~~PERIODICAL DEPARTMENT~~

SAN FRANCISCO HISTORY ROOM

SAN FRANCISCO PUBLIC LIBRARY

VITA SINE LITERIS MORS EST

Book No. f621.12 P11 18

Accession 168055

NOT TO BE TAKEN FROM THE LIBRARY

FORM NO. 37 2M-5-21

~~PERIODICAL DEPARTMENT~~

Digitized by the Internet Archive
in 2010 with funding from
San Francisco Public Library

http://www.archive.org/details/pacificmarinerev1821paci

INDEX FOR 1921

PACIFIC MARINE REVIEW

(Note: References are to month and page)

- Accident Record, A Shipbuilding Plant's........Oct. 635
- Acme Gas Engine, Test Performance of a 20 H. P., Using a Mixture of Alcoline in the Fuel, by D. W. & R. Z. Dickie.May 55
- Additional Machine Tools in San Francisco Plant (United Engineering Co.)........Mar. 195
- Admiral Line Expansion........Aug. 489
- Admission Day in California, 1850—See Argoes of the Argonauts
- Airco Factory, New (Air Reduction Sales Co.)........Jan. 48
- Air Seasoning—A Study of Its Application in the Lumber Business (Forest Products Laboratory)........Dec. 58
- Alca, Spanish Diesel-Engined Coaster (See also Kitchen Rudder).Sept. 88
- Alexander, J. W. Secretary of Commerce—Our Inland Waterways in Relation to the American Merchant Marine........Jan. 3
- Aliens—See Immigration
- Allen, A. P. (Federal Shipbuilding Co.)........Apr. 223
- "All Hands"—A Message from the Pacific American Steamship Association and the Shipowners' Association of the Pacific Coast to Their Employes........Oct. 579
- Alloy Research........Feb. 75
- America, S. S., Reconditioned........Sept. 56
- American Marine Manager, An (Robert L. Hague)........Mar. 144
- American Merchant Marine, The, by Albert D. Lasker........Nov. 637
- American Shipping ("Ship American Goods in American Ships")May 272
- Anchors and Anchor Chains, by A. J. Dickie........Jan. XXXI
- Anderson, J. Herbert, President Anderson Overseas Corp.—The St. Louis World Trade Cruise—The Past and Present of America's Foreign Trade........Nov. 653
- Andrew Jackson, Medium Clipper Ship, History of, by F. C. Matthews........Nov. 647
- Annie Johnson, Renewing the........Jan. 40
- Anning, The Yangtse Steamer........May 295
- Appeal from the Middle West, An—Interior Chambers of Commerce Interested in the Success of the American Merchant Marine........Nov. 641
- Appeal to Employes, An ("Safety First"), by R. M. MacLeod. Safety Engineer Los Angeles Shipbuilding & Drydock Co...Oct. 636
- Application of the Winton Diesel Electric Drive to Ocean Liners, by R. Z. Dickie........Feb. 60
- Appraisal of Terminal Properties, by H. McL. Harding........Apr. 228
- Arconstruct Hullfin Ferry Boat Poughkeepsie, The Diesel Electric, by C. V. S. Wyckoff........Nov. 665
- Argoes of the Argonauts, The (Vessels in San Francisco Bay September 9, 1850)........Sept., following ad. page 46
- Arnott, David—Rules and Regulations for Freeboard........Jan. 35
- Asano Docks, New........Jan. 31
- Associations and Conferences, Pacific Merchant Marine:
  - Pacific American Steamship Association........Jan. XXVI
  - Shipowners' Association of Pacific Coast........Jan. XXVII
  - Northwest Steamship Managers' Association........Jan. XXVIII
  - Pacific Westbound Conference........Jan. XXIX
  - Shipping Board Conferences........Jan. XXX
- Atlas Engine, New........Jan. 37
- Atlas Valve Absorbs "Ideal" Governor........Apr. 66e
- Attention to Detail Brings Success, by Sea Flame........May 283
- Australia, Government Shipbuilding in, by Trade Commissioner A. W. Ferrin, Melbourne (Compiled from Commerce Reports)........July 418
- Automatic Starter for Squirrel Cage Motors, New........Nov. 55
- Auxiliaries (See Electric Auxiliaries on Shipboard):
  - Hints on the Care of Auxiliaries
  - Electricity Applied to Ship Auxiliaries
  - Auxiliary Steamer Victoria
  - Markey Electric Auxiliaries
- Auxiliary Steamer Victoria, The, by John L. Bogert........Nov. 661

- Baker, Fred L.........Feb. 71
- Balliet, Letson:
  - Stabilizing the Shipbuilding Industry—I........May 285
  - Stabilizing the Shipbuilding Industry—II........June 352
- Ball Mills and Crushers........Dec. 60
- Baltimore City Fire Boat Torrent........Dec. 723
- Barges, Electric Steering Gear For........Feb. 56
- Benson, Admiral W. S.—The Marine Wage Situation........June 336
- "Bethlehem-Frear" Combination Steamers for Coal and Ore....May 281
- "Bethlehem-Frear" Combination Ore and Oil Steamer, by Hugo P. Frear........Apr. 197
- Bethlehem Delivers Tankers (Sparrows Point)........July 415
- Bethlehem Combination Steering Gear........Sept. 58
- Bill of Lading (See Marine Insurance); Bills of Lading and Insurance Claims........June 366
- Biturine, Thirty-five Miles of Ships Have Used........Jan. 54
- Blow-off Cock, The:
  - The Cost of Ocean Freight from a Marine Engineer's Standpoint........Oct. 598
  - One Hundred Years Behind the Times........Dec. 730
  - High Operating Costs........Dec. 731
- Blowpipe Test, A (Bureau of Standards—A. S. M. E.)........Oct. 634
- Boat Handling System, A New (Davits)........Jan. 52
- Bogert, John L.:
  - From Steam Turbine to Diesel Electric........Oct. 592
  - The Auxiliary Steamer Victoria........Nov. 661
  - Warping of Gear Cases........Dec. 725
- Bohemian Club Launching, The........June 340b
- Boiler Scale and Soot, Heat Losses from, by F. A. Page......Aug. 59
- Bond Buying Plan, New (Western Electric Co.)........Jan. 21
- Bolting-up Machine, A New........July 450
- Boobyalla (M. S.)........Mar. 60
- Book Reviews........Feb. 107 & 55
- Book Reviews........Apr. 234 & 66f
- Book Reviews........June 355
- Book Reviews........Aug. 484
- Book Reviews........Sept. 539
- Book Reviews........Oct. 632
- Book Reviews........Nov. 696
- Boring, Drilling and Milling Machines........Oct. 44
- Berton Braley—The Tug(verse)........Jan. 5
- Breathing Apparatus, Rescue, by Willard W. Keith........Feb. 52
- Bridge Model, A Unique........Sept. 52
- Brorsen, Willard A.—The Photostat........Oct. 47
- Bunkering Facilities, New........Feb. 105
- Bunker Oil Liquid, Keeping (RanD System)........Apr. 66k
- Bureau of Standards—A Blowpipe Test........Oct. 634
- Burmeister & Wain Single Screw Motorship, The First—(Leise-Maersk)........Nov. 667
- Burning Fuel Oil (verse)........Oct. 599
- Butterfly Map, Sea Routes Shown On........Jan. III

- Cable Project in Sweden, American........Feb. 106
- Cahill, B. J. S., F. R. G. S.:
  - Sea Routes Shown on Butterfly Map........Jan. III
- Calendars for 1921........Feb. 131
- California, The:
  - Editorial........Sept. 522
  - Our Cover........Oct. 579
  - See also The Pneumercator System on the U. S. S. California
- California Industries, Some Observations on, by Frank R. Devlin........Aug. 59
- Californian and Missourian, The Motorships........Dec. 718
- Canadian Importer, Saving the, by G. W. Gove, Master of Tug Sea Lion........Oct. 621
- Carpenter, George B.:
  - Commercial Watersheds and the Shipping Board........May 270
- Case, A. F., Engineer Wellman-Seaver-Morgan Co.:
  - A 250-ton Ship Crane for the U. S. Navy........Jan. 29
- Castings, Centrifugal........Sept. 570
- Cesser and Lien—A Discussion of the Clause in Charter Parties, by Harold M. Sawyer........Feb. 67
- Chain, Largest Cast Steel........June 371
- Chalkley, A. P.:
  - The Double Acting Diesel Engine........Mar. 149
- Challenge Cup Race........Aug. 43
- Challenge of the Seas, The (verse), by Perrin Holmes Lowrey..Jan. XXX
- Chamberlain, Eugene Tyler—A Great American Legal Navigator........Dec. 717
- Chapman, W. A., Manager Western Department Fireman's Fund Insurance Company—The Great Lakes Ore Traffic........May 293
- Charter Parties—See Cesser and Lien
- Checking the Passing Buck, by Harwood Frost, President Brown Portable Conveying Machinery Company........Jan. 25
- Chief Engineer, The, by Sea Flame........Apr. 207
- China Mail, Coastwise Laws........Apr. 250
- China Mail, Coastwise Laws........Sept. 507
- China Mail, Coastwise Laws........Oct. 607
- City Gas for Steel Cutting........Apr. 64
- Cleopatra's Barge, The, by J. M. Lydgate........Aug. 469
- Clippers, In the Days of the........Oct. 580
- Clipper Ships (See Clippers, In the Days of):
  - Easting Down
  - Easting Down, Running the
  - Three Brothers, The Clipper Ship
  - Andrew Jackson, Medium Clipper Ship, History of the
  - Wooden Ship, Our Greatest
  - Great Republic, The Clipper Ship
- Coaling Arrangement, An Efficient........Nov. 52
- Coast Guard:
  - Coast Guard to the Navy, Transfer of the, by John W. Kean, I........Feb. 89
  - Coast Guard to the Navy, Transfer of the, by John W. Kean, II........Mar. 138
  - Coast Guard Cutters, New........Oct. 600
- Cobb, Professor John N.—See Fisheries, A College of
- Cobbledick Removal........June 58
- "Codem," A Marine Insurance Code........Apr. 66f
- Cofer, L. R.: Commercial Honesty........Jan. XXXIII
- Colloidal Fuel........July 394
- Combination Ore and Oil and Ore and Coal Steamers — See "Bethlehem Frear;" also G. Harrison Smith
- Commercial Honesty, by L. R. Cofer........Jan. XXXIII
- Commercial Watersheds and the Shipping Board, by George B. Carpenter, Foreign Trade Adviser Merchants' National Bank, Los Angeles........May 270
- Comparative Statement of Engineers' Wages 1914-1921........May 267
- Compressor, A New Type of Belt-Driven Air........Nov. 50
  - G-R Regenerative........May 60
- Condenser, Multiwhirl Subcooling........Feb. 56
- Conferences—See Steamship Conferences
- Connell, E. L., Chief Engineer Van Dorn Electric Tool Co.:
  - Maintenance of Portable Electric Drills........May 59
- Contracts, United States Government........Sept. 45
- Contracts, United States Government........Oct. 586
- Conversion Plan for 8800-Tonners, by John L. Bogert........Oct. 592
- Conveying and Elevating Machinery in the Sugar Warehouse at Crockett, by Henry T. Hesselmeyer........Sept. 531
  - See also Sugar Refinery in the World, The Largest
- Cooling Compound Feed System, Efficient........May 56
- Cornett, Gardner:
  - The Pneumercator System on the U. S. S. California......July 451
- Cost of Ocean Freight from a Marine Engineer's Standpoint, by Sea Flame........Oct. 598
- Costs (See also Operating Costs)........Apr. 208
  - Shipbuilding Costs........Sept. 423
  - Cutting Costs in Handling Cargo........Oct. 48
- Cover, Our—(West Faralon)........Sept. 523
  - (U. S. S. California)........Oct. 579
- Crane:
  - A 250 - ton Ship Crane for the U. S. Navy, by A. F. Case, Engineer Wellman-Seaver-Morgan Co.........Jan. 29
  - Huge Pontoon Crane........Jan. 30
  - Crane Gear, A New........June 371
- Crankless Reciprocating Engine, A (Michell engine)........Oct. 599
- Credits, Long Time—Their Value to the Exporting Manufacturer, by George R. Meyercord........July 396
- Cuban Situation, The........May 273
- Cutting Cast Iron........Nov. 699
- Cutting Cast Iron........Jan. 48
- Cutting Cast Iron........Feb. 62

- Cutting Costs in Handling Cargo ..... Oct. 48
- Cutting Steel, City Gas for ..... Apr. 64
- Cylinder Lubrication with Superheated Steam ..... May 106

- Davits—Boat Handling System, A New ..... Jan. 52
- Day, Thomas Fleming:
  - The Sailor of the Sail (verse) ..... Oct. 21
- Deck Machinery—See Electric Deck Machinery
- Deck Pastime, A New ..... July 66a
- Dedication to Pacific American Steamship Association ..... Jan. 1
- DeLaval Double-Reduction Gears and Turbines, 10,500-ton Tank Steamers Refitted with ..... Sept. 50
- De Luxe Express Passenger and Freight Service, A ..... June 329
- Denman, William:
  - The Motorship Project—Statement Before Walsh Committee ..... Feb. 84
- Destroyers, Four Miles of ..... May 268
- Dettmer, John R. F.: Self-Trimming Vessels ..... May 287
- Devlin, Frank R.:
  - Some Observations on California Industries ..... Aug. 59
- Developments in Marine Insurance, by Charles F. Howell ..... Jan. 41
- Developments in Marine Insurance, by Charles F. Howell ..... Feb. 101
- Developments in Marine Insurance, by Charles F. Howell ..... Mar. 173
- Developments in Marine Insurance, by Charles F. Howell ..... Apr. 235
- Dickie, A. J.:
  - The Good Ship Pacific Marine ..... Jan. II
  - Anchors and Anchor Chains ..... Jan. XXXI
  - Marine Engineering Trends, I ..... Jan. 1
  - Marine Engineering Trends, II ..... Feb. 73
  - Some Notes on Machine Design ..... May 324
  - Port Any, U. S. A. ..... June 325
- Dickie, D. W. and R. Z.:
  - Diesel Electric Tanker Considered in Connection with Section XI of Merchant Marine Bill, I ..... Jan. 15
  - Diesel Electric Tanker Considered in Connection with Section XI of Merchant Marine Bill, II ..... Feb. 83
  - Diesel Electric Ferries for the Golden Gate Ferry Co. ..... May 279
  - Test Performance of a 20 H. P. Acme Gas Engine Using a Mixture of Alcoline in the Fuel ..... May 55
  - New Motor Tug for Harbor Board ..... Nov. 57
- Dickie, R. Z.:
  - Application of the Winton Diesel Electric Drive to Ocean Liners ..... Feb. 60
  - Motorship Era ..... Aug. 472
  - Motorship Building in Germany ..... Oct. 591
  - Some Observations on the Kitchen Rudder ..... Nov. 664
- Diesel Electric:
  - Arconstruct Hullfin Ferry Boat Poughkeepsie, by C. V. S. Wyckoff ..... Nov. 665
  - Ferries for the Golden Gate Ferry Co., by D. W. and R. Z. Dickie ..... May 279
  - From Steam Turbine to, by John L. Bogert ..... Oct. 592
  - Tanker Considered in Connection with Section XI of the Merchant Marine Bill, by D. W. and R. Z. Dickie, I ..... Jan. 15
  - Tanker Considered in Connection with Section XI of the Merchant Marine Bill, by D. W. and R. Z. Dickie, II ..... Feb. 83
- Diesel Engines—See Oil Engines and Motorships
- Diesel Engine, Winton ..... June 60
- Diesel Ship Maneuvering, by Alexander McNab (Kitchen Rudder) ..... Dec. 760
- Directory of Pacific Coast Operators ..... Jan. V
- Directory of Pacific Shipbuilders ..... Jan. XXXIX
- Docks—See Material Handling; also Terminals
- Dollar, Robert: Steamer Service on the Yangtze ..... Jan. 11
- Doris Crane ..... Jan. 52
- Double Acting Diesel Engine, by A. P. Chalkley ..... Mar. 149
- Doxford Marine Oil Engine ..... Jan. 19
- Dreadnought, Uncle Sam's Latest (U. S. S. Washington) ..... Oct. 601
- Drills:
  - Maintenance of Portable Electric Drills, by E. L. Connell ..... May 59
  - A New Drill Chuck ..... July 452
  - Making a Twist Drill Live Up to Its Reputation, by H. Wells ..... Jan. 45
- Dry Docks:
  - Los Angeles' Great Dry Dock ..... Mar. 167
  - Dry Dock Rate War ..... July 409
- Dual Carburetor System on Liberty Twin Engines ..... Feb. 59
- Duct Keel ..... Nov. 60

- Early Steam Navigation on the Pacific, by Elwin M. Eldredge ..... July 398
- Easthampton Radio Station ..... Jan. 38
- Easting Down ..... Oct. 580
- Ebey, H. H.—A Hearty Endorsement (editorial) ..... Oct. 586
- Editorials:
  - "Et tu, Brute?" (Lloyd's); American Classification; Some Traffic Figures; Commissioner of Navigation; The Lighthouse Service; Steamboat Inspection Service; Coast and Geodetic Survey ..... Jan. 8-10
  - Financial Juggling; Repairs; Damages by Government Agencies; A Unique Contest; An Interesting Decision, by C. H. Calhoun; A Helpful Service; Alloy Research ..... Feb. 74-75
  - Ship Prices; A New Shipping Board; A Boost; Foreign Trade Convention; State Nautical School; Duty, Right and Privilege; Evils of Double Taxation; Ministers from Diplomatic Service; Wages and Costs ..... Mar. 140-142
  - American Freight for American Ships; Foreign Trade Bureau Organized; U. S. Salvage Association; The Chief, Engineer, by Sea Flame ..... Apr. 206-207
  - An American Message for American Shippers; The Shippers' Share; American Insurance for American Ships; Bare Boat Charter and Ship Prices; Foreign Trade Convention; Motorship Suggestion; Yachting ..... May 264-266
  - German Competition; American Maritime Policy; Government Service to Business; The San Francisco Harbor Bill ..... June 334-335
  - New Shipping Board; The Army Transport Service; Selling Ships; Eight Hours at Sea; Ship Names ..... July 400-403
  - The Shipping Board; At Washington; The Marine Engineers ..... Aug. 464
  - U. S. Government Contracts (foreword); The California; Panama Canal; Ocean Fruit Traffic; Shipbuilding Costs; Ship Prices; Do You Know—; Our Cover ..... Sept. 522-523
  - What Is Wrong with the American Merchant Marine?; World Shipping; One Way to Help; Analysis of Shipping Figures; Unemployment; Government Contracts; Scientific Employment Service; A Hearty Endorsement (H. H. Ebey) ..... Oct. 584-586
  - The Shipping Board Task; Transportation Problems; "Business Is Business," by Berton Braley (verse); New Record for San Francisco Mint; Public Buildings or Public Bread Lines?; Fifteen Years Ago; Unemployment ..... Nov. 650-65
  - American Shipbuilding; The Naval Architects and Marine Engineers; New Motorships; The Leviathan; American Marine Week ..... Dec. 714-71
- Edward Sewall (sailing ship)—A Modern Flying Dutchman ..... Aug. 46
  - Making the Golden Gate ..... Dec. 41
- Edwards, W. D., Manager Hospital and Safety Department, Moore Shipbuilding Co.
  - Self Insurance as Conducted by the Moore Shipbuilding Company ..... June 349
- Eldredge, Elwin M.:
  - Early Steam Navigation on the Pacific ..... July 398
- Electric:
  - Auxiliaries on Shipboard ..... Feb. 100
  - Deck Machinery ..... May 280
  - Deck Machinery on the Kennecott ..... June 340d
  - Annealing Furnace, Large ..... May 52
  - Drive, Japan Adopts ..... July 414
  - First Turbo-Electric Passenger Ship ..... Jan. 22
  - Fish Barrage ..... Oct. 57
  - Power for Deck Machinery, by Reginald Trautschold ..... Mar. 54
  - Combination Tool, A New ..... Jan. 6
  - Steering Gear for Barges ..... Feb. 56
- Electrical:
  - Deck Machinery in the Navy ..... Feb. 95
  - Installations on Shipboard—Recommended Practice for Marine Rules ..... Sept. 540
  - Smelting ..... Aug. 485
  - Terminal Facilities, by Commander C. S. McDowell, U. S. N. ..... Mar. 160
- Electricity Applied to Ship Auxiliaries, by H. L. Hibbard ..... Mar. 133
- Elevator, Bulk Cargo ..... Jan. 28
- Engine:
  - Acme Gas Engine ..... May 55
  - A Crankless Reciprocating (Michell) ..... Oct. 599
  - Room Problems ..... Mar. 52
  - Ship Drives—A Discussion of Reciprocating, Turbine and Diesel Engines, by H. Haas ..... Oct. 58
- Engineering—See Marine Engineering
- Engineering, Ridiculous, by Sea Flame ..... Aug. 476
- Enterprise Diesel Engine, New ..... July 52
- Equipment of the Curtis Steam Yacht Lyndonia ..... Mar. 191
- Erie Steam Drop Forging Hammer ..... Apr. 52
- European Marine Developments ..... Jan. 32
  - European Marine Developments ..... Feb. 92
  - European Marine Developments ..... Mar. 163
  - European Marine Developments ..... Apr. 221
  - European Marine Developments ..... May 290
  - European Marine Developments ..... June 357
  - European Marine Developments ..... July 416
  - European Marine Developments ..... Aug. 482
  - European Marine Developments ..... Sept. 536
  - Impressions of a Californian in Britain ..... Oct. 595
  - Impressions of a Californian Abroad ..... Dec. 722
- Expansion Joint, New Type Low Pressure ..... Oct. 52
- Express Freighters (Matson Co. Manulani and Manukai) ..... July 393

- Fabricated Steel Buildings ..... Feb. 62
- Far East, In the ..... June 340c
- Farrell, Andrew
  - Some Humble Suggestions ..... Jan. XXXIV
  - Island Wrecks, IX ..... Jan. 20
  - Island Wrecks, X ..... Apr. 217
- Farwell, R. F.:
  - Knowing the Rules of the Road ..... Dec. 711
- Federated American Engineering Societies—Scientific Employment Service ..... Oct. 586
- Ferrin, A. W., Trade Commissioner, Melbourne:
  - Government Shipbuilding in Australia ..... July 418
- Fire at Sea, Minimizing the Danger of ..... Aug. 64
- Fire Boat—See Baltimore City Fire Boat Torrent
- Fish:
  - Pacific Coast Fisheries — California, the Premier Fishing State, I ..... Sept. 517
  - Pacific Coast Fisheries — California, the Premier Fishing State II ..... Oct. 573
  - Pacific Coast Fisheries—Washington, III ..... Nov. 656
  - An Electric Fish Barrage ..... Oct. 575
  - A College of Fisheries ..... Nov. 660
  - Subchaser Now Fisherman ..... Nov. 696
  - Diesel Power for Fish Boats ..... Dec. 763
- Flagship of American Football, The ..... Nov. 643
- Fleming, Dr. John Ambrose:
  - A Well Deserved Honor ..... Sept. 539
- Floating Dock, New 6000-ton ..... Aug. 481
- Flying Dutchman, A Modern ..... Aug. 463
- Foreign Trade Council Speaks—Final Declaration of the Eighth National Foreign Trade Convention ..... July 389
- Forty Freighters Finished ..... Feb. 95
- Foster Turret Lathes ..... Mar. 196
- Four Miles of Destroyers ..... May 268
- Four Notable Sea-going Tugs ..... Mar. 165
- Frank G. Drum (tanker) ..... May 269
- Frear, Hugo P.:
  - "Bethlehem-Frear" Combination Ore and Oil Steamer ..... Apr. 197
- Freeboard, Rules and Regulations for ..... Jan. 35
- Free Ports and Free Zones for the United States ..... Nov. 644
- Freights—See Rates and Freights
  - The Cost of Ocean Freight from a Marine Engineer's Standpoint ..... Oct. 598
- Frey, A. J.: ..... Oct. 577
- Frost, Harwood, President Brown Portable Conveying Machinery Company:
  - Checking the Passing Buck ..... Jan. 25
- Fuel Oil:
  - Fuel Oil Situation ..... Jan. 38
  - Oil Production Grows ..... Jan. 52
  - Fuel Oil and Coal ..... Feb. 127
  - Fuel Oil Consumption ..... June 373
  - Colloidal Fuel ..... July 394
  - Oil Bunkering Facilities ..... Sept. 52
  - Burning Fuel Oil (verse) ..... Oct. 599
  - Japan and Fuel Oil ..... Dec. 746
- "Full and By"—A Message from the Waterfront Employers' Union ..... June 340c
- Full Speed Ahead ..... Jan. 53-64
  - Full Speed Ahead ..... Feb. 108-128

  Machining with a Flame..........Mar. 194
  Additional Machine Tools in San Francisco Plant..........Mar. 195
  Foster Turret Lathes..........Mar. 196
  Pacific Worm Gears..........Mar. 196
  Engine Room Problems, by T. Alfred Porter..........Mar. 52
  Electric Power for Deck Machinery, by Reginald Trautschold..........Mar. 54
  New Compressor Installations..........Apr. 260
  Huge Gate Valves..........Apr. 260
  Efficient Valve Design on Tosi Engines..........Apr. 51
  Southern Pacific Shops..........Apr. 51
  Vulcan Refrigerating Equipment..........Apr. 52
  Special Riveter for Marine Boiler Construction..........Apr. 52
  Pollak Offices Moved..........Apr. 52
  Erie Steam Drop Forging Hammer..........Apr. 52
  California Machinery Company..........Apr. 53
  Improved Twist Drill Grinder, An..........Apr. 54
  Sixteen-ton Propeller Wheel Under 15-ton Shaw Electric Traveling Crane..........Apr. 54
  Some Notes on Machine Design, by A. J. Dickie..........May 324
  Cost of Changing to the Metric System..........May 52
  Wrecked Shear Reclaimed..........May 52
  Large Electric Annealing Furnace..........May 52
  Notable Welding Repair..........May 54
  Two Notable Features in This Repair..........May 54
  New Structural Shop at Mare Island..........June 367
  DeLuxe Piston..........June 368
  Westinghouse Plants, New..........June 369
  Portland, New Shop at..........June 370
  Crane Gear, A New..........June 371
  Largest Cast Steel Chain..........June 371
  Gas Comparisons, Some..........June 372
  Rigging Record, A..........June 372
  Floating Machine Shop, A..........July 449
  Bolting-up Machine, A New..........July 450
  Pneumercator System on the U. S. S. California..........July 451
  Expansion in a Portland Foundry..........Aug. 57
  Some Observations on California Industries, by Frank R. Devlin..........Aug. 59
  Heat Losses from Boiler Scale and Soot, by F. A. Page..Aug. 59
  Large Oxyacetylene Gas Plant..........Sept. 569
  Universal Valve Facing Machine..........Sept. 570
  Centrifugal Castings..........Sept. 570
  Reclaiming Waste..........Sept. 571
  Oxyacetylene Versus Dynamite..........Sept. 571
  See also Machinery and Equipment.
Pacific Mail Report..........Apr. 250
  Reorganization..........Oct. 606
Pacific Shipbuilding—See Full Speed Ahead.
Page, F. A.:
  Heat Losses from Boiler Scale and Soot..........Aug. 59
Panama Canal:
  Panama and the British..........Oct. 54
  Fiscal year..........Oct. 610
  Fiscal year..........Nov. 674
  Fruit Cargoes..........Apr. 255
  Fruit Cargoes..........July 433
  Fruit Cargoes..........Oct. 626
  Fruit Cargoes..........Dec. 734
  Japanese Use of..........Sept. 547
  Libel (A Just Decision)..........June 370
  Lumber Shipments by..........June 387
  Philippines, Coastwise Laws..........Nov. 672
  Shipbuilding at Balboa..........July 419
  Statistics, More Canal..........Nov. 676
  Tolls Remission..........May 315
  Tolls Remission..........Nov. 669
    Canada and..........Oct. 609
    Canada and..........Dec. 737
  Traffic..........Apr. 215
  United States Use of..........Dec. 740
Parcel Post—See International Parcel Post.
Pawling & Harnischfeger Office Moved..........June 58
Photostat, The, by Willard A. Brorsen..........Oct. 47
Pictures (verse)..........May 110
Pierce, G. A.:
  Deck Machinery of the William Penn..........Dec. 719
Pilferage—See Marine Insurance.
Piston, The De Luxe..........June 368
Pneumercator System on the U. S. S. California, by Gardner Cornett..........July 451
  Installation, Notable (on S. S. Paris)..........Nov. 56
Pollak Offices Moved..........Apr. 52
Port Any, U. S. A..........June 325
Port Authorities, International Conclave of..........Oct. 604
Port Development:
  Projects on Pacific Coast..........Jan. 27
  New Asano Docks..........Jan. 31
  New Pier at Seattle..........Jan. 33
  Harbor Improvements..........Jan. 61
  At Portland..........Feb. 97
  Naval Base (Alameda)..........Feb. 105
  Port Development..........Feb. 124
  Port and Harbor Development..........Mar. 157
  Electrical Terminal Facilities, by Commander C. S. McDowell, U. S. N...........Mar 160
  New Drydock at Fore River...........Mar. 162
  Pacific Coast Port Work..........Mar. 166
  Trans-Pacific Harbor Development..........Mar. 167
  Port Contract Signed (Progreso, Mexico)..........Mar. 181
  Leixoes (Portugal) Work Planned..........Mar. 184
  Port Improvements..........Apr. 257
  New Orleans Ship Canal..........May 291
  Free Ports and Free Zones, by Henry M. Robinson..........Nov. 644
Porter, T. Alfred:
  Operating Costs..........Feb. 96
  Engine Room Problems..........Mar. 52
Portland:
  Newest Terminal..........Sept. 533
  Traffic Department..........Sept. 572
  Port Development..........Feb. 97
  New Shop at..........June 370
Poughkeepsie, The Diesel Electric Arconstruct-Hullfin Ferry Boat, by C. V. S. Wyckoff..........Nov. 665
Power Cross Feed for Turret Lathe, New..........Nov. 699
Prayer (verse), by John Masefield..........May 107
Preliminary to a Promise, The, by H. A. B. Sneve..........Dec. 761
Preservo—A Well Distributed Product..........Feb. 62
Prices, Ship..........Sept. 523
Progress in Motorship Building. See Motorship Building.
Propelling Machinery of U. S. S. Tennessee..........Aug. 486
Pump, A New Cargo..........Mar. 193
Purchasing Service, Technical..........Apr. 64

Radio:
  New Shop for Radio Specialties..........Jan. 24
  Easthampton Radio Station..........Jan. 38
  David Sarnoff (Radio Corporation)..........July 447
Railroad Rates:
  Import and Export..........Jan. 50, 51
  Import and Export..........Apr. 253
  Import and Export..........July 433
  Import and Export..........Aug. 495, 496
  Import and Export..........Sept. 563, 564
  Import and Export..........Dec. 744
    Cotton..........Nov. 693
    Cotton..........Dec. 744
  Intercoastal Competition..........Oct. 625
RanD System—Keeping Bunker Oil Liquid..........Apr. 66k
Rastall, Dr. B. M.:
  The Greater San Francisco..........May 261
Rates and Freights—See With the Exporters and Importers, Full Speed Ahead Section; also Railroad Rates; Steamship Rates.
  Drydock Rate War..........July 409
Refrigerator Vessels—See Panama Canal, Fruit Cargoes.
Repairing Canvas Covered Boats, New Method of..........Nov. 58
Repairs on a Towing Machine..........Nov. 698
Rescue Breathing Apparatus, by Willard W. Keith..........Feb. 52
Ridiculous Engineering, by Sea Flame..........Aug. 476
Rigging Record, A..........June 372
Robinson, Henry M.:
  Free Ports and Free Zones for the United States..........Nov. 641
Rohlfs, J. C.:
  Ships' Officers' Salaries—A Few Comparisons Between American and British Merchant Marine Practice.......Jan. XXXVII
  Shipping Strike, The..........June 337
Rolph, George M.:
  Marine Borers at Crockett..........Aug. 479
  See also The Largest Sugar Refinery in the World.
Rope—How Manila Rope Is Made and Used..........Sept. 48
Rules and Regulations for Freeboard, by David Arnott..........Jan. 35
Rules of the Road, Knowing the, by R. F. Farwell..........Dec. 711

Safe Deposit Vault, Marine Unsinkable..........Nov. 61
Safety at Sea..........Oct. 588
Sailing Ships—See Edward Sewall; A Staunch Old Windjammer, (E. R. Sterling); The Sailor of the Sail (verse); Clipper Ships.
Sailor of the Sail, The (verse), by Thos. Fleming Day..Oct. Frontispiece
Salaries, Ships' Officers', by J. C. Rohlfs..........Jan. XXXVII
Sal Log, The..........May 61
Salt Detector, The McNab..........Nov. 52
Salvage:
  U. S. Salvage Association (editorial)..........Apr. 207
  An Interesting Salvage..........Dec. 763
Samuels, Frederick S.:
  Subsidies..........Feb. 70
San Francisco Bay, Vessels in, Sept. 9, 1850..........Sept. Following ad, page 46
San Francisco Firm Invades East Coast..........May 61
San Francisco, The Greater, by Dr. B. M. Rastall..........May 261
San Lorenzo, S. S., The Reconditioned..........May 297
Saving the Canadian Importer, by G. W. Gove, Master Tug Sea Lion..........Oct. 621
Sawyer, Harold M.:
  Cesser and Lien, A Discussion of the Clause in Charter Parties..........Feb. 67
Schat, Ane P. (Schat davit)..........Jan. 52
Schwab, Charles M.:
  An Appreciation..........Feb. 69
  A Testimonial..........June 340a
  In Recognition of Achievement..........Dec. 716
Scout Cruisers, The New..........Feb. 94
Scythia—The Most Modern Steamer..........Oct. 633
Sea Flame:
  The Chief Engineer..........Apr. 207
  Attention to Detail Brings Success..........May 283
  Hints on the Care of Auxiliaries..........June 358
  Marine Turbine Operation..........July 412
  Ridiculous Engineering..........Aug. 476
  The Cost of Ocean Freight from a Marine Engineer's Standpoint..........Oct. 598
  High Operating Costs..........Dec. 731
Seattle, New Pier at..........Jan. 33
Self-Trimming Vessels, by John R. F. Dettmer..........May 287
Sheedy, Joseph E...........Oct. 587
Shipbuilder, An Optimistic (J. J. Tynan)..........Aug. 465
Shipbuilding:
  Japanese:
    Future of..........May 321
    Government Policy..........Apr. 251
    Strikes..........Sept. 561
  United States:
    See Full Speed Ahead in each issue.
    Wage Cuts..........Aug. 507
  See also Stabilizing the Shipbuilding Industry, by Letson Balliet; Australia, Government Shipbuilding In; Panama Canal; Shipbuilding Costs (editorial).
Shipbuilding Plant's Accident Record, A..........Oct. 635
Ship Drives, by H. Haas..........Oct. 58
Ship Lighting Sets, Automatic..........July 452
Ship Machinery, Service for..........Aug. 65
Shipowners' Association of the Pacific Coast..........Jan. XXVII
  "All Hands"..........Oct. 579
Shipping:
  Figures, Analysis of (editorial)..........Oct. 585
  World Shipping..........Oct. 584
Shipping Board—See United States Shipping Board.
Shipping Industry of Norway—See Norway.
Ship Prices (editorial)..........Sept. 523
Ships' Officers' Salaries, by J. C. Rohlfs..........Jan. XXXVII
Shipyard Data—See Full Speed Ahead.
Shop at Mare Island, The New Structural..........June 367
Shop Work on Large Engines..........Nov. 697
Smith, C. Fox:
  Lee Fore Brace (verse)..........Feb. 55
Snaps Along the Waterfront (pictorial)..........June 340

Snaps Along the Waterfront (pictorial)........July 445
Snubbing Device, New........July 418
Some Humble Suggestions, by Andrew Farrell........Jan. XXXIV
Some Notes on Machine Design, by A. J. Dickie........May 324
Some Observations on California Industries, by Frank R. Devlin........Aug. 59
Somersetshire, M. S.........Oct. 594
Southern California Steel Plant, New........Nov. 54
Southern Pacific Shops........Apr. 51
Southwestern Shipbuilding Plant, Aeroplane View of........Feb. 85
"Southwestern" Tankers, Two........Apr. 231
St. Louis:
  World Trade Cruise........Nov. 653
  Conditioning for World Trade Cruise........Nov. 61
Stabilizer at Work, A........June 64
Stabilizing the Shipbuilding Industry, by Letson Balliet, I...May ..285
Stabilizing the Shipbuildng Industry, by Letson Balliet, II.....June 352
Stamp Electric Hoists........June 66
Standard Oil Tankers, New........Sept. 538
Steamer or Motorship—An Instructive Comparison of Earning Capacities........July 405
Steamer Service on the Yangtze, by Robert Dollar........Jan. 11
Steamship Conferences:
  Associations and........Jan. XXVI
  Australasian Formed........Sept. 565
  List of........Feb. 117
  Pacific Westbound Breaks........Mar. 182
  Pacific Westbound Re-formed........Apr. 249
  Pacific Westbound Breaks........May 316
  Pacific Westbound Dissolved........June 385
  Three Reorganized........July 427
  More Trouble........Aug. 503
  Seattle Disbands........Sept. 564
Steamship Rates:
  European Reductions........Feb. 115
  Foreign Exchange in........Feb. 114
  Fruit Reductions........Apr. 256
  Fruit Reductions........May 320
    Ruling on........June 388
  Hawaiian........Feb. 115
  Import Commodity........Jan. 49
  I. C. C. to Take Hand........Nov. 671
  Lumber........May 319
  Lumber........Oct. 626
  Lumber........Nov. 691
  Oriental, Division of Receipts........Mar. 183
  Oriental, Division of Receipts........Apr. 249
    War........July 429
    Rates Increased........Nov. 691
  Steel Breaks........Sept. 565
  Tendencies........Dec. 742
  Wars........Dec. 743
Steamship Strike........June 373
Steamship Strike........July 429
Steamship Strike........Aug. 501
Steamship, Wages Compared........Dec. 739
Steel Buildings, Fabricated........Feb. 62
Steel Cutting, City Gas for........Apr. 64
Steering Gear for Barges, Electric........Feb. 56
Steering Gear, Bethlehem Combination........Sept. 58
Sterling, E. R.—See Sailing Ships.
Steel Stern Frames, Forged........Feb. 105
Stewart, Myron B.:
  National Marine Exposition........Mar. 169
Strike, The Shipping, by J. C. Rohlfs........June 337
  See also the Marine Wage Situation.
Subchaser Now Fisherman........Nov. 696
Subsidies, by Frederick S. Samuels........Feb. 70
Suez Canal........Dec. 738
Sugar Refinery, The Largest in the World........Aug. 466
Superheated Steam........Jan. 34
  Cylinder Lubrication with........May 106
Superheater:
  Locomotive Superheater Expansion........Apr. 63
  Offices Moved........June 58
  Steam Superheaters, by H. B. Oatley........Dec. 726
Switchboard, Safety-First Marine........Oct. 53

Tahiti, S. S.—See Two Large Oil Installations.
Tamaha, S. S.—See Engine Room Problems.
Tampa, U. S. C. G. Cutter—See Coast Guard.
Tanker:
  New Record (Frank G. Drum)........May 269
  Two "Southwestern"........Apr. 231
  New Standard Oil........Sept. 538
  10,500-ton Tank Steamers Refitted with De Laval Double-Reduction Gears and Turbines........Sept. 50
Technical Purchasing Service........Apr. 64
Telephone Post Hole Auger........May 62
Tennessee, Propelling Machinery of U. S. S.........Aug. 486
Teredo Damage:
  Marine Piling Survey........Jan. 26
  Marine Borers at Crockett, by George M. Rolph........Aug. 479
  See also Sowing Rice, Reaping Fishworms (Sept., 1920, p. 105).
Terminals:
  Electrical Facilities........Mar. 160
  Appraisal of Properties, by H. McL. Harding........Apr. 228
  Appraisal of Properties........July 58
  Marine Terminals and the Motor Dray, by H. McL. Harding........Aug. 487
  Portland's Newest........Sept. 533
Test Performance of a 20 H. P. Acme Gas Engine Using a Mixture of Alcoline in the Fuel, by D. W. and R. Z. Dickie........May 55
Thau, W. E.:
  Marine Propulsion Machinery........Mar. 153
Theft and Pilferage—See Marine Insurance Section.
Thermos Box, The........Apr. 229
"Third-Class" Liners—See Liners for "Third Class."
Three Brothers, The Clipper Ship........Oct. 581
Three-Deck Cargo Steamers........June 331
Tilting and Rotary Table, New Universal........July 452
Todd Yard, Important Launching at........Jan. 7
Tools—See Pacific Machinery.
Torch—Cutting Cast Iron........Nov. 699
Tow Line, Passing a........Aug. 483
Trade Literature........Feb. 131, 58
Trade Literature........Apr. 66g
Trade Literature........June 63
Trade Literature........July 56
Trade Literature........Aug. 67
Trade Literature........Sept. 51, 58b
Trade Literature........Oct. 47, 56
Trade Literature........Nov. 59
Trade Literature........Dec. 54
Trans-Pacific Harbor Development—See Port Development.
Trautschold, Reginald:
  Electric Power for Deck Machinery........Mar. 54
Tug, The (verse), by Berton Braley........Jan. 5
Tug, A 300 H. P. Motor........June 66a
Tug for Harbor Board, New Motor........Nov. 57
Turbine to Diesel Electric, From Steam, by John L. Bogert....Oct. 592
Turbo-Electric Passenger Ship, First, by James A. Kelley......Jan. 22
Turret Lathes, Foster........Mar. 196
Twist Drill Grinder, An Improved........Apr. 54
Two Large Oil Installations (Makura and Tahiti)........Jan. 6
Two "Southwestern" Tankers........Apr. 231
Tynan, J. J.—An Optimistic Shipbuilder........Aug. 465

Union Construction Company's Shop, Some Tools in........Jan. 44
United States Salvage Association (editorial)........Apr. 207
United States Shipping Board:
  Bareboat Charter........May 315
  Bareboat Charter........Oct. 605
  Bareboat Charter........Nov. 672
  Commercial Watersheds and the Shipping Board, by George B. Carpenter........May 270
  Conferences........Jan. XXX
  Financial Juggling (editorial)........Feb. 74
  New Shipping Board (editorial)........July 400
  New European Manager (Joseph E. Sheedy)........Oct. 587
  Steamer or Motorship........July 405
  See The American Merchant Marine, by Albert Lasker, Chairman; also Progress in Motorship Building (November, 663).
United States vs. Foreign Shipping........Dec. 736
Universal Valve Facing Machine........Sept. 570
University of California—See The Flagship of American Football.
Unusual Shipment, An (yacht Idalia)........Dec. 764

Vanderbilt (Str.)—See Clipper Ship Three Brothers.
Velero—See Yachting, A Revival of.
Verse:
  Burning Fuel Oil........Oct. 599
  The Challenge of the Seas, by Perrin Holmes Lowrey.....Jan. XXX
  Easting Down, by John Anderson........Oct. 580
  Lee Fore Brace, by C. Fox Smith........Feb. 55
  Pictures........May 110
  Prayer, by John Masefield........May 107
  Running the Easting Down, by Frederic W. Wallace......Oct. 580
  The Sailor of the Sail, by Thomas Fleming Day...Oct. Frontispiece
  Tacking Off Shore........Nov. 647
  The Tug, by Berton Braley........Jan. 5
Victory, The Auxiliary Steamer, by John L. Bogert........Nov. 661
Vulcan Refrigerating Equipment........Apr. 52

Wage Situation, The Marine, by Admiral W. S. Benson.......June 336
Wages, Comparative Statement of Engineers'........May 267
Warping of Gear Cases, by John L. Bogert........Dec. 725
Washington—Uncle Sam's Latest Dreadnought........Oct. 601
Waste, Reclaiming........Sept. 571
Waterfront, Snaps Along the (pictorial)........June 340
  Snaps Along the Waterfront........July 445
Waterspouts........Apr. 220
Waterways—See Our Inland Waterways.
Welding Repair, Notable........May 54
West Chopaka (launching)........Oct. 576
West Faralon (Our Cover)........Sept. 523
Western Electric Warehouse in New York, New........Oct. 52
West Hartland Libel........July 426
  See also Governor Loss........May 299
Westinghouse Expansion........May 107
  New Plants........June 369
  Report........July 426
West Lewark—Three-Deck Cargo Steamers........June 331
White Star Buys Bismarck........Apr. 323
Whiting Reorganization........Feb. 106
William Penn, M. S.:
  Steamer or Motorship........July 405
  Progress in Motorship Building........Nov. 663
  Deck Machinery of........Dec. 719
Williamson, Charles H.:
  Bills of Lading and Insurance Claims........June 366
Wills, H.:
  Making a Twist Drill Live Up to Its Reputation........Jan. 45
Windjammers Rejuvenated, Old........Feb. 80
Windjammer, A Staunch Old........Oct. Frontispiece
Winton Diesel Electric Drive to Ocean Liners, Application of the, by R. Z. Dickie........Feb. 60
Winton Diesel Engine, The........June 60
With the Exporters and Importers—See Full Speed Ahead Section of each issue.
Wooden Ships:
  Using the........Jan. 36
  A Good Use for........Nov. 646
  Our Greatest Wooden Ship........Dec. 706
World Shipping (editorial)........Oct. 584
Wrecked Shear Reclaimed........May 52
Wyckoff, C. V. S.:
  The Diesel Electric Arconstruct-Hullfin Ferry Boat Poughkeepsie........Nov. 665
  XXXX Nickel Babbitt, The Home of........June 56

Yachts and Yachting:
  Challenge Cup Race........Aug. 43
  Equipment of the Curtis Steam Yacht Lyndonia........Mar. 191
  Lipton Cup Race........Aug. 462
  New Era in Yachting........Dec. 762
  Revival of Yachting........Sept. 521
  Steam Yacht Louise........Dec. 762
  Unusual Shipment, An (Idalia)........Dec. 764
  Yachting (editorial)........May 266
Yale, S.S.—A De Luxe Express Passenger and Freight Service..June 329
Yangtze Steamer Anning........May 295
Yangtze, Steamer Service on, by Robert Dollar........Jan. 11

Pacific Marine Review

The National Magazine of Shipping

S. S. VACUUM
BUILT BY
MOORE SHIPBUILDING COMPANY,
OAKLAND, CAL.

January
921

Pacific Marine Review, Vol. 18, No. 1. Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.

FEW of us stop to consider what a vastly important part oxygen plays in our daily existence.

Every form of life; human, animal, vegetable—even that of underwater creatures—is dependent on this marvelous gas.

And thanks to Linde researches and Linde enterprise, oxygen is becoming more and more essential to industrial progress every day.

In thousands of manufacturing plants in every corner of the country, Linde Oxygen, the standard of uniform purity, is making possible production short-cuts undreamed of yesterday.

A chain of seventy-five Linde plants and warehouses insures welders and cutters of prompt supplies of oxygen. Whatever their requirements — wherever they are.

LINDE AIR PRODUCTS COMPANY
Carbide and Carbon Building, 30 East 42nd Street, New York
BALFOUR BUILDING, SAN FRANCISCO

THE LARGEST PRODUCER OF OXYGEN IN THE WORLD

L-504-21

Pacific Marine Review

f621.12
P11 18

CONTENTS

168055

JANUARY, 1921

FEATURE INSERT

The Good Ship Pacific Marine, by A. J. Dickie; Lists of Ship Operating Companies and Vessels Operating Out of Pacific Coast Ports; Lists of Shipbuilders; Shipowners' Associations; Accounts of Conferences; and Feature Articles Pertaining to Operation on the Pacific.

REGULAR

Marine Engineering Trends, by A. J. Dickie 1
Our Inland Waterways, by Hon. J. W. Alexander 3
Two Large Oil Installations 6
An Important Launching 7
Editorial 8
Steamer Service on Yangtsze, by Captain Robert Dollar 11
Moore's Yard 12
Oil Engines and Motorships 13
    The Diesel Engine, IV; Diesel Electric Tanker; Motor Shipbuilding in Europe; The Doxford Marine Oil Engine.
Island Wrecks IX, by Andrew Farrell 20
New Bond Buying Plan 21
First Turbo-Electric Passenger Ship, by James A. Kelley 22
Material Handling 25
    Checking the Passing Buck, by Harwood Frost; Marine Piling Survey; Port Development Projects on the Pacific Coast; Bulk Cargo Elevator; A 250-Ton Ship Crane for the United States Navy, by A. F. Case; Huge Pontoon Crane; New Asano Docks.
European Marine Developments 32
New Pier at Seattle 33
Superheated Steam 34
With the Naval Architects 35
Using the Wooden Ships 36
New Intercoastal Service 39
A New Fast Motor Boat 40
Renewing the Annie Johnson 40
Developments in Marine Insurance, by Charles F. Howell 41
Pacific Machinery 44
    Some Tools in the Union Construction Company's Shop; Making a Twist Drill Live Up to Its Reputation, by H. Wills; Some Hall-Scott Tools; Cutting Cast Iron; New Airco Factory.
With the Exporters and Importers 49
Full Speed Ahead 53

Johnson Gear Company

extends cordial greetings to its friends and expresses appreciation of business received during the past year.

Our new manufacturing plant in Berkeley awaits your personal inspection. You are cordially invited to visit us.

San Francisco Office
for convenience of our customers will be maintained at

17 SPEAR STREET
Phone Sutter 2768

Johnson Gear Company
***Works and Main Office*—BERKELEY, CALIF.**
Telephones — Berkeley 7376-7377

JOHNSON
QUALITY GEARS

THIS issue of Pacific Marine Review is respectfully dedicated to the Pacific American Steamship Association. In its pages we have endeavored to draw a true picture of the present status of shipping on the Pacific Coast.

As we write the dark grey clouds cover Tamalpais and hang low over the Gate. An American freighter bound for the Orient is steaming out of the bay. She enters the fringe of the cloud and disappears, seemingly engulfed in its menacing folds.

But look again at the Gate—there is movement in the clouds. The dark masses suddenly writhe and swirl and lift and now the steamer is seen on the broad bosom of the Pacific in a pathway of gold stretching westward from the Golden Gate to the lands of the Setting Sun.

We extend to you, Shipping Men of the Pacific Coast, our heartiest best wishes for 1921 and our confidence that your shrewd common sense and high courage will soon dissipate the clouds that seem so threatening, as your optimism reminds you that all clouds are "fraught with blessing" and "big with mercy" to those who will to achieve.

Pacific Marine Review

The National Magazine of Shipping

January, 1921

Copyright, 1921, by J. S. Hines

THE GOOD SHIP PACIFIC MARINE

By A. J. DICKIE

DEAR READERS—Owners, Builders, Operators, Managers, Captains, Deck Officers, Engineers, and Crew of the good ship Pacific Marine, and all you land-lubbers who have to do with her supply of cargo and passengers—we salute you in the closing moments of 1920 and propose that we take stock together. Perhaps we may be able as a result of stock taking to arrive at such understanding of our problems as will enable us to go forward with a firm conviction of ultimate success, and so enter the new year that is before us not only wishful for its happiness but assured of its prosperity.

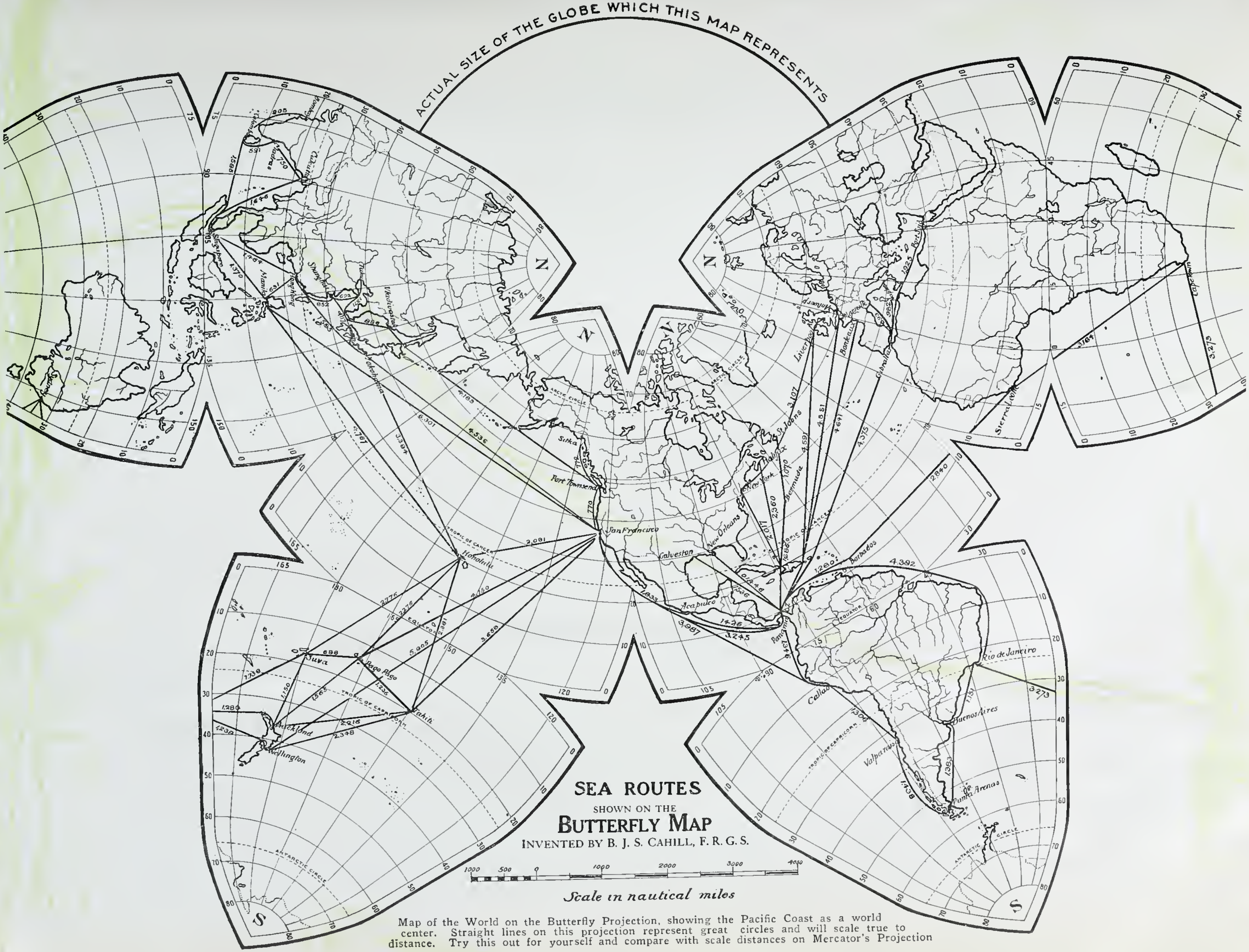
Before starting to take stock we must clear the decks of much impedimenta verbal and/or actual with which they seem to be littered. For instance, there is that constantly overheard remark, "The bottom has dropped out." This expression should not and cannot have any place in the vocabulary of a successful personnel for Pacific Marine, and we must rouse out the firehose and wash it overboard at once. Consider for a moment the plight of this ship if such an allegation is allowed to stand. "Holds empty," "freight offerings nil," "rates slaughtered"—all these may be listened to, may even be admitted, and the good ship be safe, sound and seaworthy, ready for any emergency. But "bottom dropped out" is a phrase fit only for the lips of Shipping Board "inspectors with holdovers" and Walsh committees; no true seaman or sea trader would ever indulge such a sentiment. The fact is that in marine and shore business we have for the last three or four years been floating around on foamy bubbles, and the bubble, not the bottom, is dropping out. The bottom, foundation, solid earth, or deep blue sea, as you will, is there just as it always was. So it is for us to get our feet, or the feet of the ladder on which we are climbing, or the keel of our Pacific Marine properly established, set, or guided on or over this "bottom," well realizing that consistent work will bring good success. And that's that.

Another hindrance that is cumbering the deck is the entanglement of red tape and foolish "burdensome, restrictive, regulatory legislation." This obstacle to the successful operation of Pacific Marine shows itself in many ways and in many forms. According to some pessimists, "So thick a cloud" of this nature "obscures the sky" over our good ship that they "cannot see the sun on high" nor even the tops of the masts. But there is ample evidence that much of this cloud will be dissipated in the not far distant future. The ownership through the Shipping Board of the largest merchant marine fleet under one control gives to the Federal government the viewpoint of the ship owner and affords a splendid opportunity to all wise shipping men for introducing a strong constructive marine legislation policy for which the present Merchant Marine Act may well form a solid foundation. President-elect Harding is intensely interested in the American merchant marine and has repeatedly declared his willingness to give the "Merchant Marine Act effective administration backing." The overwhelming majority given him at the polls puts the American people squarely behind the same policy. Cut that red tape, Captain Harding, and let the tangled rigging go by the board, and see the good old ship right herself.

But there is another obstacle left—the omnivorous, ubiquitous, congressional investigation committee—the committees ad lib which for the last three years have been asking questions and getting nowhere. Why can they not in connection with such businesses as building and operating ships ferret out the graft and prosecute the criminals without holding up the American merchant marine to the ridicule and scorn of the shipping world? There is every reason to believe that the new administration will select Shipping Board commissioners who will be able to deal with the service in their charge without raising such a hue and cry as is now raised by the Walsh committee. All shipbuilders and shipping men in the United States should co-operate in putting a stop to graft in their respective lines, and they would so co-operate if led in that co-operation by a proper Shipping Board. Admiral Benson, be it said in all justice, has done more in that direction than any of his predecessors, but there is still much to do.

And now, having jettisoned our deckload, let us not like Davalo sigh "for a ninth great peaceful wave to drown and roll" us under, but let us take a deep breath of good Pacific air and get busy with the "holystones" while the "old man" tells us why we of the Pacific Marine should be glad to be alive and afloat in so fine a ship on such a great ocean.

Analysis of the year's production of foodstuffs and raw materials shows a normal condition in the United States or, as previously remarked, the bottom is still there—the foundation is safe. Curtailment of credits both domestic and foreign caused a lowering of prices and a retrenchment in buying which was reflected in a



SEA ROUTES

SHOWN ON THE

BUTTERFLY MAP

INVENTED BY B. J. S. CAHILL, F. R. G. S.

Scale in nautical miles

Map of the World on the Butterfly Projection, showing the Pacific Coast as a world center. Straight lines on this projection represent great circles and will scale true to distance. Try this out for yourself and compare with scale distances on Mercator's Projection slowing down of manufactures and a tendency to reduce stocks of raw materials, resulting in small volume of freight offerings. That is, in a nutshell, the whole trouble. We have great stocks of foodstuffs and raw materials in our warehouses in the interior, our transportation system on land is almost back to normal, our customers across both oceans need what we have to offer and have stocks of which we are equally needful, and because of breakdown in the financial system we are hindered in or prevented from trading, and our good ship Pacific Marine is unable to get a steady job.

This condition is world-wide. The League of Nations is making important attempts at remedial measures in an international way. The National Foreign Trade Council and the bankers' associations in the United States are forming foreign trade credit corporations to finance reasonable credits to foreign customers. As the world swings back to normal conditions, we shall see right foreign trade relations once more established. And there is every reason to believe that the swing of the world in that direction is being so governed that the readjustment period will not be of very long duration.

At any rate, it is a first rate idea to be always ready for Old Man Opportunity when he comes our way, and a slack time is a good "get ready" time. A glance at the map of the world published herewith will show us that we of the Pacific Marine, at our home port or anywhere on the Pacific Coast of the United States, occupy a very strategic and central position in the world of trade.

And we are undoubtedly agreed that from Cape Flattery to the Caves of La Jolla we are possessed of just about the finest stretch of country that lies out of doors. That a very great many citizens of other parts have during the last ten years become obsessed with the same idea is well attested by the recent census returns.

We produce a tremendous volume of raw materials and foodstuffs, the great bulk of which is shipped to points far distant from our shores. An increasing amount of this produce is being shipped by water. Particularly in recent months has this been true with reference to coastwise shipping, and we are just beginning to feel the beneficial effects that the "big ditch" at Panama will bring to our shipping. There will also be an ever-increasing trade with the Philippines under the coastwise shipping law.

Right here be it noted that Alaska is a field which may be said to belong peculiarly to the good ship Pacific Marine, and it has possibilities for almost unlimited development. Pacific Marine shipping men should unite in a movement for the opening up of Alaska's resources. The vast coal beds and other mineral deposits, which are now bottled up under the government's conservation policy, would if sanely developed place the whole Pacific Coast on a much firmer industrial and manufacturing basis, and add greatly to the volume of tonnage available for our Pacific Marine.

Turning to foreign trade, we certainly find much encouragement in the tremendous increase in the tonnage carried in the holds of our Pacific Marine, and in judging our progress in this respect we must not forget the great increase in the number and capacity of those holds.

Six short years ago we were publishing articles calling attention to the disgraceful lack of holds in our Pacific Marine. Now we have ample capacity to take care of our immediate needs and a large reserve to call on for future expansion. The Pacific Marine is known now at every foreign port on every ocean, and with adequate home backing she will certainly become mistress of Pacific Ocean trade routes.

The Orient is awakening to Occidental influences, Siberia is awaiting development, Australasia has only been scratched, and while the looked-for developments from these sources will take time, we need only compare the volume carried ten years ago with that handled this year to realize that there are great things in store for us.

If any operator thinks Oriental development too slow and tedious a process, there is Mexico urging him to lend a hand in her direction, promising to be good under a new political regime, and so anxious to get at maritime trade that she is starting to build a merchant marine of her own.

As a corollary to all this, we wish to submit a proposal that the United States Shipping Board (if it is to carry out the spirit and letter of the instructions contained in certain provisions of the Merchant Shipping Act) should keep its ships running on all routes where there is possibility of development, whether those ships are run at a present profit or not. The history of every great steamship line in the world has been at the start full of lean years when the managing owners kept the ships running in the face of small or no profits, and in some cases heavy losses, but always with the vision of a great future. Those clauses in the Merchant Marine Act which direct the Shipping Board to develop new trade routes for the American merchant marine were framed with full knowledge of those conditions, and the Shipping Board should live up to that idea.

> "The streaming lanes of commerce surge and sway,
>   Daring our boats to breast them and explore.
> Put forth the trading vessel! Seize the day!
>   Ho! race the engines! Seek the farthest shore!
>
> Put forth to China, Africa and Greece.
>   Up! weigh for Argentina and the Horn.
> Set all your ships to seek the Golden Fleece,
>   And let their crews go singing down the morn.
>
> With steel and books and chemicals and ore
>   Let the ships sail. The ocean roads are free.
> Put forth to Rio and to Singapore,
>   And all the ports that fringe the swinging sea!
>
> In this new age of manly sentiments
>   In seeking ends beyond a selfish good,
> They serve the most who waken continents
>   And teach the world a braver brotherhood."

And now we wish to express again our heartiest good wishes for your continued prosperity in 1921, and our confidence that the good ship Pacific Marine operated by bold Pacific mariners, routed by shrewd Pacific traffic managers, and filled with the produce of Pacific fertility, will bring to us the good will of all our neighbors across the sea and a full measure of profit for whatever adventures we give into her charge.

PACIFIC AMERICAN MERCHANT MARINE

IN the following paragraphs an attempt has been made to list all shipping companies operating privately-owned or Shipping Board deep-water vessels in Pacific Coast waters, intercoastal, coastwise and offshore shipping included. Returns could not be obtained from some companies, but the list as presented does convey accurately an idea of the vast tonnage employed in the different Pacific Ocean trades. No attempt has been made to correct the listings of the companies for changes in allocations of Shipping Board vessels, so that in some cases the listings are not accurate because of recent withdrawals and re-allocations.

UNITED STATES SHIPPING BOARD, PACIFIC COAST DISTRICT, 369 PINE STREET, SAN FRANCISCO

Division of Operations

H. H. Ebey, district director; William Kincaid, operating manager; W. Mohns, executive assistant; W. M. Minor, manager traffic department.

Pacific Coast district, including California and Oregon from Columbia River south. Having charge of the following Shipping Board vessels.

Number of vessels: 138, of the following aggregate deadweight tonnage: 1,133,870.

Assignments as of November, 1920, name of company, number of vessels and aggregate deadweight tonnage being given:

Columbia Pacific Shipping Company, 4, of 35,800. Robert Dollar Company, 7, of 41,535. E. C. Evans & Sons, 4, of 35,600. General Steamship Corporation, 16, of 60,669. W. R. Grace & Company, 1, of 5075. Luckenbach Steamship Company, 6, of 52,132. Los Angeles Pacific Navigation Company, 2, of 17,165. Matson Navigation Company, 5, of 36,206. McCormick & McPherson, 7, of 56,527. Pacific Steamship Company (Portland), 7, of 65,298. Pacific Mail Steamship Company, 20, of 140,535. Struthers & Dixon, 17, of 156,306. Sudden & Christenson, 10, of 81,924. Swayne & Hoyt, 4, of 32,292. Williams Dimond & Company, 14, of 128,893. Total, 118 vessels, of 945,957 tons.

Tankers: Standard Oil Company, 2, of 20,212. Struthers & Dixon (transporting U. S. S. B. fuel oil), 8, of 79,420. Total, 128 vessels, of 1,045,589 tons.

Vessels laid up, 9, of 80,781. Tankers laid up, 1, of 7500. Grand total, 138 vessels, of 1,133,870 tons.

The vessels are engaged on the following routes:

Portland-Orient: Pacific Steamship Company, 4, of 37,600 tons.

San Francisco-Orient: Robert Dollar Company, 3, of 25,935 tons. Pacific Mail Steamship Company, 4, of 34,648 tons. Struthers & Dixon, 7, of 62,607 tons. Total, 14 vessels, of 123,190 tons.

Puget Sound-Orient: Struthers & Dixon, 6, of 51,880 tons.

Los Angeles-Orient: Los Angeles Pacific Navigation Company, 2, of 17,165 tons.

Portland - North China: Columbia Pacific Shipping Company, 4, of 35,800 tons.

Around-the-World: Pacific Mail Steamship Company, 8, of 74,175 tons.

Oriental Local Service: Robert Dollar Company, 4, of 15,600 tons. Pacific Mail Steamship Company, 8, of 31,712 tons. Total, 12 vessels, of 47,312 tons.

Pacific-Europe: E. C. Evans & Sons, 4, of 35,600 tons. Williams Dimond & Company, 14, of 128,893 tons. Total, 18 vessels, of 164,493 tons.

West Coast South America: General Steamship Corporation, 6, of 26,760 tons. W. R. Grace & Company, 1, of 5075 tons. Matson Navigation Company, 1, of 4050 tons. Total, 8 vessels, of 35,885 tons.

River Plate: Swayne & Hoyt, 4, of 32,292 tons.

Australia: General Steamship Corporation, 4, of 33,909 tons.

Pacific-Atlantic: Luckenbach Steamship Company, 5, of 46,907 tons.

Tramps: Luckenbach Steamship Company, 1, of 5225 tons. McCormick & McPherson, 7, of 56,527 tons. Pacific Steamship Company (Portland), 3, of 27,698 tons. Struthers & Dixon, 4, of 41,819 tons. Sudden & Christenson, 10, of 81,924 tons. Total, 25, of 213,193 tons.

Hawaii: Matson Navigation Company, 4, of 32,156.

Tramp Tankers: Standard Oil Company, 2, of 20,212 tons. Struthers & Dixon, 8, of 79,420 tons. Total, 10 vessels, of 99,632 tons.

Grand total: 128 vessels, of 1,045,589 deadweight tons.

UNITED STATES SHIPPING BOARD, PUGET SOUND DISTRICT, SECURITIES BUILDING, SEATTLE

Division of Operations

District Director's Office: D. W. Burchard, district director; F. B. Wurzbacher, traffic assistant; L. F. Root, executive assistant; S. W. Bone, chief supervisor; K. G. Clark, radio supervisor; J. S. Smith, port captain; W. H. Rober, port engineer; E. A. Gruby, port steward.

District Auditor's Office: R. B. Bush, district auditor.

Recruiting Service Bureau: Captain J. H. Payne, supervisor.

Division of Construction and Repair, District Manager's Office: William Chisholm, district manager; R. L. Dyer, executive assistant.

Repair Department: William Bullock, local manager.

General Attorney: Colonel Eugene West.

Puget Sound District assignments as of November, 1920, deadweight tonnage and service in which engaged at that time being given:

Pacific Steamship Company: Endicott, 9600, Seattle-Orient; Elkton, 9600, Seattle-Orient; Eldridge, 10,000, Seattle-Orient; Edmore, 9600, indefinite; City of Spokane, 9600, Seattle-Orient; Cross Keys, 9600, Seattle-Orient; Iconium, 9400, Seattle-Orient; Wheatland Montana, 9600, Seattle - Orient; Abercos, 9400, Portland-

Orient; Waban, 9400, delivered to Struthers & Dixon; Coaxet, 9400, Portland-Orient; Montague, 9400, indefinite; Wawalona, 9400, Columbia River-Europe; Pawlet, 9400, Portland-Orient; Diablo, 9400, flour, P. S.-U. K.; Havilah, 9400, flour, P. S.-U. K.; West Hartland, 8800, coal, Norfolk-Pearl Harbor; Western Knight, 8500, Atlantic-Orient; Osaqumsick, 9500, Atlantic-Pacific operation; Braeburn (W), 3688, will be delivered to U. S. S. B.; Kenosha, 3500, redelivered to U. S. S. B. as managing caretakers.

Thorndyke - Trenholme Company: Kayseeka, 9000, wheat, P. S. and Col. R. to U. K.; Eastern Victor, 8400, rails, Seattle-Black Sea; Eastern Glen, 8500, flour, Col. R. to Europe; Yosemite, 9400, flour, Col. R. to Europe; Western Cross, 8752, ties, Seattle-U. K.; Jalapa, 9400, flour, P. S.-Europe.

Frank Waterhouse & Company: Stanley, 9600, New York - Orient; Nile, 9600, New York - Orient; Eastern Mariner, 10,500, New York-Orient; West Jappa, 8800, New York-Orient; Delight, 7500, Seattle-Orient; West Ivan, 8800, Seattle-Orient; West Jester, 8800, Seattle-Orient.

Passenger Vessels:

Pacific Steamship Company: Wenatchee, 535's, Seattle-Orient; Keystone State, 535's, Seattle-Orient.

ALASKA CODFISH COMPANY,
15 STEUART STREET,
SAN FRANCISCO

Operating the following privately-owned vessels:

Schr. Bangor, 511 gross; 165 long; San Francisco to Sydney, Australia.

Sch. S. N. Castle, 515 gross; 155-8 long; San Francisco to Sydney, Australia.

Schr. Glendale, 296 gross; 43 long; San Francisco to Unga, Alaska, and codfishing banks in Behring Sea.

Schr. Maweema, 454 gross; 156 long; San Francisco to Unga, Alaska, and codfishing banks in Behring Sea.

Schr. City of Papeete, 390 gross; 145-6 long; San Francisco to Unga, Alaska, and codfishing banks in Behring Sea.

ALASKA PACKERS' ASSOCIATION,
WELLS FARGO BUILDING,
SAN FRANCISCO

No report. Twenty-nine vessels of 41,116 gross tons, principally sailers, between Alaska and San Francisco, yearly voyages, transporting the Alaska salmon pack.

ALASKA PORTLAND PACKERS ASSOCIATION
1107 YEON BUILDING,
PORTLAND

President, Frank M. Warren; vice-president, George A. Warren; marine superintendent, F. A. Dalu.

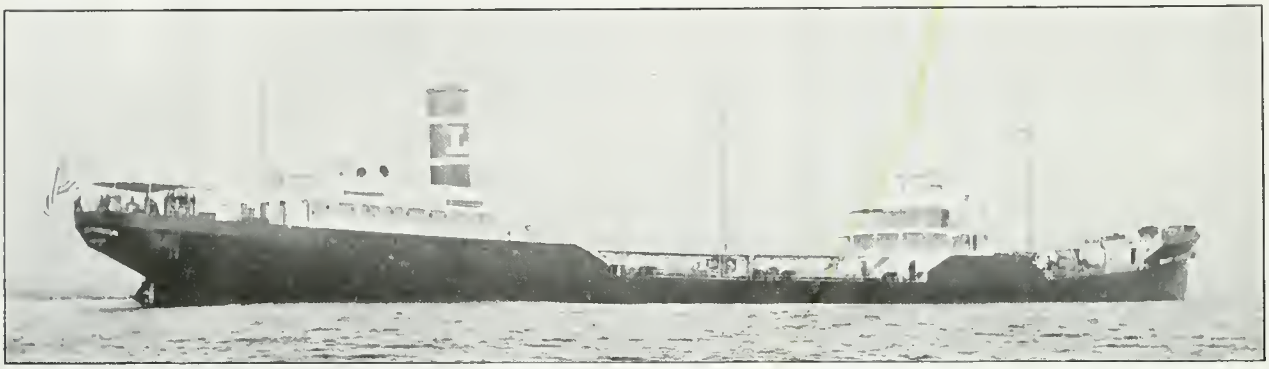
Operating the following privately-owned vessels:

Bark Berlin, 1634 gross; 222-5 long; Western Alaska.

Bark Levi G. Burgess, 1616 gross; 217-5 long; Western Alaska.

S. S. Akutan, 218 gross; 110 long; Western Alaska.

The above named vessels are used for fishing purposes only; leaving Portland in April and returning in September each year.



New Luckenbach tanker Mary Luckenbach, built at the Southwestern Shipbuilding Company and recently added to the Luckenbach fleet

ALASKA SALMON COMPANY
141 CLAY STREET,
SAN FRANCISCO

President, Crescent P. Hale; vice-president, C. E. Cocks; secretary, C. I. Sturrock.

Operating the following privately-owned vessels:

Bark Emily F. Whitney, 1317 gross; San Francisco to Alaska.

Schr. Frank & Lena, power, 350 gross; San Francisco to Alaska.

ALASKA STEAMSHIP COMPANY,
PIER 2,
SEATTLE

President, Stephen Birch; vice-president and operating manager, E. T. Stannard; marine superintendent, R. R. Pierson; port engineer, E. W. Raymond.

Operating the following privately-owned vessels:

S. S. Victoria, combination, 3502 gross; 361 long; 12 speed; Seattle to Behring Sea, monthly (summer).

S. S. Alaska, combination, 3709 gross; 327 long; 13 speed.

S. S. Northwestern, combination, 3496 gross; 336 long; 12 speed.

S. S. Alameda, combination, 3158 gross; 331 long; 14 speed.

S. S. Jefferson, 1615 gross; 207 long; 10 speed.

The above listed four vessels operate between Seattle and Alaska, seven to twelve days.

S. S. Cordova, combination, 2273 gross; 253 long; 9 speed.

S. S. Latouche, combination, 2332 gross; 240 long; 9 speed.

S. S. Redondo, combination, 1130 gross; 183 long; 9 speed.

S. S. Santa Ana, combination, 1203 gross; 182 long; 8 speed.

S. S. Juneau, freight, 2382 gross; 244 long; 8 speed.

S. S. Valdez, freight, 2382 gross; 244 long; 8 speed.

S. S. Ketchikan, freight, 2373 gross; 237 long; 8 speed.

S. S. Skagway, freight, 1838 gross; 240 long; 8 speed.

ALBION LUMBER COMPANY,

1501 HOBART BLDG.,
SAN FRANCISCO

Branches or agencies: Albion, California.

President, Epes Randolph; secretary and general manager, Paul M. Dimmick.

Operating the following privately-owned vessel:

S. S. Pasadena, gross 300; 141 long.

ALLEN & ROBINSON, LIMITED,

55 SOUTH QUEEN STREET,
HONOLULU

Branches or agencies: Seattle, Port Blakely Mill Company; San Francisco, Port Blakely Mill Company.

President, E. H. Wodehouse; vice-president, W. W. Chamberlain; operating manager, L. H. Underwood.

Operating the following privately-owned vessels:

Schr. Helene, 828 gross; 202 long; Puget Sound to Honolulu.

Schr. Mary E. Foster, 839 gross; 202 long; Puget Sound to Honolulu.

AMERICAN-HAWAIIAN STEAMSHIP COMPANY,

(UNITED AMERICAN LINES, INC.),
39 BROADWAY, NEW YORK CITY

Branches or agencies: Seattle, W. C. Dawson & Co., Mutual Life Building; Tacoma, W. C. Dawson & Co.; Portland, Columbia Pacific Shipping Company, Board of Trade Building; San Francisco, Williams Dimond & Co., general agents for Pacific Coast; F. A. Hooper, general freight agent.

Operating manager, J. D. Tomlinson; marine superintendent, F. J. Bennett; port engineer, B. Mills; general freight traffic manager, C. J. Beck; assistant freight traffic manager in charge of westbound coast trade, F. J. Kehoe; assistant freight traffic manager in charge of eastbound coast trade, R. L. Francis.

Operating the following privately-owned freight vessels:

S. S. Alaskan, 8617 gross; 484 long; 10½ speed.
S. S. American, 5600 gross; 430 long; 9¾ speed.
S. S. Arizonan, 8724 gross; 484 long; 10¾ speed.
S. S. Dakotan, 6501 gross; 429 long; 11¾ speed.
S. S. Floridan, 6784 gross; 429 long; 11¾ speed.
S. S. Hawaiian, 5670 gross; 430 long; 9¾ speed.
S. S. Iowan, 6547 gross; 429 long; 11¾ speed.
S. S. Kentuckian, 6432 gross; 429 long; 11 speed.
S. S. Mexican, 8673 gross; 488 long; 11½ speed.
S. S. Minnesotan, 6548 gross; 429 long; 11¾ speed.
S. S. Ohian, 6649 gross; 429 long; 12 speed.
S. S. Oregonian, 5648 gross; 430 long; 10½ speed.
S. S. Panaman, 6499 gross; 429 long; 12 speed.
S. S. Pennsylvanian, 6499 gross; 429 long; 12½ speed.
S. S. Texan, 8615 gross; 484 long; 11½ speed.
S. S. Virginian, 7914 gross; 501 long; 11½ speed.
S. S. Ipswich, 6214 gross; 417 long; 9 speed.
S. S. Mystic, 6214 gross; 417 long; 9 speed.
S. S. Sudbury, 5075 gross; 402 long; 9 speed.

The above listed vessels maintain fortnightly sailings from Boston and New York to Los Angeles (San Pedro), San Francisco, Portland, Seattle and Tacoma, and vice versa, occasionally calling at Charleston, S. C., eastbound.

AMERICAN PACIFIC WHALING COMPANY,

BAY CITY, WASHINGTON

No report. Four steamships.

ASSOCIATED OIL COMPANY,

SHARON BUILDING,
SAN FRANCISCO

Branches or agencies: Portland, Yeon Building.

President, Paul Shoup; vice-president, A. C. McLaughlin; operating manager, G. D. Zeh; port engineer, O. Lundin.

Operating the following privately-owned vessels:

Tanker Frank H. Buck, 6076 gross; 425 long, O. A.; 410 B. P.; 10 speed.

Tanker Wm. F. Herrin, 4939 gross; 400-6 long, O. A.; 384-2 B. P.; 10 speed.

Tanker W. S. Porter, 4902 gross; 400 long, O. A.; 385 B. P.; 10 speed.

New vessels under construction or contract:

Tanker not yet named; 435 long, B. P.; 10 speed.

ATLAS STEAMSHIP COMPANY,

2 PINE STREET,
SAN FRANCISCO

Branches or agencies: Vancouver, B. C., Albers Bros. Milling Company; Seattle, Albers Bros. Milling Company; Portland, Albers Bros. Milling Company; Los Angeles, Rolph, Mills & Co.; San Diego, George W. Beermaker; and Mexican and Central American ports.

President, M. Thomsen; vice-president, E. A. Deming; operating manager, A. Humburg; marine superintendent, A. J. Pollard.

Operating the following privately-owned freight vessels:

S. S. Rainier, 1409 gross; 204-9 long; 10 speed; San Francisco to Mexican and Central American ports; sailings every four or five weeks.

S. S. Northland, 1387 gross; 195 long; 10 speed; same route as S. S. Rainier.

Transferred by sale from the Albers Bros. Milling Company to the Atlas Steamship Company in July, 1920.

ATLANTIC, GULF & PACIFIC S. S. COMPANY,

406 WATER STREET,
BALTIMORE

Branches or agencies: Philadelphia; San Francisco, 60 California Street, T. J. Wade, Pacific Coast manager; Los Angeles, G. W. Blake, general agent.

President, W. Bernard Duke, Baltimore; secretary and treasurer, W. M. W. Mann; general manager, C. A. Askew; Pacific Coast manager, T. J. Wade; port captain, John Halversen.

Operating the following privately-owned freight vessels:

S. S. West Apaum, steel; 5573 gross; 409-6 long.

S. S. Liberator, steel; 7951 gross; 410 long.

S. S. Cape Romain, 4992 gross; 376-4 long.

S. S. Cape Henry, 4992 gross; 376-4 long.

S. S. Chas. H. Cramp, 9500 DWT.

The above-listed vessels operate between San Francisco, Los Angeles, Baltimore and Philadelphia.

J. H. BAXTER & COMPANY,
702 AMERICAN NATIONAL BANK BLDG.,
SAN FRANCISCO

Branches or agencies: Vancouver, Leon Littlefield, 613 Carter Cotton Building; Los Angeles, Baxter & Jordan, 1033 Central Building; Everett, Washington, Chas. G. Stempson, 1001 Hewitt avenue.

President, J. H. Baxter; vice-president and operating manager, A. M. Baxter; marine superintendent, Phil Sheridan.

Operating the following privately-owned vessels:

S. Schr. Fred Baxter, 1294 gross; 225 long; 10 speed; coastwise.

S. Schr. Horace X. Baxter, 1293 gross; 225 long; 10 speed; coastwise.

GEORGE E. BILLINGS,
312 CALIFORNIA STREET,
SAN FRANCISCO

Operating the following privately-owned freight vessels:

Schr. Geo. E. Billings, 1100 gross.

Schr. H. K. Hall,, 1105 gross.

Schr. Inca, 901 gross.

Bktn. James Tuft, 1042 gross.

Schr. Wm. Bowden, 685 gross.

Schr. W. H. Talbot, 743 gross.

These vessels are engaged in Pacific Ocean freighting.

BOWES & ANDREWS,
153 STEUART STREET,
SAN FRANCISCO

Operating the following privately-owned vessels:

S. S. Hoquiam, 644 gross; 187 long; 8 speed; tramp lumber carrier.

Schr. Tahoe, 751 gross; 192 long; 8 speed; tramp lumber carrier.

THE BORDER LINE TRANSPORTATION COMPANY,
1160 STUART BUILDING,
SEATTLE

Branches or agencies: Vancouver, Dodwell & Company, Ltd., 609 Yorkshire Building; Tacoma, 223 Tacoma Building; San Francisco, No. 2 Pine Street; Victoria, B. C., Dodwell & Company, Ltd.; Bellingham, Mr. W. H. Williams, 1251 Elk Street; Nanaimo, B. C., M. C. Ironsides.

President, G. W. Ninemire; vice-president, K. J. Middleton; operating manager, J. S. Elliott.

Operating the following privately-owned freight vessels:

S. S. Fulton, 605 gross; 152-7 long; 8 speed; Puget Sound to British Columbia every five days.

M. S. Wakena, 399 gross; 132-5 long; 7 speed; Puget Sound to British Columbia every five days.

BROOKINGS COMMERCIAL COMPANY,
BROOKINGS, OREGON

Branches or agencies: C. & O. Lumber Company, 2 Pine Street, San Francisco.

President, William Carson; vice-president, A. R. Owen; operating manager, J. H. Owen; port engineer, B. S. Free; treasurer, F. D. Stout.

Operating the following privately-owned vessels:

S. Schr. Frank D. Stout, 1113 gross; 190 long; 12 speed; Brookings to San Francisco and San Pedro every ten days.

S. Schr. Necanicum, 752 gross; 178 long; 10 speed; Brookings to San Francisco and San Pedro, every ten days.

BUEHNER LUMBER COMPANY,
NORTH BEND,
COOS BAY, OREGON

Branches or agencies: Portland, 1509 Yeon Building; San Francisco, 806 Newhall Building; Los Angeles, W. D. Wise & Company, Central Building.

President, Philip Buehner; vice-president, Henry P. Buehner.

Operating the following privately-owned vessel:

Schr. Martha Buehner, single screw steam; 774 gross; 193 long; 10 speed; coastwise.

BROUGHTON & WIGGINS NAVIGATION COMPANY,
YEON BUILDING,
PORTLAND

No report. One steamship.

BURNS, PHILP & COMPANY,
AMERICAN NATIONAL BANK BUILDING,
SAN FRANCISCO

No report.

C. & O. LUMBER COMPANY,
BROOKINGS, OREGON

Branches or agencies: San Francisco, No. 2 Pine Street and 326 Ocean Boulevard.

President, A. R. Owen; vice-president, William Carson; operating manager, James H. Owen; port engineer, B. S. Free.

Operating the following privately-owned vessels:

See Brookings Commercial Company, same vessels.

CALIFORNIA SEA PRODUCTS COMPANY,
235 MONTGOMERY STREET,
SAN FRANCISCO

Operating whaling stations at: Moss Landing; Trinidad, California.

President, operating manager and marine superintendent: F. K. Dedrick; vice-presidents, D. B. Moody, John

Erickson; secretary-treasurer, Kirkham Wright; assistant secretary, D. Skeoch.

Operating the following privately-owned whaling vessels:

S. S. Port Saunders, steel, 98 long; 14 speed.

S. S. Hawk, steel, 98 long; 11 speed.

S. S. Hercules, wood, 100 long; 10 speed.

S. S. Traveler, wood, 106 long; 10 speed.

CALIFORNIA TRANSPORTATION COMPANY, SAN FRANCISCO

President, A. E. Anderson; vice-president, Rudolph Herold, Jr,; operating manager, A. O. Dorey; marine superintendent, James Burns.

Operating the following privately-owned vessels:

S. S. Fort Sutter, built 1912, 1139 gross; 801 net; 680 hull; 292-2 long; 42-6 beam; 9.3 depth, 1200 h. p.

S. S. Capital City, built 1910, 1142 gross; 701 net; 684 hull; 220 long; 42-6 beam; 9.3 depth; 1200 h. p.

S. S. Pride of the River, built 1878, 619 gross; 553 net; 391 hull; 175 long; 39 beam; 8 depth; 650 h. p.

S. S. Isleton, built 1902, 615 gross; 534 net; 331 hull; 167.5 long; 36 beam; 7.5 depth; 300 h. p.

S. S. Captain Weber, built 1892, 690 gross; 569 net; 348 hull; 174-5 long; 36.5 beam; 8 depth; 350 h. p.

S. S. Onisbo, built 1900, 632 gross; 605 net; 332 hull; 178.1 long; 36.6 beam; 6.5 depth; 250 h. p.

S. S. Reform, built 1898, 627 gross; 560 net; 348 hull; 178 long; 40 beam; 6 depth; 375 h. p.

S. S. Aurora, built 1885, 406 gross; 328 net; 223 hull; 145 long; 30 beam; 7.5 depth; 380 h. p.

S. S. Fort Bragg, built 1899, 317 gross; 275 net; 264 hull; 155 long; 35 beam; 6 depth; 80 h. p.

S. S. Newtown No. 2, freight, built 1905, 217 gross; 185 net; 177 hull; 131-5 long; 30-5 beam; 5.2 depth; 180 h. p.

S. S. Sonoma, built 1874, 305 gross; 250 net; 177 hull; 135 long; 29 beam; 6.5 depth; 60 h. p.

These vessels are operated on San Francisco Bay.

COLUMBIA-PACIFIC SHIPPING COMPANY, BOARD OF TRADE BUILDING, PORTLAND

Branches or agencies: Vancouver and Seattle, R. T. Johns & Company; Aberdeen, G. H. Stevedore Company; San Francisco, Sudden & Christensen, 110 Market Street; Los Angeles, McCormick & McPherson, 548 South Spring Street; Oriental agent, China Pacific Company, with offices at all ports of call on the North China Line.

President, Emery Olmstead; vice-president, C. E. Dant; general manager, K. D. Dawson; marine superintendent, Captain E. G. Heinrici; port engineer, J. P. Bryne; assistant general manager, V. A. Cartwright; traffic manager, W. T. Sexton; general freight agent, B. L. McMullen; port steward, J. Vaughan.

Operating the following Shipping Board vessels:

North China Line: Portland to Yokohama, Kobe, Shanghai, Tsingtao, Taku Bar, for Tientsin and Dairen.

S. S. Angeles, 8800 DWT; 5481 gross; 410 long; 12 speed.

S. S. West Nomentum, 8800 DWT; 5652 gross; 410 long; 10 speed.

S. S. West Nivaria, 8800 DWT; 6000 gross; 410 long; 10 speed.

S. S. West Keats, 8800 DWT; 6000 gross; 410 long; 10 speed.

S. S. Bearport, 9400 DWT; 6076 gross; 402 long; 10 speed.

S. S. Sinasta, 9400 DWT; 6103 gross; 402 long; 10 speed.

W. R. CHAMBERLIN & COMPANY, 1200 BALFOUR BUILDING, SAN FRANCISCO

Branches or agencies: Portland, 618 Northwestern Bank Building; Los Angeles, 205 Union Oil Building.

Operating manager and owner, W. R. Chamberlin; marine superintendent, E. A. Chamberlin; port engineer, T. L. Tomilson; port captain, J. S. Bender.

Operating the following privately-owned vessels:

S. Schr. Phyllis, 1266 gross; 225 long; 9½ speed; coastwise.

S. Schr. Stanwood, 1129 gross; 225 long; 10 speed; coastwise.

S. Schr. Pacific, 1240 gross; 231 long; 11 speed; coastwise.

The above-listed vessels are operated in this company's lumber business coastwise, with an occasional trip off-shore.

CHINA MAIL STEAMSHIP COMPANY, LTD., 510 MONTGOMERY STREET, SAN FRANCISCO

Branches or agencies: Honolulu, Castle & Cooke, Ltd.; Yokohama, O. D. Martinez; Nagasaki, Holme, Ringer & Company; Shanghai, F. R. Barrett; Hongkong, C. T. Surridge; Manila, Thomas Cook & Sons; Singapore, Francis Peek & Company, Ltd.

President, Chin Lain; vice-presidents, Yee Ling and Lee Sing Hing; operating manager, Lo Lok Chai; secretary, M. Q. Fong; treasurer, Mark Thue; assistant general manager, A. M. Garland; auditor, W. G. Anderson.

Operating the following privately-owned vessels:

S. S. Nanking, 8262 gross; 442-6½ long; 16 speed; San Francisco to Hongkong every four weeks.

S. S. China, 5060 gross; 440 long; 14 speed; San Francisco to Hongkong every four weeks.

S. S. Nile is under British registry.

COMMERCIAL PACIFIC CABLE COMPANY, 253 BROADWAY, NEW YORK CITY

Branches or agencies: San Francisco, Battery and Bush Streets.

President, Clarence H. Mackay; vice-president, George G. Ward.

Operating the following privately-owned vessels:

S. S. Restorer, cable repairing, 3660 gross; 377 long; 15 speed; stationed at Charleston, Washington, to go out on repairs to cables in the Pacific Ocean whenever required.

S. Schr. Flaurence Ward, 266 gross; 127 long; Honolulu to Midway, four times a year.

COOS BAY LUMBER COMPANY
711 SYNDICATE BUILDING
OAKLAND

Branches or agencies: Marshfield, Oregon.

President, C. R. Johnson; vice-president and treasurer, F. A. Warner; secretary, G. S. Arnold.

Operating the following privately-owned freight vessels:

S. S. Johanna Smith, propeller, 1844 gross; 257-2 long; San Francisco to Marshfield every five days.

S. S. C. A. Smith, propeller, 1878 gross; 275-2 long; San Francisco to Marshfield every five days.

J. E. CHILBERG,
ALASKA BUILDING,
SEATTLE

No report.

COLUMBIA RIVER PACKERS' ASSOCIATION,
ASTORIA, OREGON

No report. Three sailing vessels.

THOMAS CROWLEY,
HOWARD STREET WHARF,
SAN FRANCISCO

No report. Three sailing vessels.

E. J. DODGE COMPANY
SAN FRANCISCO

President, Hubert E. Hunt; vice-president, Charles S. Dodge.

Operating the following privately-owned vessel:

S. S. Vanguard, freight, 358 gross; 137-5 long; 9.5 speed; San Francisco to Eureka and San Pedro every ten days.

THE ROBERT DOLLAR COMPANY
311 CALIFORNIA STREET,
SAN FRANCISCO

Branches or agencies: Vancouver, B. C., 305 Credit Foncier Building; Seattle, 1214 L. C. Smith Building; Shanghai, Hongkong, Ichang, Chungking, Tientsin, Manila, Kobe, Singapore.

President, Robert Dollar; vice-president, R. Stanley Dollar; operating manager, A. A. Moran; port engineer, E. B. Egbert.

Operating the following privately-owned freight vessels:

S. S. Stanley Dollar, 3392 gross; 310-2 long; 10½ speed; San Francisco to New York, sailings every eight weeks.

Ship Dunsyre, 2149 gross; 267-10 long.

Ship John Ena, 2942 gross; 312-11 long.

Bktn. Jane L. Stanford, 970 gross; 219 long.

S. S. Admiral Wainwright, 1783 gross; 9½ speed.

S. S. Bessie Dollar, 4329 gross; 384-5 long; 8½ speed; New York to Vancouver, sailings every thirty days.

S. S. Melville Dollar, 4304 gross; 384-5 long; 8½ speed; to Orient.

S. S. Harold Dollar, 4877 gross; 390 long; 8½ speed; to Orient.

S. S. Grace Dollar, 6533 gross; 411-6 long; 10½ speed; to Orient.

S. S. M. S. Dollar, 9394 gross; 495 long; 10½ speed; to Orient.

S. S. Esther Dollar, 7548 gross; 483-6 long; 10½ speed; to Orient.

Steamships Melville Dollar to Esther Dollar inclusive maintain a thirty-day schedule to the Orient.

Operating the following Shipping Board freight vessels:

S. S. West Hepburn, 5679 gross; 410-5½ long; 10 speed; San Francisco to Orient, sailings every twelve weeks.

S. S. West Cadron, 5730 gross; 427 long; 10½ speed; San Francisco to Orient, sailings every twelve weeks.

S. S. West Ira, 5879 gross; 426-6 long; 10½ speed; San Francisco to Orient, sailings every twelve weeks.

S. S. West Harts, 6179 gross; 423-9 long; 10½ speed; San Francisco to Orient.

S. S. Lake Farrar, 2664 gross; 261 long; China Coast.

S. S. Lake Onawa, 2824 gross; 261 long; China Coast.

S. S. Glymont, 2632 gross; 300 long; China Coast.

S. S. Cadaretta, 2632 gross; 300 long; China Coast.

The four last-named vessels sail every six weeks.

ESCHEN & MINOR COMPANY
24 CALIFORNIA STREET,
SAN FRANCISCO

President, R. Minor; secretary, J. N. Eschen.

Operating the following privately-owned vessels:

Bktn. Georgina, sail, 998 gross; 210 long.

Schr. H. D. Bendixsen, sail, 642 gross; 173-5 long.

Bark Lord Templetown, sail, 2152 gross; 282-9 long.

Above-listed vessels engaged in foreign lumber, copra and coal trade.

E. C. EVANS & SONS,
454 CALIFORNIA STREET,
SAN FRANCISCO

Branches or agencies: Vancouver, B. C., B. W. Greer & Son; Seattle, Norton, Lilly & Company; Tacoma, Norton, Lilly & Company; Portland, Norton, Lilly & Company; Astoria, Norton, Lilly & Company; Grays Harbor, H. Delanty; Los Angeles, Norton, Lilly & Company.

President, E. C. Evans, Jr.; vice-president, H. L. Evans.

Operating the following privately-owned freight vessels:

S. S. Steel Maker, 6860 gross; 441 long; 15 speed.

S. S. Steel Voyager, 6860 gross; 441 long; 15 speed.

S. S. Steel Worker, 5686 gross; 441 long; 15 speed.

S. S. Steel Exporter, 5686 gross; 441 long; 15 speed.

S. S. Steel Ranger, 5686 gross; 441 long; 15 speed.

The above-listed vessels are of the Isthmian Line, and operate monthly from the Pacific Coast to the United Kingdom.

Operating the following Shipping Board freight vessels:

S. S. Brookline, 5524 gross; 427 long; 10 speed.

S. S. Hayden, 9400 gross; 416 long; 10 speed.

S. S. Quillwark, 6034 gross; 416 long; 10 speed.

S. S. West Camak, 5721 gross; 427 long; 10 speed.

S. S. West Canon, 6800 gross; 427 long; 10 speed.

EUROPEAN-PACIFIC LINE

See Williams, Dimond & Company.

FIFE SHIPPING COMPANY,
350 CALIFORNIA STREET,
SAN FRANCISCO

President, R. C. Reid; operating managers, Balfour, Guthrie & Company; marine superintendent, J. C. Fogarty.

Operating the following privately-owned vessels:

Bktn. Monterey, 1854 gross; 260 long.

Schr. Thistle, 1584 gross; 240 long.

Schr. Columbia River, 1200 gross; 231-6 long.

The above-listed vessels are engaged in offshore lumber trade.

GARDINER MILL COMPANY,
16 CALIFORNIA STREET,
SAN FRANCISCO

President, J. R. Knowland; vice-president, H. G. Stevenson; secretary, C. C. Stevenson, Jr.

Operating the following privately-owned vessels:

Schr. Alvena, 772 gross; 186-4 long.

Schr. Caroline, 511 gross, 163-1 long.

Schr. Irene, 772 gross; 186-4 long.

Schr. King Cyrus, 717 gross; 188-5 long.

Schr. W. F. Jewett, 474 gross; 155-7 long.

GASTON, WILLIAMS & WIGMORE,
PACIFIC COAST COMPANY,
MONADNOCK BUILDING, SAN FRANCISCO

At present are operating no vessels in Pacific waters.

GENERAL PETROLEUM CORPORATION,
310 SANSOME STREET,
SAN FRANCISCO

Branches or agencies: Seattle, 1710 Sixteenth Avenue, S. W., W. J. Dinsmore, local manager; San Pedro, Twenty-second and Front Streets, F. Maurer, local superintendent; Los Angeles, 1003 Higgins Building.

President, John Barneson; vice-president and operating manager, L. T. Barneson; marine director, William Walker; comptroller, R. S. Durkee; auditor, A. R. Barr; treasurer, R. Mitchell; assistant treasurer, F. C. Adams.

Operating the following privately-owned vessels:

Tanker Belridge, 6047 gross; 433 long; 10 speed; (chartered).

Tanker Maricopa, 6047 gross; 433 long; 10 speed; (chartered).

New vessels under construction, to be placed in commission early in 1921.

Tanker Yorba Linda, 453 long; 11 speed.

Tanker Liebre, 453 long; 11 speed.

GENERAL STEAMSHIP CORPORATION,
280 BATTERY STREET,
SAN FRANCISCO

Branches or agencies: Vancouver, B. C., B. W. Greer & Son, Yorkshire Building; Portland, Railway Exchange Building; Seattle, Colman Building; Los Angeles, McCormick & McPherson, 548 South Spring Street; Callao, Peru; Valparaiso, Chile; Melbourne, Australia.

President, Charles Belknap; operating manager, Captain A. T. Hunter; port engineer, D. Dorward, Jr.

Operating the following privately-owned vessels:

S. S. Meriden, cargo, 2722 gross; 10 speed; Pacific Coast of the United States to West Coast, every twenty days.

Operating the following Shipping Board cargo vessels:

S. S. Wallingford, 2302 gross; 10 speed.

S. S. Depere, 3475 gross; 10 speed.

S. S. Derblay, 3475 gross; 10 speed.

S. S. Japtha, 3475 gross; 10 speed.

S. S. West Mahwah, 5587 gross; 10 speed.

The five vessels mentioned above maintain twenty-day sailings from the Pacific Coast of United States to the West Coast.

S. S. West Mahwah, 5587 gross; 10 speed.

S. S. West Camargo, 5721 gross; 10 speed.

S. S. West Holbrook, 5490 gross; 10 speed.

S. S. Las Vegas, 5490 gross; 10 speed.

The four last named vessels sail monthly from the Pacific Coast of the United States to Australasia.

W. R. GRACE & COMPANY,
NEW YORK CITY

Branches or agencies: San Francisco, W. R. Grace & Company, G. H. Carter, manager.

Operating the following privately-owned vessels:

S. S. Santa Alicia, freight, 2244 gross; 299 long, 10 speed.

S. S. Santa Inez, freight, 1742 gross; 252 long; 9 speed.

S. S. Santa Rita, freight, 1600 gross; 250 long; 9½ speed.

M. S. Santa Flavia, freight, 2133 gross; 225 long; 7 speed.

Bark Belfast, 1957 gross; 260 long; (tows).

S. S. Colusa, combination, 5732 gross; 424 long; 12 speed.

The above-listed vessels operate from San Francisco to West Coast of South America every three weeks.

The S. S. Colusa is being operated by the Pacific Mail Steamship Company, and will be returned to the W. R. Grace Company after January, 1921.

Operating the following Shipping Board vessels:

S. S. Delroas, freight, 3475 gross; 321 long; 9 speed; West Coast of South America every three weeks.

GRANT SMITH COMPANY,
PORTLAND

See Oregon Pine, Inc., and Oregon Fir, Inc.

HENRY GRAY & COMPANY,
817 SANSOME STREET,
SAN FRANCISCO

President, Henry Gray; operating manager and marine superintendent, A. Connick.

Operating the following privately-owned vessels:

Schr. Lizzie Vance, three-masted; 383 net; sailings to Tahiti every four months.

Schr. Roy Somers, three-masted; 298 net; sailings to Tahiti every four months.

JAMES GRIFFITHS & SONS,
502 BURKE BUILDING,
SEATTLE

Branches or agencies: Vancouver, B. C., S. Garnham, 805 Birks Building; San Francisco, Rinder & Cook, 24 California Street.

President, James Griffiths; vice-president, Stanley A. Griffiths; manager, A. Wuthenow; port engineer, C. C. Lacey.

Operating the following privately-owned vessels:

S. S. Anyox, freight towing steamer, 1287 gross; 193 long; 10 speed; Seattle to Alaska and South America.

S. S. Griffco, 1463 gross; 220 long; 12 speed; Seattle to South America.

S. S. Griffdu, 1484 gross; 220 long; 12 speed; Seattle to California ports every three weeks.

Barge Griffson, 2260 gross; 268 long; Puget Sound, California, South America.

Barge Henry Villard, 1553 gross; 219 long; Puget Sound, California, South America.

GERRITSEN, CURTIS & COMPANY,
PORTLAND

No report.

GRAYS HARBOR MOTORSHIP CORPORATION,
ABERDEEN, WASHINGTON

No report. Three motorships.

J. R. HANIFY COMPANY,
24 CALIFORNIA STREET,
SAN FRANCISCO

Branches or agencies: Portland, H. B. Cooper, 810 Northwestern Bank Building; Los Angeles, W. T. Cooper, 522 Central Building.

President, J. R. Hanify; vice-presidents, E. de Reynier and Al Hanify; operating manager, marine superintendent, and port engineer, J. L. Reed.

Operating the following privately-owned vessels:

S. Schr. Santa Barbara, 695 gross; 183 long; 8 speed.

S. Schr. Santa Monica, 497 gross; 166 long; 8 speed.

S. Schr. Anne Hanify, 756 gross; 235 long; 11 speed.

S. Schr. Ryder Hanify, 756 gross; 235 long; 11 speed.

These vessels operate between coast lumber ports; no set schedule.

D. J. HANLON,
OAKLAND

No report. Salvage steamship Homer, 331 net; 146 long.

HART WOOD LUMBER COMPANY,
1006 FIFE BUILDING
SAN FRANCISCO

Branches or agencies: Portland, Gasco Building; Los Angeles, Trust & Savings Building.

President and operating manager, W. H. Wood; marine superintendent, P. P. Sheridan.

Operating the following privately-owned vessels:

S. S. Avalon, combination, 818 gross; 196-6 long; 9 speed.

S. S. Hartwood, combination, 946.8 gross; 199-3 long; 9 speed.

S. S. Solano, freight, 943 gross; 198-2 long; 9 speed.

The above-listed vessels maintain fifteen-day sailings from San Francisco to Grays or Willapa Harbor to San Pedro and San Diego.

S. S. Claremont, freight, 1291 gross; 242 long; 9 speed.

S. S. San Diego, freight, 1487 gross; 242 long; 8½ speed.

The last-named vessels sail every twenty days from San Francisco to Grays Harbor or Willapa Harbor to San Pedro and San Diego.

HELM & COMPANY,
311 CALIFORNIA STREET,
SAN FRANCISCO

No report. Motorship Margaret, San Francisco to Monterey.

HIBBARD SWENSON COMPANY,
HIBBARD BUILDING,
SEATTLE

Branches or agencies: Hakodate, Japan, Denbigh & Company; operating manager, Olaf Swenson.

Operating the following privately-owned vessels:

M. S. Kamchatka, 517 gross; 144 long; 8 speed; Seattle to Siberia; trading with Kamchatka and Northeastern Siberia only.

HIND, ROLPH & COMPANY,
230 CALIFORNIA STREET,
SAN FRANCISCO

Branches or agencies: Seattle, 838 Henry Building; New York, 38 Park Row; Kobe, Japan, 30-B Akashi-Machi; Honolulu, Campbell Block.

Marine superintendent, Captain J. S. Hellingsen.

Operating the following privately-owned vessels:

Bark Annie M. Reid, steel, 4-masted; 2165 gross; 291.3 long.

Bark William T. Lewis, steel, 4-masted; 2156 gross; 279.7 long.

Bktn. Hawaii, steel, 4-masted; 1085 gross; 195.7 long.

Bktn. Conqueror, wood, 4-masted; 1395 gross; 231.4 long.

Bktn. Puako, wood, 4-masted; 1084 gross; 221 long.

Bktn. Lahaina, wood, 4-masted; 1067 gross; 217 long.

Bktn. Makaweli, wood, 4-masted; 899 gross; 194 long.

Bktn. Kohala, wood, 4-masted; 891 gross; 194.8 long.

Schr. Robert R. Hind, wood, 4-masted; 546 gross; 162.5 long.

Schr. Honoipu, wood, 4-masted; 546 gross; 162.5 long.

Schr. Muriel, wood, 4-masted; 536 gross; 162 long.

The eleven vessels listed above are engaged chiefly in freighting lumber to Australia, New Zealand, South Africa and West Coast, South America; also in general trading.

S. S. Annette Rolph, 2D, 3 mast, wood; 2361 gross; 245-3 long; 9 speed.

S. S. Georgina Rolph, 2 D, 3 mast, wood; 2354 gross; 245-3 long; 9 speed.

The last-named vessels maintain sailings coastwise between Puget Sound, Columbia River, San Pedro and San Francisco.

HOBBS WALL & COMPANY,
1 DRUMM STREET,
SAN FRANCISCO

Branches or agencies: Crescent City.

President, W. J. Hotchkiss; vice-president, J. M. Hotchkiss; operating manager, R. W. Myers.

Operating the following privately-owned vessels:

S. Schr. Westport, 211 gross; 124 long; 8 speed; San Francisco to Crescent City, weekly.

S. Schr. South Coast, 302 gross; 131 long; 9 speed; San Francisco to San Pedro, weekly.

INTER-ISLAND STEAM NAVIGATION COMPANY,
HONOLULU

No report. Twelve steamships in Hawaiian inter-island trade.

ISTHMIAN LINE

See E. C. Evans & Sons.

E. & E. T. KRUSE,
24 CALIFORNIA STREET,
SAN FRANCISCO

Operating the following privately-owned vessels:

S. S. Elizabeth, combination, 415 gross; 142 long; 8 speed; San Francisco to Bandon every ten days.

S. S. Helene, freight, 672 gross; 172.1 long; 8 speed; San Francisco to Grays Harbor every twenty days.

KUSKOWIN FISHING & TRANSPORTATION CO.,
COLMAN DOCK, SEATTLE

No report. One auxiliary vessel.

LEWERS & COOKE, LTD.,
HONOLULU

President, F. J. Lowrey; vice-president, C. H. Cooke.

Operating the following privately-owned vessels:

Schr. Robert Lewers, sail, 732 gross; 185 long; Honolulu to Puget Sound.

Schr. Alice Cooke, sail, 782 gross; 185 long; Honolulu to Puget Sound.

LIBBY, MC NEIL & LIBBY,
SEATTLE

President, W. F. Burrows; vice-president, E. G. McDougall; operating manager, D. W. Branch.

Operating the following privately-owned vessels:

M. S. Libby Maine, 1811 gross; 240 long; 7 speed; various ports.

M. S. W. F. Burrows, 1560 gross; 201 long; 6 speed; various ports.

S. S. Abner Coburn, 1973 gross; 225 long; Seattle to Alaska, yearly.

Bark W. B. Flint, 835 gross; 178 long; Seattle to Alaska, yearly.

Bark George Curtis, 1837 gross; 240 long; Seattle to Alaska, yearly.

Bark Oriental, 1688 gross; 220 long; Seattle to Alaska, yearly.

Schr. Henry Wilson, 499 gross; 157 long; Seattle to Alaska, yearly.

Schr. Salvator, 465 gross; 160 long; Seattle to Alaska, yearly.

S. S. San Juan, 248 gross; 118 long; 10 speed; Seattle to Alaska, yearly.

S. S. George F. Hatter, 185 gross; 101 long; 8 speed; Seattle to Alaska, yearly.

S. S. North Star, 99 gross; 73 long; 9 speed; Seattle to Alaska, yearly.

Gas. S. Willard B., 64 gross; 73 long; 8 speed; Seattle to Alaska, yearly.

Gas. S. President, 50 gross; 72 long; 8 speed; Seattle to Alaska, yearly.

Gas. S. Excursion, 46 gross; 65 long; 9 speed; Seattle to Alaska, yearly.

Gas. S. Expansion, 175 gross; 104 long; 8 speed; Seattle to Alaska, yearly.

Gas. S. Bonito, 98 gross; 78 long; 8 speed; Seattle to Alaska, yearly.

Gas. S. Ahrmklin, 52 gross; 66 long; 8 speed; Seattle to Alaska, yearly.

Gas. S. Aknold G., 16 gross; 34 long; 8 speed; cannery tender.

Gas. S. Bernice, 15 gross; 44 long; 8 speed; cannery tender.

Gas. S. Climax, 10 gross; 28 long; 8 speed; cannery tender.

Gas. S. Charlotte B., 71 gross; 74 long; 9 speed; cannery tender.

Gas. S. Comet, 41 gross; 56 long; 8 speed; cannery tender.

Gas. S. Glenn, 34 gross; 49 long; 9 speed; cannery tender.

Gas. S. George S., 43 gross; 57 long; 9 speed; cannery tender.

Gas. S. Helen T., 32 gross; 50 long; 8 speed; cannery tender.

Gas. S. John L. C., 26 gross; 62 long; 8 speed; cannery tender.

Gas. S. J. T. Robinson, 18 gross; 43 long; 7 speed; cannery tender.

Gas. S. Leona, 47 gross; 59 long; 8 speed; cannery tender.

Gas. S. Mitchell, 14 gross; 49 long; 8 speed; cannery tender.

Gas. S. May, 10 gross; 45 long; 8 speed; cannery tender.

Gas. S. Nuten, 22 gross; 44 long; 8 speed; cannery tender.

Gas. S. Olaf, 21 gross; 42 long; 8 speed; cannery tender.

Gas. S. Olga, 14 gross; 40 long; 8 speed; cannery tender.

Gas. S. Pride of Alaska, 15 gross; 53 long; 8 speed; cannery tender.

Gas. S. St. James, 10 gross; 32 long; 8 speed; cannery tender.

Gas. S. Triumph, 15 gross; 53 long; 8 speed; cannery tender.

Gas. S. Vigilant, 14 gross; 39 long; 8 speed; cannery tender.

H. LIEBES & COMPANY,
167-177 POST STREET,
SAN FRANCISCO

President, Leon Liebes; vice-president, Arnold Liebes; operating manager, Ben A. Goldsmith.

Operating the following privately-owned vessels:

Gas. Schr. Herman, 362 gross; 131.3 long; 6 speed; San Francisco to Point Barrow, yearly.

Schr. Fox, 342 gross; 145 long; San Francisco to Point Barrow, yearly.

LITTLE RIVER STEAMSHIP COMPANY,
112 MARKET STREET,
SAN FRANCISCO

President, H. W. Cole; vice-president, L. Crannell; operating manager, W. D. Dunning; port engineer, P. Sheridan.

Operating the following privately-owned vessels:

S. Schr. Washington, 539 gross; 9 speed; maintains a nine-day schedule between San Francisco and Eureka.

FRED LINDERMAN,
110 MARKET STREET,
SAN FRANCISCO

Operating manager, Fred Linderman; port engineer, L. C. Bartmess.

Operating the following privately-owned freight vessels:

S. S. Henry T. Scott, steel, 1596 gross; 235-6 long; 10 speed.

S. S. Cricket, steel, 1136 gross; 210 long; 9 speed.

S. S. Rosalie Mahony, wood, 1473 gross; 196 long; 8 speed.

These vessels are engaged in coastwise lumber trade.

LOOP LUMBER COMPANY,
FOOT OF SIXTEENTH STREET,
SAN FRANCISCO

President and operating manager, William Chatham; vice-president, C. S. Frantz; marine superintendent, T. L. Tomlinson.

Operating the following privately-owned vessels:

S. S. Johan Poulsen, 650 gross; 179 long; 10 speed; San Francisco to Puget Sound and Columbia River every two weeks.

S. S. F. S. Loop, 794 gross; 193 long; 10 speed; San Francisco to Puget Sound and Columbia River every two weeks.

LOS ANGELES PACIFIC NAVIGATION COMPANY,
WILMINGTON (Los Angeles Harbor)

Branches or agencies: San Francisco, R. M. Grose, assistant general freight agent, 806 American National Bank Building; Los Angeles, G. T. Darragh, district freight agent, 787 Pacific Electric Building; Hongkong, Manila, Singapore, Batavia, Samarang, Sourabaya, Penang, Bangkok, Dairen, Tientsin, Hankow.

President, Fred L. Baker; vice-presidents, M. de Brabant and Paul Shoup; general manager, A. J. Frey; port engineer, C. C. Bentley; port captain, Captain N. H. Anderson.

Operating the following Shipping Board freight vessels:

S. S. West Hika, 8800-ton cargo vessel; 5940 gross; 423.9 long, O. A., approximately 10 speed.

S. S. West Hixton, 8800-ton cargo vessel; 5940 gross; 423.9 long, O. A., approximately 10 speed.

S. S. West Montop, 8800-ton cargo vessel; 5940 gross; 423.9 long, O. A., approximately 10 speed.

S. S. Vinta, 8800-ton cargo vessel; 5661 gross; 427 long, O. A., approximately 10 speed.

The above-listed four vessels operate from Los Angeles to Honolulu, Shanghai, Hongkong, Manila and return via Honolulu, sailing about every ninety days. Every fourth sailing: Los Angeles to Honolulu, Yokohama, Kobe, Shanghai, Manila, Singapore, Hongkong, Manila, Honolulu, Los Angeles Harbor. Time required to complete this schedule, 120 days.

LOS ANGELES STEAMSHIP COMPANY,
WILMINGTON (Los Angeles Harbor)

Agency: San Francisco, 685 Market street.

President, Fred L. Baker; general manager, A. J. Frey.

Reconditioning steamships Yale and Harvard, 3730 gross; 407-4 long; 23 speed; for San Francisco-Los Angeles service, six days a week, after April.

LUCKENBACH STEAMSHIP COMPANY, INC.,
44 WHITEHALL STREET,
NEW YORK CITY

Branches or agencies: Seattle, General Steamship Corporation, Colman Building; Portland, General Steamship Corporation; San Francisco, 804 Merchants Exchange Building; Los Angeles, 711 Central Building; San Diego, Spreckels Brothers.

President, Edgar F. Luckenbach; vice-president, R C. Thackara; Pacific Coast manager, A. P. Hammond.

Operating the following privately-owned cargo vessels:

S. S. Frederick Luckenbach, 2903 gross; 317 long; 10 speed.

S. S. Hattie Luckenbach, 4417 gross; 331 long; 10 speed.

S. S. Florence Luckenbach, 4989 gross; 401 long; 10 speed.

S. S. Pleiades, 3753 gross; 331 long; 10 speed.

S. S. Julia Luckenbach, 8151 gross; 436 long; 15 speed.

Operating the following Shipping Board cargo vessels:

S. S. Delisle, 3478 gross; 320 long; 10 speed.

S. S. West Inskip, 6107 gross; 410 long; 10 speed.

S. S. Lavada, 6200 gross; 402 long; 10 speed.

The above-mentioned vessels are operated between Atlantic Coast ports and Pacific Coast ports.

Service to be augmented with additional steamers.

MC CORMICK & MC PHERSON,
503 MARKET STREET,
SAN FRANCISCO

Branches or agencies: Seattle, General Steamship Corporation; Portland and Los Angeles.

Operating the following Shipping Board freight vessels:

S. S. Eastern Temple, 3816 gross; 316 long; 9 speed; Seattle to South America.

S. S. Eastern Belle, 3124 gross; 305 long; 9 speed; Seattle to Cuba.

S. S. Eastern Ocean, 5868 gross; 385 long; 9.5 speed; Portland to United Kingdom.

S. S. Heber, 6041 gross; 402-6 long; 9.5 speed; Portland to Rotterdam.

S. S. Mosella, 6054 gross; 402-6 long; 9.5 speed; San Francisco to United Kingdom.

S. S. West Wind, 5814 gross; 410-5½ long; 9.5 speed; Portland to United Kingdom.

S. S. Culberson, 5453 gross; 410 long; 9.5 speed; Seattle to Hamburg.

G. W. MC NEAR, INC.,
433 CALIFORNIA STREET,
SAN FRANCISCO

President, G. W. McNear; vice-president, John A. McNear.

Operating the following privately-owned vessels:

S. S. Asuncion, tanker, 2196 gross; 242 long.

S. S. Marion Chilcott, tanker, 1738 gross; 249 long.

S. S. Falls of Clyde, tanker, 1809 gross; 266 long.

Schr. Georgette, 866 gross; 188 long.

The above-listed four vessels operate from San Francisco to European ports.

MATSON NAVIGATION COMPANY,
120 MARKET STREET,
SAN FRANCISCO

Branches or agencies: Seattle, Alexander & Baldwin, Ltd.; Tacoma, Alexander & Baldwin, Ltd.; Honolulu, Castle & Cooke, Ltd.; Manila, Welch Fairchild & Company; Hilo, C. Brewer & Company, Ltd.

President, E. D. Tenney; vice-president and general manager, W. P. Roth; port engineer, J. Barker.

Operating the following privately-owned vessels:

S. S. Maui, steel, twin-screw, 10,261 gross; 501 long; 15 speed; San Francisco to Hawaiian Islands, every twenty-eight days.

S. S. Matsonia, steel, 9402 gross; 501-4 long; 15 speed; San Francisco to Hawaiian Islands, every twenty-eight days.

S. S. Wilhelmina, 6974 gross; 451 long; 13½ speed; San Francisco to Hawaiian Islands, every twenty-eight days.

S. S. Manoa, 6805 gross; 446-2½ long; 13 speed; San Francisco to Hawaiian Islands, every twenty-eight days.

S. S. Lurline, steel, 5928 gross; 437 long; 12½ speed; San Francisco to Hawaiian Islands, every twenty-eight days.

S. S. Hyades, 3753 gross; 331-5 long; 9½ speed; San Francisco-Puget Sound to Hawaiian Islands, about every forty-five days.

S. S. Enterprise, steel, 2675 gross; 322-8 long; 10.9 speed; San Francisco to Hawaiian Islands, every twenty-eight days.

Schr. Annie Johnson, iron auxiliary sailing vessel, 1044 gross; 212-1 long; 7 speed; San Francisco to Hawaiian Islands, about every sixty days.

Operating the following Shipping Board cargo vessels:

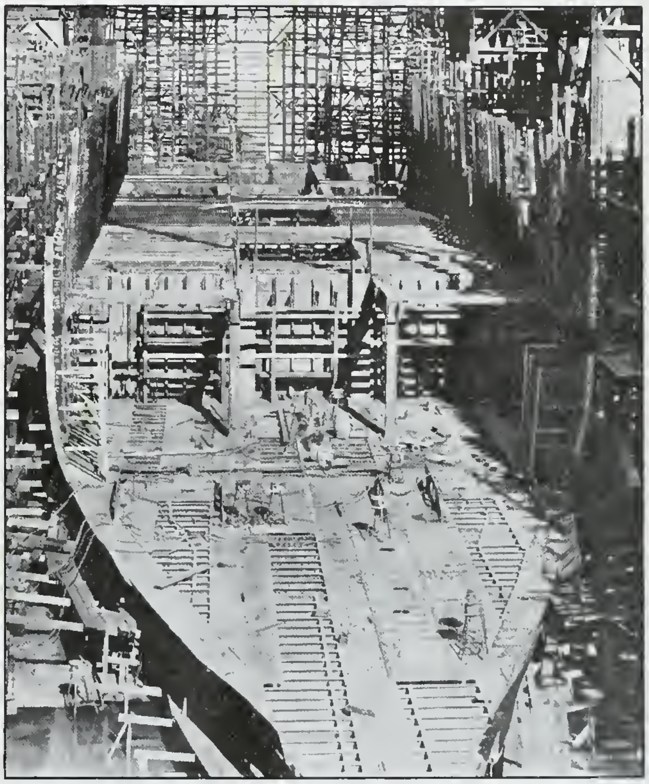
S. S. Eastern Guide, 3986 gross; 345 long; 10½ speed; San Francisco to Hawaiian Islands, every twenty-eight days.

S. S. Lake Gebhardt, 2810 gross; 251 long; 9½ speed; San Francisco to Puget Sound, South America and Hawaiian Islands, every ninety days.

S. S. West Nilus, 5569 gross; 410-5½ long; 10½ speed; San Francisco to Puget Sound and Hawaiian Islands, every forty-five days.

S. S. West Keene, 6067 gross; 410-5½ long; 10½ speed; San Francisco to Puget Sound and Hawaiian Islands, every forty-five days.

S. S. Hollywood, 5945 gross; 427 long; 10½ speed; San Francisco to Puget Sound and Hawaiian Islands, every forty-five days.



View of construction work on the new Matson freighter Manulani at the Moore Shipbuilding Company, Oakland

New vessels under construction or contract:

S. S. Manulani, steel freight steamer, 14,000 DWT; 497 long; 12½ speed.

S. S. Manukai, steel freight steamer, 14,000 DWT; 497 long; 12½ speed.

ANDREW F. MAHONY,
1 DRUMM STREET,
SAN FRANCISCO

No report.

CHARLES R. MC CORMICK & COMPANY,
1 DRUMM STREET,
SAN FRANCISCO

No report. Six steamships and one sailer in lumber trade.

GEORGE T. MYERS & COMPANY,
464 COLMAN BUILDING,
SEATTLE

General manager, George T. Myers.

Operating the following privately-owned vessel:

Barge Elwell, 1461 gross; 212-3 long; Seattle to Chatham, Alaska.

Used in the transportation of cannery supplies to George T. Meyers & Company's salmon cannery and return to Seattle with canned salmon.

NAKNEK PACKING COMPANY,
73 MAIN STREET,
SAN FRANCISCO

President and general manager, Frank B. Peterson; vice-president, Ferd. C. Peterson.

Operating the following privately-owned vessels:

Bark Pactolus.

Bark B. P. Cheney.

The above-listed vessels are laid up in Oakland Creek; are used only during the summer months when making trip to Alaska salmon cannery.

THE CHARLES NELSON COMPANY,
230 CALIFORNIA STREET,
SAN FRANCISCO

Branches or agencies: Seattle, Dawson Terminals Company; Tacoma, Dawson Terminals Company; Portland, Oregon Pacific Company; Los Angeles, E. D. Howard.

President, James Tyson; vice-president, H. W. Jackson; operating manager and marine superintendent, James K. Nelson; port engineer, L. C. Bartmess; freight agent, A. J. Houda.

Operating the following privately-owned freight vessels:

S. S. Port Angeles, 1358 gross; 235 long; 9½ speed; San Francisco to Puget Sound and Hawaiian ports, every eight weeks.

S. S. Mukilteo, 1230 gross; 225 long; 9 speed; San Francisco to Puget Sound and Hawaiian ports, every eight weeks.

S. S. Nome City, freight and passenger, 939 gross; 230 long; 9 speed; San Francisco to Puget Sound, every four weeks.

S. S. Wilmington, 990 gross; 210 long; 9 speed; San Francisco to Eureka and Hawaiian ports, every five weeks.

S. S. Saginaw, 886 gross; 191 long; 9 speed; San Francisco to Puget Sound and San Pedro, every four weeks.

S. S. Mayfair, 670 gross; 173 long; 8 speed; San Francisco to Eureka, every seven days.

Bktn. Aurora, 1211 gross; 221 long; San Francisco, Puget Sound and Australian ports; average every nine months.

Bktn. James Johnson, 1149 gross; 214 long; operating between same ports as Bktn. Aurora.

Bktn. Mary Winkleman, 522 gross; 155 long; operating between same ports as Bktn. Aurora.

Bktn. Thomas P. Emigh, 1040 gross; 211 long; operating between same ports as Bktn. Aurora.

Schr. Barge Big Bonanza, 1431 gross; 210 long; in tow of S. S. Mukilteo.

Schr. Barge Charles Nelson, 688 gross; 196 long; in tow of S. S. Saginaw.

Schr. Harvester, 737 gross; 156 long; San Francisco, Eureka and Australian ports, averaging every nine months.

Schr. Minnie A. Caine, 880 gross; 195 long; San Francisco, Puget Sound and Australian ports, averaging every nine months.

Schr. Oceania Vance, 445 gross; 148 long; San Francisco, Puget Sound and Australian ports, averaging every nine months.

Schr. Barge Rufus E. Wood, 1432 gross; 200 long; in tow of S. S. Port Angeles.

Schr. Taurus, 551 gross; 161 long; San Francisco, Puget Sound and Australian ports, averaging every nine months.

Schr. William H. Smith, 1939 gross; 232 long; San Francisco, Puget Sound and Australian ports, averaging every nine months.

Bark Harvard, 1566 gross; 218 long; San Francisco, Puget Sound and Australian ports, averaging every nine months.

Bktn. Monitor, 2247 gross; 264 long; San Francisco, Puget Sound and Australian ports, averaging every nine months.

NORTH ATLANTIC & WESTERN STEAMSHIP CO.,
PACIFIC STEAMSHIP COMPANY, AGENT

Operating the following privately-owned freight vessels:

S. S. M. C. Brush, steel.

S. S. Eastern Ocean, steel, 5868 gross; 11½ speed.

S. S. Yalza, steel.

S. S. West Isleta, steel, 5680 gross; 409-8 long; 12 speed.

S. S. West Togus, steel, 5628 gross; 409-8 long; 11½ speed.

S. S. Lehigh, steel, 5753 gross; 401 long; 11½ speed.

S. S. Artigas, steel, 5620 gross; 401 long; 11½ speed.

The above-listed vessels maintain ninety-day sailings between Philadelphia, Boston, Portland, Maine, Wilmington, San Francisco, Seattle and Portland, Oregon.

NORTHERN COMMERCIAL COMPANY,
1010 ALASKA COMMERCIAL BUILDING,
SAN FRANCISCO

Branches or agencies: Seattle, J. L. Burnside, 508 Alaska Building.

President, Louis Sloss; vice-presidents, William L. Gerstle, Louis Sloss, Jr., and Leon Liebes.

Operating the following privately-owned vessel:

M. S. Ozmo, wood, 765 gross; 160 long; 7 speed; San Francisco and Seattle to Bethel, Alaska, two or three trips each season.

NORTHERN FISHERIES, INC.,
141 CLAY STREET,
SAN FRANCISCO

President, Crescent P. Hale; vice-president, C. E. Cocks; secretary, C. I. Sturrock.

Operating the following privately-owned vessels:

Schr. Progress, power, 169 gross; San Francisco to Alaska.

Schr. Chas. Brown, 72 gross; San Francisco to Alaska.

NORTHWESTERN FISHERIES COMPANY,
PIER 11-B,
SEATTLE

President, K. L. Ames, Chicago; vice-president, P. L. Smithers, Chicago.

Operating the following privately-owned vessels:

S. S. Benj. F. Packard, 2156 gross; 244-2 long; Seattle to Nushagak, Alaska, yearly.

Bark Guy C. Goss, 1572 gross; 213.9 long; Seattle to Chignik, Alaska, yearly.

S. S. St. Paul, 1893 gross; 228-2; Seattle to Kenai, Alaska, yearly.

Tug A. B. Carpenter, 141 gross; 97-8; 8¾ speed; Seattle to Kenai, Alaska, yearly.

Tug Shelikof, 183 gross; 135 long; 10 speed; Seattle to Naknek, Alaska, yearly.

NORTON, LILLY & COMPANY,
AMERICAN NATIONAL BANK BUILDING,
SAN FRANCISCO

No report. Agents of Isthmian Line.

OCEANIC STEAMSHIP COMPANY,
2 PINE STREET,
SAN FRANCISCO

Branches or agencies: Los Angeles, A. M. Culber, 517 South Spring Street; Honolulu, C. Brewer & Company, Ltd.; Sydney, V. A. Sproul, Pitt & Bridge Streets.

President, J. D. Spreckels; vice-president, A. B. Spreckels; operating manager, F. S. Samuels; marine superintendent, W. J. Owens.

Operating the following privately-owned combination vessels:

S. S. Sonoma, 6279 gross; 400 long; 16½ speed; San Francisco to Sydney, via Honolulu and Samoa.

S. S. Ventura, 6282 gross; 400 long; 16½ speed; San Francisco to Sydney, via Honolulu and Samoa.

Sailings by these vessels every twenty-eight days.

OLIVER J. OLSON,
I DRUMM STREET,
SAN FRANCISCO

Operating manager, Oliver J. Olson, marine superintendent, Phil P. Sheridan.

Operating the following privately-owned vessels:

S. Schr. Florence Olson, 1185 gross; 213-7 long; 9 speed; coastwise.

S. Schr. Paraiso, steel, 1383 gross; 214 long; 9 speed; coastwise.

OREGON PINE, INCORPORATED,
OREGON FIR, INCORPORATED,
436 RAILWAY EXCHANGE BUILDING,
PORTLAND

President and operating manager, Frank S. Baillie; vice-president, James B. Kerr.

Operating the following privately-owned vessels:

Schr. Oregon Pine, wood, 2526 gross; to Australia.

Schr. Oregon Fir, wood, 2526 gross; to Australia.

H. P. OSTRANDER,
812 LEARY BUILDING,
SEATTLE

Operating the following privately-owned vessel:

Schr. Levi W. Ostrander, 5-masted; 1639 gross; 1502 net; freight and lumber, operating from Pacific Coast ports to South Africa, Australia, South America and Pacific Islands.

PACIFIC AMERICAN FISHERIES,
SOUTH BELLINGHAM,
WASHINGTON

President, E. B. Deming; vice-president, A. W. Deming; operating manager, H. B. Drisko; port engineer, Fred Heath.

Operating the following privately-owned freight vessels:

S. S. Windber, 2837 gross; 290 long; 9 speed.
S. S. Catherine D., 2224 gross; 250 long; 9 speed.
S. S. Redwood, 1793 gross, 235 long; 9 speed.
S. S. Norwood, 1323 gross; 210 long; 9 speed.

The vessels listed above are used in connection with the Alaska canneries and general freight of the Pacific American Fisheries.

PACIFIC COMMERCIAL NAVIGATION CO., LTD.,
HONOLULU

Vice-president, Ho Fon; operating manager, Chung K. Hi.

Operating the following privately-owned vessels:

Schr. Columbia, 4-masted, 663 gross; 181 long.
M. S. Pioneer, 436 gross; 162 long; 7 knots.

PACIFIC FREIGHTERS COMPANY,
310 CALIFORNIA STREET,
SAN FRANCISCO

President, Cyrus Ryder; vice-president, B. F. Mackall; secretary, R. H. Holmberg; treasurer, W. Leslie Comyn.

Operating the following privately-owned freight vessels:

Bktn. Alicia Haviside, 2265 gross; 266-5 long.
Bktn. Anne Comyn, 2265 gross; 266-5 long.
Bktn. Chas. F. Crocker, 860 gross; 204 long.
Bktn. Katherine Mackall, 2301 gross; 266-5 long.
Bktn. Phyllis Comyn, 2301 gross; 266-5 long.
Bktn. Russell Haviside, 2301 gross; 266 long.
Schr. Rosamond, 1030 gross; 201 long.
Schr. John W. Wells, 2528 gross; 267 long.
Schr. Watson A. West, 818 gross; 192 long.

The above-listed vessels operate between Pacific Coast ports and Australia, West Coast of South America and South Africa.

PACIFIC MAIL STEAMSHIP COMPANY,
508 CALIFORNIA STREET,
SAN FRANCISCO

Branches or agencies: Seattle, W. R. Grace & Company, Hoge Building; Los Angeles, M. E. McLaurin, 439 Merchants National Bank Building; Honolulu, Yokohama, Kobe, Shanghai, Hongkong, Manila, Singapore, Anapala, Mazatlan, Guatemala, Cristobal.

President, George J. Baldwin; vice-president and general manager, J. H. Rosseter; assistant general manager, Daulton Mann; marine superintendent, A. E. Moncaster; port captain, Andrew Martin; general freight agent, C. R. King; general passenger agent, W. A. Young, Jr.

Operating the following privately-owned vessels:

S. S. Colombia, combination, 5643 gross; 395 long; 14 speed; trans-Pacific, every three months.

S. S. Venezuela, combination, 5641 gross; 395 long; 14 speed; trans-Pacific, every three months.

S. S. Ecuador, combination, 5544 gross; 395 long; 14 speed; trans-Pacific, every three months.

S. S. San Jose, combination, 2135 gross; 296 long; 10 speed; San Francisco to Panama, every two months.

S. S. San Juan, combination, 2152 gross; 296 long; 10 speed; San Francisco to Panama, every two months.

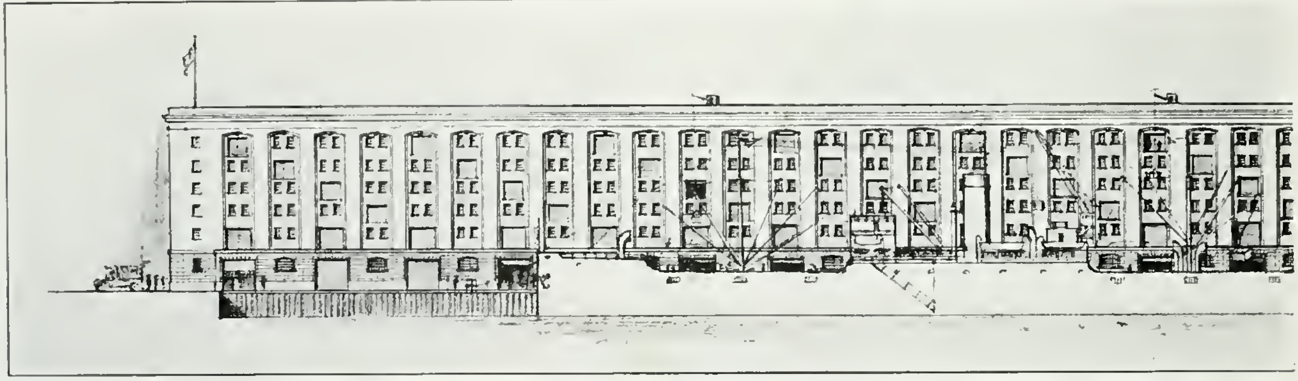
S. S. Newport, combination, 2643 gross; 348 long; 10 speed; San Francisco to Panama, every two months.

S. S. City of Para, combination, 3404 gross; 360 long; 10 speed; San Francisco to Panama, every two months.

S. S. Cuba, combination, 3130 gross; 307 long; 10 speed; San Francisco to Panama, every two months.

S. S. Colusa, combination, 5732 gross; 424 long; 12 speed; Manila to East India, every three months.

S. S. Santa Cruz, combination, 5081 gross; 398 long; 12 speed; Manila to East India, every three months.



Proposed warehouse and transit shed to be built by the State Harbor Board of San Francisco at China Basin

S. S. Point Adams, freight, 2675 gross; 300 long; 10 speed; San Francisco to Baltimore, every two months.

S. S. Point Bonita, freight, 2675 gross; 300 long; 10 speed; San Francisco to Baltimore, every two months.

S. S. Point Judith, freight, 2670 gross; 300 long; 10 speed; San Francisco to Baltimore, every two months.

S. S. Point Lobos, freight, 2670 gross; 300 long; 10 speed; San Francisco to Baltimore, every two months.

Operating the following Shipping Board freight vessels:

S. S. West Niger, 5987 gross; 410 long; 10 speed; trans-Pacific, every three months.

S. S. West Caddoa, 5647 gross; 410 long; 10 speed; trans-Pacific, every three months.

S. S. West Neris, 5987 gross; 410 long; 10 speed; trans-Pacific, every three months.

S. S. Eastern Exporter, 5744 gross; 398 long; 11 speed; Manila to East India, every three months.

S. S. West Sequana, 6128 gross; 410 long; 10 speed; around-the-world every six months.

S. S. Eastern Importer, 5786 gross; 398 long; 11 speed; around-the-world every six months.

S. S. West Mingo, 5940 gross; 410 long; 10 speed; around-the-world every six months.

S. S. Elkridge, 6462 gross; 415 long; 10 speed; around the world every six months.

S. S. West Calera, 5721 gross; 427 long; 10 speed; around-the-world every six months.

S. S. West Conob, 6036 gross; 410 long; 10 speed; around-the-world every six months.

S. S. Eastern Merchant, 8152 gross; 445 long; 11½ speed; around-the-world every six months.

S. S. West Kasson, 6085 gross; 410 long; 10 speed; around-the-world every six months.

S. S. Lake Fielding, 2571 gross; 251 long; 9 speed; Hongkong to Calcutta every two months.

S. S. Lake Gitano, 2606 gross; 251 long; 9 speed; Hongkong to Calcutta every two months.

S. S. Lake Gilpen, 2664 gross; 251 long; 9 speed; Hongkong to Calcutta every two months.

S. S. Lake Faulk, 2606 gross; 251 long; 9 speed; Hongkong to Calcutta every two months.

S. S. Lake Farmingdale, 2643 gross; 251 long; 9 speed; Hongkong to Calcutta every two months.

S. S. Doylestown, 2632 gross; 289 long; 9 speed; Hongkong to Calcutta every two months.

S. S. Jacox, 2740 gross; 289 long; 9 speed; Hongkong to Calcutta every two months.

S. S. Caddopeak, 2865 gross; 289 long; 9 speed; Hongkong to Calcutta every two months.

New vessels under construction or contract:

Tanker, not named, 9820 DWT; 435-8 long; 11½ speed.

It is expected that seven or eight of the new United States Shipping Board passenger vessels will be turned over to this company during the first six months of 1921 for operating to Honolulu, Yokohama, Kobe, Shanghai, Manila and Hongkong. The vessels are of the so-called "State" class, i. e., Golden State, Empire State, etc.; five of them are 535 feet long, 72 feet beam and 30 feet draft; DWT 12,600; displacement tonnage 21,167; speed 17½. Two or three will be of the 502 type; they will be used in the San Francisco-India service. After delivery to this company of all or any of the State vessels, the Ecuador, Colombia and Venezuela may be withdrawn, one vessel at a time or otherwise, as circumstances warrant, for operation in the Panama Line service to Mexico, Central America, Panama, Havana and Baltimore.

PACIFIC MOTORSHIP COMPANY,
310 CALIFORNIA STREET,
SAN FRANCISCO

Branches or agencies: Vancouver, B. C., E. Cunningham, 602 Yorkshire Building; Seattle, George S. Bush & Company, 259 Colman Building; Tacoma, George S. Bush & Company, 316 National Realty Building; Los Angeles, C. J. Lehman, 786 Pacific Electric Building; West Coast Central & South America, Pacific Steam Navigation Company, general agents.

President, R. J. Ringwood; marine superintendent, Captain Cyrus Ryder; general freight agent, H. W. Deas.

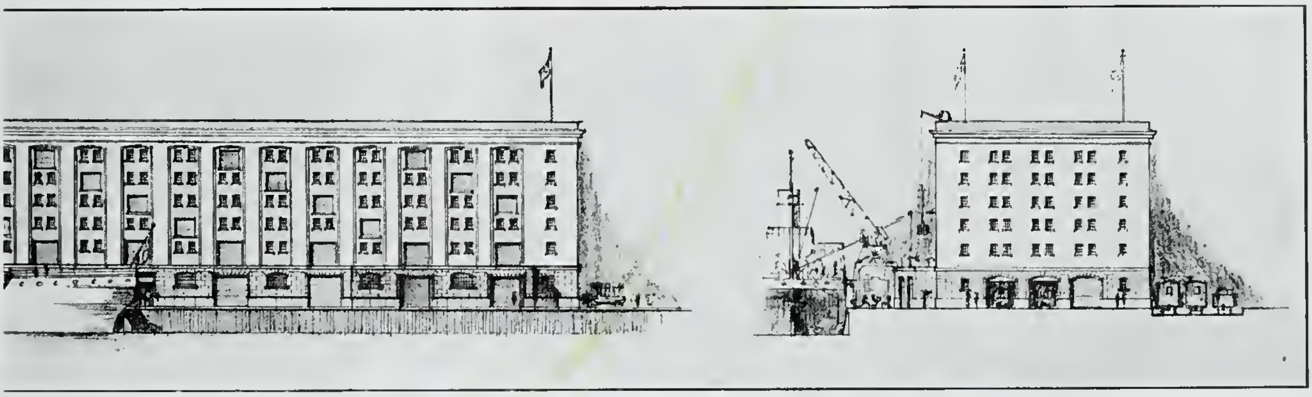
Operating the following privately-owned vessels:

M. S. Balcatta, 3109 gross; 268 long; 8 to 9 speed.
M. S. Babinda, 3099 gross; 268 long; 8 to 9 speed.
M. S. Benowa, 3093 gross; 268 long; 8 to 9 speed.
M. S. Boobyalla, 3099 gross; 268 long; 8 to 9 speed.

The above-listed four vessels maintain twenty-five day schedule between San Francisco and the West Coast of South America.

M. S. Coolcha, 2376 gross; 263 long; 8 to 9 speed.
M. S. Cethana, 2305 gross; 262 long; 8 to 9 speed.
M. S. Culburra, 2353 gross; 261 long; 8 to 9 speed.
M. S. Challamba, 2368 gross; 262 long; 8 to 9 speed.

The last-named four vessels maintain sailings every two weeks between San Francisco and the West Coast of Central America.



Proposed warehouse and transit shed to be built by the State Harbor Board of San Francisco at China Basin

PACIFIC STEAMSHIP COMPANY
(THE ADMIRAL LINE)
PERKINS BUILDING, TACOMA
GENERAL OFFICES, L. C. SMITH BLDG., SEATTLE

Branches or agencies:

Vancouver, A. B. Graham, agent, 605 Hastings Street; Seattle, general offices, L. C. Smith Building; Tacoma, R. W. Gillam, agent, Pacific Steamship Company's dock; Portland, F. J. O'Connor, general agent, 101 Third Street; Astoria, George W. Sanborn & Sons, agents, Sanborn dock; Grays Harbor; San Francisco, M. S. Cropley, assistant manager, 112 Market Street; Los Angeles, W. M. Cline, district freight agent and passenger agent, Citizens Bank Building.

Alaska: Anchorage, George Banbury, agent, 418 G Street; Cordova, L. H. Counts, agent, Empress Theater Building; Douglas, Guy L. Smith, agent, Third and D Streets; Juneau, J. H. Kline, agent, Pacific Steamship Company's dock; Kodiak, W. J. Erskine & Company, agents; Ketchikan, V. A. Peterson, agent, Heckman wharf; Petersburg, K. L. Steberg, agent; Seward, Wayne Blue, agent, Admiral Building; Seldovia, R. V. Anderson, agent; Sitka, Sitka Wharf & Power Company, agents; Skagway; St. Michael, American Yukon Navigation Company, agents; Thane, J. S. Reedy, agent; Valdez, Valdez Dock Company, agents; Wrangell, Leo McCormack, agent; Yakutat, Libby, McNeil & Libby, agents.

British Columbia: Victoria, R. P. Rithet & Company, agents.

California: Cayucos, James Cass & Company, agents; Eureka, W. E. Peacock, agent, wharf, F and C Streets; Hueneme, Hueneme Wharf Company, agents; Monterey, J. J. Harrington, aegnt; Moss Landing, John Scudder, Jr., agent; Port San Luis, R. E. Carey, agent; San Diego, S. T. Johnson, agent, municipal wharf; San Simeon, Hearst Estate Company, agents; Santa Barbara, Stearns Wharf Company, agents; Santa Cruz, E. Silvey, agent; Ventura, Ventura Wharf & Warehouse Company, agents; Wilimington, W. Parris, agent, municipal dock.

Central America: Acajutla, La Agencia Nacional, Ltd., agents; Champerico, Cia de Agencias de Champerico, Ltd., agents; Corinto, May & Griffith, agents; Guatemala City, G.c. Boef, general agent; La Libertad, Agencia Salvaderona, agents; La Union, International Railways of Central America, agents; San Jose de Guatemala, C. R. McGregor, agent..

Mexico: Acapulco, Juan Funes, agent; Manzanillo, Adolfo Stahl, agent; Mazatlan, Ramon Cevallos, agent; Salina Cruz, Sanjurjo y Moneros, agents.

Oregon: Marshfield, C. F. McGeorge, agent, Smith Terminal.

Washington: Everett, John Flynn, agent, Everett Imp. Company Wharf.

China: Shanghai, John J. Gorman, manager in Orient, 53 Szechuen Road, P. O. Box 503; Hongkong, H. Krull, agent, General P. O. Box 51; Dairen, E. L. Matteson, agent, 43 Yamagata-dori; Canton, Gerin, Drevard & Co., agents; Tientsin, Anderson Meyer & Co., agents: Hankow, Anderson Meyer & Co., agents; Amoy, Boyd & Co., agents; Tsingtau, Cornabe, Eckford & Co., agents.

Indo China: Haiphong, Denis Freres, agents; Saigon, Denis Freres, agents.

Japan: Kobe, E. E. Johnson, district agent, Japan, 7A Kaigan-dori, P. O. Box 308; Yokohama, Don Tinling, agent, 50 Yamashita Cho, P. O. Box 326; Nagasaki, Holme, Ringer & Co., agents; Moji, Wuriu Shokwai, agents; Otaru, Howell & Co., agents; Shimonoseki, Wuriu Shokwai, agents; Nagoya, Keneka Express Co., agents; Osaka, Gotan—Kingsbury Shoten, agents; 1 Saiwai Cho, Sanchome, Nishi-ku.

Philippine Islands: Manila, J. B. Armstrong, agent, 24 Calle David, P. O. Box 1636; Ilo Ilo, Pacific Commercial Co., agents; Zamboanga, Pacific Commercial Co., agents; Cebu, Pacific Commercial Co., agents.

Strait Settlements: Singapore, E. F. Townsend, agent, 2-2 Raffles Quay; Port Swettenham (Klang), Guthrie & Co., agents.

Siberia: Vladivostok, Howarth Lewis, agent, 21 Aleutskaya.

Korea: Seoul, J. H. Morris, agent.

Formosa: Daitotei, J. C. Whitney & Co., agents; Keelung, Samuel, Samuel & Co., agents; Taipeh (Taikoku), Samuel, Samuel & Co., agents.

Siam: Bangkok, Anglo Siam Corporation, agents.

Celebes: Macassar, Manders, Seeman & Co., agents.

Java: Sourabaya, Pitcairn Syme & Co., agents; Samarang, Pitcairn Syme & Co., agents; Batavia, Pitcairn Syme & Co., agents.

Australia: Sidney, W. S. G. Horwood, agent, Macquarie Place.

India: Bombay, King, King & Co., agents; Calcutta, Cox Shipping Agency, agents; Colombo, Shaw Wallace & Co., agents.

Hawaiian Islands: Honolulu, Fred L. Waldron, Ltd., agents.

British North Borneo: Sambakan, Harrison & Crossfield, agents.

President: H. F. Alexander; vice-president and general manager, A. F. Haines; operating manager, H. C. Cantelow; marine superintendent, A. J. Storrs; port engineer, J. D. Gilmour. E. H. Hall, comptroller; J. D. Amos, assistant treasurer; J. H. Cooper, assistant to president; R. D. Pinneo, freight traffic manager; E. G. McMicken, passenger traffic manager; C. E. Flye, general freight agent; R. L. Betts, auditor; A. R. Gardner, general purchasing agent; P. Ottesen, general commissary; M. F. Tarpey, port captain (coastwise); E. L. McNoble, port captain (foreign); L. L. Bates, foreign freight agent; J. J. Gorman, manager Orient (Shanghai); M. F. Cropley, assistant manager (San Francisco).

Operating the following privately-owned vessels:

S. S. Spokane, steel, 2277 gross; 280 LOA; 11-3 speed.

S. S. City of Seattle, steel, 1958 gross; 257-6 LOA; 13.2 speed.

S. S. Admiral Rodman, wood, 1101 gross; 186-6 LOA; 8 speed.

The above listed three vessels maintain a ten-day schedule between Puget Sound and Southeastern Alaska ports, with the exception of S. S. Admiral Rodman, which is irregular.

S. S. Admiral Watson, steel, 2009 gross; 253-1 LOA; 12.5 speed; Puget Sound to Southwestern Alaska ports every twenty-one days.

S. S. Admiral Schley, steel, 2104 gross, 202 LOA; 13.5 speed.

S. S. Admiral Dewey, steel, 2104 gross; 292 LOA; 13.5 speed.

S. S. Queen, iron, 2727 gross, 366 LOA; 14.5 speed.

S. S. Admiral Evans, steel, 2140 gross; 253-1 LOA; 12.5 speed.

The four last-named vessels operate every fourteen days between Puget Sound, San Francisco, Wilmington and San Diego.

S. S. Governor, steel, 5475 gross; 416-9 LOA; 16.8 speed.

S. S. President, steel, 5453 gross; 416-9 LOA; 16.3 speed.

The S. S. Governor and S. S. President operate every fourteen days between Puget Sound, Victoria, San Francisco and Wilmington.

S. S. Admiral Goodrich, steel, 1419 gross; 230 LOA; 11.2 speed.

S. S. Admiral Sebree, steel, 2446 gross; 256 LOA; 9.3 speed.

The two last-named vessels operated from Puget Sound to California ports.

S. S. Senator, steel, 2432 gross; 292 LOA; 11.3 speed.

S. S. Admiral Farragut, steel, 2142 gross; 292 LOA; 13.5 speed.

The two vessels listed above operate from San Francisco to Mexican and Central American ports every forty-five days.

S. S. Curacao, steel, 1548 gross; 257.7 LOA; 10.5 speed; operating every twelve days between San Francisco, Eureka, Coos Bay, Astoria and Portland.

S. S. Admiral Nicholson, steel, 678 gross; 148 LOA; 7.5 speed; weekly sailings San Francisco, Santa Cruz, Moss Landing, Monterey, San Simeon, port San Luis, Santa Barbara.

M. S. Wood, 1935 gross; 267 LOA; 6 speed; trans-Pacific ports from Puget Sound.

Operating the following Shipping Board vessels:

S. S. Endicott, steel, 6319 gross; 415-11 LOA; 10½ speed.

S. S. Eldridge, steel, 7001 gross; 423-9 LOA; 11 speed.

S. S. Wheatland Montana, steel, 7001 gross; 423-9 LOA; 10½ speed.

S. S. City of Spokane, steel, 6404 gross; 415-11 LOA; 10½ speed.

S. S. Cross Keys, steel, 6869 gross; 423-9 LOA; 10½ speed.

The five vessels listed above maintain a three-week sailing schedule between Puget Sound, Yokohama, Kobe, Dairen, Shanghai, Manila, Hongkong, Singapore, etc.

S. S. Montague, steel, 6076 gross; 416-11½ LOA; 11 speed.

S. S. Abercos, steel, 6076 gross; 416-11½ LOA; 10½ speed.

S. S. Pawlet, steel, 6076 gross; 416-11½ LOA; 10½ speed.

S. S. Coaxet, steel, 6155 gross; 416-11½ LOA; 10½ speed.

The four last-named vessels operate monthly from Portland to Yokohama, Kobe, Shanghai, Hongkong, Manila, etc.

The following six vessels operate from Puget Sound and Portland to trans-Pacific ports, irregular sailings:

S. S. West Hartland, steel, 6167 gross; 423-9 LOA; 10 speed.

S. S. Western Knight, steel, 5776 gross; 426-6 LOA; 12 speed.

S. S. Osaqumsick, steel, 6001 gross; 416-10 LOA; 11 speed.

S. S. Elkton, steel, 6318 gross; 423-9 LOA; 10½ speed.

S. S. Iconium, steel, 6032 gross; 416-10 LOA; 11 speed.

S. S. Wawalona, steel, 6076 gross; 416-11½ LOA; 10½ speed.

PACIFIC STEAMSHIP COMPANY
AGENT, NORTH ATLANTIC & WESTERN STEAMSHIP COMPANY

See North Atlantic & Western.

PAN-AMERICAN LINE,
220 FRONT STREET,
SAN FRANCISCO

Branches or agencies: Vancouver, Kingsley Navigation Company, Pacific Building; Los Angeles, John McLaurin, Central Building.

President, Adolfo Stahl; vice-president, Donald Lindo; operating manager, John C. Settle; port engineer, Phil P. Sheridan.

Operating the following privately-owned freight vessels:

S. S. San Antonio, 785 gross; 158 long; 8 speed; San Francisco to Mexico and Central America every thirty days.

Str. Griffdu, 1484 gross; 220 long; 12 speed; chartered.

PAN AMERICAN PETROLEUM & TRANSPORT COMPANY,
SECURITY BUILDING,
LOS ANGELES

At present this company is not operating any vessels on the Pacific Coast.

PARR-MC CORMICK STEAMSHIP LINE,
800 FIFE BUILDING,
SAN FRANCISCO

Branches or agencies: Seattle, Pier 4; Portland, 181 Burnside Street; San Francisco, Pier 7.

President, Fred D. Parr.

Operating the following privately-owned vessel:

S. S. Daisy Freeman, wood, 614 gross; 173-5 long; 7½ to 9 speed; calling at Pacific Coast ports every two weeks.

L. A. PEDERSEN,
112 MARKET STREET,
SAN FRANCISCO

President and operating manager, L. A. Pedersen.

Operating the following privately-owned vessels:

S. S. Costa Rica, 1783 gross; 221-5 long; San Francisco to Bristol Bay.

Bktn. City of Sidney, 2903 gross; 339 long; San Francisco to Australia.

Bktn. Kate G. Pedersen, 2106 gross; 266 long; offshore.

Bark McLaurin, 1374 gross; 200-8 long; San Francisco to Bristol Bay.

Bark Narwhal, 523 gross; 149-5 long; San Francisco, offshore.

PETROLEUM PRODUCTS CO. OF CALIFORNIA,
INSURANCE EXCHANGE BUILDING,
SAN FRANCISCO

No report. One steamship.

PHILIPPINE VEGETABLE OIL COMPANY,
MANILA

No report. Three motorships.

POPE & TALBOT,
SAN FRANCISCO

President, W. H. Talbot; vice-president, A. G. Harms; port engineer, J. F. Primrose.

Operating the following privately-owned vessel:

S. Schr. Yosemite, 827 gross; 193 long; 9 speed; San Francisco to Puget Sound every two weeks.

PORT BLAKELY MILL COMPANY
SEATTLE

President, D. E. Skinner; vice-president, John W. Eddy.

Operating the following privately-owned vessel:

Schr. Bainbridge, sail, 567 gross; 174 long; operating in Pacific Ocean.

RED SALMON CANNING COMPANY,
73 MAIN STREET,
SAN FRANCISCO

President and general manager, Frank B. Peterson; vice-president, Ferd. C. Peterson.

Operating the following privately-owned vessels:

Bark Hecla.

Bark St. Katherine.

Stmr. Lehua.

The above mentioned vessels laid up in Oakland Creek; are used only during summer months, when they make the trip to salmon canneries in Alaska.

REMCO STEAMSHIP COMPANY,
1600 HOBART BUILDING,
SAN FRANCISCO

President, C. J. Wood; vice-president and operating manager, C. E. De Camp.

Operating the following privately-owned vessels:

S. S. Caspar, 648 gross; 175-1 long; 9 speed; sailing every six days Pittsburg to Caspar.

S. S. Lakme, 529 gross; 176-8 long; 9 speed; sailing every six days Pittsburg to Caspar.

ROBIN LINE STEAMSHIP COMPANY,

L. C. SMITH BUILDING,
SEATTLE

No report. Robin steamships.

ROBINSON FISHERIES COMPANY,

ANACORTES, WASHINGTON

No report. Two vessels.

THE SAN FRANCISCO & PORTLAND STEAMSHIP COMPANY,

673 MARKET STREET,
SAN FRANCISCO

Branches or agencies: Portland, C. F. Heywood, Ainsworth dock; Astoria, J. P. Tapscott; San Francisco, F. O. Schullerts agent, Pier 38, O. B. Englehart, city freight agent.

President, Carl R. Gray, Omaha, Nebraska; operating manager, F. Schafer; general freight agent, H. E. Leunsbury; general passenger agent, William McMurray, Portland.

Operating the following privately-owned vessels:

S. S. Rose City, combination, 3468 gross; 336 long; 14 speed; San Francisco to Astoria and Portland, every five days.

Operating the following chartered vessel:

S. S. Alaska, combination, 3742 gross; 327 long; 14 speed; San Francisco to Astoria and Portland, every five days.

SANDERS & KIRCHMANN,

212 AMERICAN NATIONAL BANK BUILDING,
SAN FRANCISCO

Affiliated with Wolff, Kirchmann & Company, importers and exporters, same address.

President, J. M. Kirchmann; operating manager, H. Kirchmann; marine superintendent, C. W. Wikander.

Operating the following privately-owned vessels in Pacific trades:

Schr. Philippine, 523 gross; 162 long.
Schr. Luzon, 545 gross; 170 long.
Schr. Forester, 663 gross; 184 long.
Schr. Commerce, 658 gross; 184 long.
Schr. Samar, 710 gross; 189 long.

SHELL COMPANY OF CALIFORNIA,

343 SANSOME STREET,
SAN FRANCISCO

President, J. C. Van Eck; vice-president, H. R. Gallagher.

Operating the following privately-owned vessels:

Tanker Silver Shell, 5614 gross; 427 long; 10 speed.
Tanker Gold Shell, 5614 gross; 427 long; 10 speed.
Tanker Pearl Shell; 5614 gross; 427 long; 10 speed.

W. S. SCAMMELL & COMPANY,

FIFE BUILDING,
SAN FRANCISCO

Operating manager, Walter S. Scammell.

Operating the following privately-owned vessels:

Schr. Forest Home, 4-masted, 763 gross; 173 long.
Schr. Port Laramie, 6-masted, 2140 gross; 264 long.
Schr. La Merced, 4-masted auxiliary, 1696 gross; 232 long; 5 speed.
Schr. Mindora, 3-masted, 679 gross; 165 long.

The above listed vessels operate in the Pacific Ocean and South Seas.

S. S. Humboldt (White Flyer Line), 1068 gross; 213 long; 14 speed; passenger service San Francisco to Los Angeles, every four days.

Bktn. Amy Turner, under British flag.

H. G. SEABORN,

(SEABORN SAILERS),
SEATTLE

Operating the following privately-owned vessels:

Schr. Meteor, wood, 600 gross; 177-3 long.
Schr. Mindanao, wood, 566 gross; 164-8 long.
Schr. Spokane, wood, 571 gross; 183 long.
Schr. Sophie Christenson, wood, 675-52 gross; 64-5 long.
Schr. Gamble, wood, 726 gross; 183-7 long.
Schr. Camano, wood, 730 gross; 184-7 long.

STANDARD OIL COMPANY OF CALIFORNIA,

200 BUSH STREET,
SAN FRANCISCO

J. C. Rohlfs, marine superintendent.

Operating the following privately-owned vessels:

S. S. Atlas, 3000 DWT.
S. S. Captain A. F. Lucas, 6000 DWT.
S. S. Col. E. L. Drake, 6000 DWT.
S. S. D. G. Scofield, 12,000 DWT.
S. S. El Segundo, 5200 DWT.
S. S. J. A. Moffett, 9000 DWT.
S. S. Richmond, 9000 DWT.
S. S. K. R. Kingsbury, 12,000 DWT; building.
S. S. R. J. Hanna, 10,200 DWT; building.
S. S. S. C. T. Dodd, 10,000 DWT; building.
S. S. W. S. Miller, 10,200 DWT; building.
Three unnamed steamers, 15,000 DWT each; building.
M. S. Charlie Watson, 3000 DWT.
M. S. unnamed, 5500 DWT; building.
Tow Barge No. 91, 3500 DWT.
Tow Barge No. 93, 3900 DWT.
Tow Barge No. 95, 7050 DWT.

The above-listed vessels are operating coastwise and to foreign ports.

The following named vessels operate on inland waters:

Barge Benicia, gas engine, bulk fuel oil boat.
Barge Contra Costa, gas engine, bulk fuel oil boat.
Barge Pico, gas engine, bulk refined oil boat.
Barge Petroleum, bulk refined oil and package boat.
Barge Petroleum II, bulk refined oil and package boat.
S. S. Petroleum III, stern wheel steamer, bulk refined and package oil boat.
Six launches, Dispatch No. 1, No. 2, No. 3, No. 4, No. 5 and No. 6; freight and tow boats.
Steam tug boat Standard No. 1, towing and docking.
Steam tug boat Standard No. 2, ocean towing.
Barge No. 1, bulk fuel oil.
Barge No. 2, case and barrelled goods.
Barge No. 3, bulk fuel oil.
Barge No. 4, bulk fuel oil.
Barge No. 5, bulk fuel oil.

Barge No. 6, floating service station.
Barge No. 7, bulk fuel oil.
Barge No. 8, self-propelled machine shop.

STRUTHERS & DIXON, INC., 343 SANSOME STREET, SAN FRANCISCO

Branches or agencies: Seattle, 321 L. C. Smith Building; Yokohama, Kobe, Shanghai, Hongkong, Manila, Saigon, Singapore.

President, H. S. Struthers; vice-president, A. Dixon and L. Everett; general manager, F. M. Barry; marine superintendent, W. W. Scott; port engineer, P. P. Sheridan.

Operating the following Shipping Board steel cargo vessels:

S. S. Colorado Springs, 7003 gross; 410 long; 10 speed.

S. S. West Cactus, 5642 gross; 410 long; 10½ speed.

S. S. West Henshaw, 5780 gross; 410 long; 10½ speed.

S. S. Hathaway, 5991 gross; 402 long; 11 speed.

S. S. West Carmona.

S. S. West Islip, 5900 gross; 410 long; 11½ speed.

The above listed six vessels operate on twenty-day schedule from San Francisco to Japan, China, Philippines, Saigon, Singapore.

S. S. Deuel, 5586 gross; 410 long; 10½ speed.

S. S. West Himrod, 5866 gross; 410 long; 10½ speed.

S. S. West Ison, 5773 gross; 410 long; 11½ speed.

S. S. West Ivis, 5866 gross; 410 long; 11½ speed.

S. S. West Jena, 5866 gross; 410 long; 11½ speed.

S. S. West Jessup, 5866 gross; 410 long; 11½ speed.

The above listed six vessels operate on twenty-day schedule from Seattle to Japan, China, Philippines, Saigon, Singapore.

The following listed five vessels operate on "Round the World Service":

S. S. West Cajoot, 6036 gross; 410 long; 9 speed.

S. S. Waban, 6155 gross; 402 long; 11 speed.

S. S. Brave Coeur, 6319 gross; 402 long; 11½ speed.

S. S. Eastern Trader, 461 long; 10 speed.

S. S. Elkhorn, 6321 gross; 402 long; 11½ speed.

Also operating fleet of tank steamers on account of Shipping Board, on Pacific, including S. S. City of Reno, Miskianza, Quabbin, Derbyline, Inlay, Salina, Durango, Stockton.

SUDDEN & CHRISTENSON, 110 MARKET STREET, SAN FRANCISCO

Branches or agencies: Portland; New York; Aberdeen, H. A. Benham Company; Hoquiam, F. G. Foster Company; Los Angeles.

President, E. A. Christenson; vice-president, D. W. Rasor; port engineer, James W. Pendergast; secretary, A. B. Cahill.

Operating the following privately-owned vessels:

S. S. Edna, 1783 gross; 276-3 long; 9 speed.

S. S. Caoba, 579 gross.

S. S. Carmel, 633 gross.

S. S. Brooklyn, 333 gross.

S. S. Charles Christenson, 839 gross.

S. S. Chehalis, 663 gross.

S. S. Grays Harbor, 660 gross.

S. S. Raymond, 596 gross.

Operating the following Shipping Board vessels:

S. S. West Kader, 5751 gross; 427 long; 10½ speed.

S. S. West Cahokia, 5720 gross; 427 long; 10½ speed.

S. S. Crown City, 5490 gross; 423-9 long; 10½ speed.

S. S. Westboro, 5769 gross; 423-9 long; 10½ speed.

S. S. Pansa, 4839 gross; 396 long; 10½ speed.

S. S. West Hesseltine, 5588 gross; 410-5½ long; 10½ speed.

S. S. Topa Topa, 5490 gross; 423-9 long; 10½ speed.

S. S. Haynie, 6037 gross; 416-6 long; 10½ speed.

SWAYNE & HOYT, INC., 430 SANSOME STREET, SAN FRANCISCO

Branches or agencies: Seattle, A. M. Gillespie, Inc., 719 Arctic Building; Los Angeles, 794 Pacific Electric Building.

President, R. H. Swayne; vice-president, J. G. Hoyt; operating manager, Charles E. Brown; marine superintendent, Captain J. S. Gade; port engineer, H. F. Gelhaus; secretary, B. Henderson.

Operating the following privately-owned vessels:

Pacific-Caribbean & Gulf Line, from San Francisco, and Puget Sound and Los Angeles to New Orleans, via Panama Canal, North Coast of Colombia and Cuba; sailings monthly:

S. S. Alvarado, steel, shelter-deck freighter, 2053 gross; 240 long; 8 speed.

S. S. Eldorado, steel, shelter-deck freighter, 2310 gross; 245 long; 8¾ speed.

S. S. Iris, iron, shelter-deck freighter, 2858 gross; 304 long; 9 speed.

Arrow Line, lumber and general merchandise trade, San Francisco to Coos Bay, Oregon, sailings every 10 days.

S. Schr. Yellowstone, wood, 767 gross; 188.6 long; 9 to 10 speed.

California & Mexico Steamship Company, from San Francisco and Los Angeles to West Coast Lower California and Mexico:

M. S. Mazatlan, steel, freight and passengers, 967 gross; 165 long; 8½ speed.

Operating the following Shipping Board vessels:

Pacific-Argentine-Brazil Line, San Francisco, Puget Sound, Los Angeles, to East Coast South America, via Straits of Magellan, and returning either through Panama Canal or Straits of Magellan; sailings monthly:

S. S. Pallas, steel shelter-deck freighter, 4839 gross; 386 long; 9½ speed.

S. S. Rotarian, steel shelter-deck freighter, 4839 gross; 386 long; 9½ speed.

S. S. West Norranus, steel shelter-deck freighter, 5652 gross; 410 long; 9½ speed.

S. S. West Notus, steel shelter-deck freighter, 5652 gross; 427 long; 9½ speed.

SAN JUAN FISHING & PACKING COMPANY, STACEY STREET, SEATTLE

No report. Two steamships.

STEAMER FAIRHAVEN COMPANY, SAN FRANCISCO

Branches or agencies: W. L. Davenport, Los Angeles.

President, J. E. Davenport; vice-president, A. Swanston; operating manager, J. E. Davenport; marine superintendent, A. L. Laur; port engineer, T. L. Tomlinson.

Operating the following privately-owned vessel:

S. S. Fairhaven, freight, 1087 gross; 185-5 long; San Francisco to Panama Canal every eight weeks.

The company also operates the freight steamships Davenport, 911 gross, 200-1 long; Tiverton, 557 gross, 155 long; and the schooner K. V. Kruse, 1728 gross, 252 long. J. O. Davenport is managing owner of the steamships, and J. E. Davenport of the schooner. The steamships are used coastwise and the schooner as chartered.

STERLING SHIPPING COMPANY,
2530 MT. CLAIRE DRIVE,
SEATTLE

No report. Two sailing vessels.

A. F. THANE & COMPANY,
311 CALIFORNIA STREET,
SAN FRANCISCO

Branches or agencies: Shanghai, 26 Canton Road.

President, A. F. Thane; vice-president, Donald Macdonald; operating manager, H. I. Zimet; marine superintendent, W. H. Neunaber.

Operating the following privately-owned vessels:

Schr. Alumna, 696 gross; 189 long.

Bktn. Echo, 708 gross; 183 long.

M. S. Oronite, 1704 gross; 232 long.

THORNDYKE-TRENHOLME COMPANY, INC.,
720 SMITH BUILDING,
SEATTLE

Branches or agencies: San Francisco, Thorndyke-Trenholme Company of California.

President, G. F. Thorndyke; vice-president and operating manager, H. W. Ross; port engineer and marine superintendent, Rowland C. Clapp; secretary and treasurer, G. M. Starr.

Operating the following Shipping Board steel vessels:

S. S. Kayseeka, 5989 gross; 401 long; 11 speed.

S. S. Eastern Gale, 5666 gross; 410 long; 10 speed.

S. S. Yosemite, 6149 gross; 402-6 long; 9 speed.

S. S. Eastern Victor, 5726 gross; 410 long; 10 speed.

S. S. Western Cross, 5778 gross; 410-5½ long; 8 speed.

S. S. Jalapa, 6085 gross; 402-6 long; 11 speed.

UNITED STATES ARMY TRANSPORT SERVICE, FORT MASON, SAN FRANCISCO

Operating the following combination army transports in the Pacific Service:

Great Northern, 8255 gross; 509-5 long; 23 speed; San Francisco-Honolulu-Manila.

Sheridan, 7496 gross, 445-5 long; 12 speed; same route.

Thomas, 7685 gross; 445-5 long; 12 speed; same route.

Logan, 7519 gross; 445-5 long; 12 speed; same route.

Sherman, 7580 gross; 445 long; 12 speed; same route.

Madawaska, 9410 gross; 490-4 long, 15 speed; same route.

Operating the following animal and freight transport:

Dix, 7212 gross; 436-4 long; 10 speed; same route.

Operating the following freight transport:

Edgemoor, 6970 gross; 409-5 long; 10 speed; San Francisco-Honolulu-Manila-New York.

UNION FISH COMPANY,
141 CLAY STREET,
SAN FRANCISCO

President, Crescent P. Hale; vice-president, C. E. Cocks; secretary, C. I. Sturrock.

Operating the following privately-owned vessels:

M. S. Golden State, 353 gross.

Schr. Sequoia, 341 gross.

Schr. Louise, 345 gross.

Schr. Beulah, 356 gross.

Schr. Galilee, 354 gross.

The above-listed vessels operate between San Francisco and Alaska.

UNION OIL COMPANY OF CALIFORNIA, LOS ANGELES

Branches or agencies: Vancouver, J. Ruddock; Seattle, W. J. Condlon; Portland, V. H. Kelly; San Francisco, A. Atwood; Los Angeles, E. S. Sharp; Honolulu, H. B. Weller.

President, W. L. Stewart; vice-president, E. W. Clark; operating manager, Max H. Dyer; marine superintendent, Captain Edward Bugge; port engineer, Albert O. Pegg; purchasing agent, F. M. Berry.

Operating the following privately-owned vessels:

S. S. Argyll, 2-deck, 2753 gross; 320-2 long; 9.1 speed; San Francisco to North Pacific ports of the United States, every ten days.

S. S. Oleum, 2-deck, 2950 gross; 293 long; 9.5 speed; San Francisco to North Pacific ports of the United States.

S. S. Washtenaw, 2-deck, 2897 gross; 315-3 long; 9.5 speed; San Francisco to North Pacific ports of the United States.

S. S. Whittier, single-deck, 1296 gross; 240 long; 9.5 speed; Port San Luis, Oleum and Coast ports, every ten days.

S. S. Coalinga, 2-deck, tanker, 7318 gross; 471 long; 10 speed; Tampico to Chile, every forty days.

S. S. Los Angeles, 2-deck, tanker, 6872 gross; 435 long; 10 speed; Tampico to Chile, every forty days.

S. S. La Brea, 2-deck, tanker, 6900 gross; 435 long; 10 speed; Port San Luis to Honolulu, every twenty-two days; occasional trips to Vancouver, B. C.

S. S. Lansing, 2-deck, tanker, 4561 gross; 400 long; 10 speed; Port San Luis to Honolulu, every twenty-two days; occasional trips to Vancouver, B. C.

Barge Fullerton, schr. rigged, 1554 gross; 235 long; towed; San Francisco and Port San Luis to San Diego, every five days.

Barge Erskine M. Phelps, schr. rigged, 3030 gross; 312-1 long; San Francisco, Port San Luis and San Diego, every five days.

Barge Simla, schr. rigged, 2237 gross; 278-2 long; San Francisco, Port San Luis and San Diego, every five days.

New vessels under construction or contract:

Tanker La Placentia, shelter deck, 8600 gross, estimated; 457 long; 11.5 speed; delivery about March or April, 1921.

Tanker Montebello, shelter deck, 8600 gross, estimated; 457 long; 11.5 speed; delivery about March or April, 1921.

Tanker, no name, 2-deck, 8600 gross, estimated; 457 long; 11.5 speed; contract placed, construction to start at once; delivery end of 1921.

Tanker, no name, 2-deck, 4900 gross, estimated; 406 long; 11 speed; contract placed; delivery, estimated, July, 1921.

UNITED AMERICAN LINES, INC.

See American-Hawaiian Steamship Company.

FRANK WATERHOUSE & COMPANY, SEATTLE

Branches or agencies: Vancouver, Rogers Building; Seattle, Central Building; Tacoma, Fred Tuttle, Perkins Building; Portland, Statter & Johnstone, Lewis Building; San Francisco, McCormick & McPherson; Los Angeles, McCormick & McPherson; Yokohama, Kobe, Hongkong, Shanghai, Manila.

President, Frank Waterhouse; vice-presidents, N. H. Begley, J. R. Lane; operating manager, Keith G. Fisken; marine superintendent, Captain John Jordison; port engineer, William Peel; traffic manager, W. D. Benson.

Operating the following Shipping Board freight vessels:

S. S. Delight, 5141 gross; 396 long; 10 speed; trans-Pacific every three months.

S. S. West Ivan, 5588 gross; 423-9 long; 11 speed; trans-Pacific every three months.

S. S. West Jappa, 5866 gross; 426 long; 11 speed; trans-Pacific every three months.

S. S. West Jester, 5866 gross; 426 long; 11 speed; trans-Pacific every three months.

WESTERN WHALING & TRADING COMPANY, 905 FIRST NATIONAL BANK BUILDING, SAN FRANCISCO

President, R. Spreckels; vice-president, J. F. Judge; secretary, H. Spreckels; operating manager, L. L. Lane.

Operating the following privately-owned whaling vessel:

Schr. Carolyn Francis, aux. schr., 570 gross; 146 long; 8 speed; sailings about every four months.

THE WHITE FLYER LINE,

See W. S. Scammell & Company.

WILLIAMS, DIMOND & COMPANY, EUROPEAN - PACIFIC LINE, 310 SANSOME STREET, SAN FRANCISCO

Branches or agencies: Seattle, W. C. Dawson, Mutual Life; Portland, Columbia Pacific Shipping, Board of Trade Building; Los Angeles, McCormick & McPherson, Merchants' National Bank Building.

Partnership, W. D. Clark, E. R. Dimond and H. W. Poett; operating manager, John E. Cushing; general freight agent, F. A. Hooper.

Operating the following Shipping Board vessels:

S. S. Bakersfield, 5997 gross, 410-5½ long; 10.5 speed.

S. S. Cickaponset, 5996 gross; 402.6 long; 11 speed.

S. S. Dewey, 5631 gross; 410-5½ long; 10.5 speed.

S. S. Eelbeck, 6425 gross; 402 long; 11.5 speed.

S. S. Effingham, 6324 gross; 402 long; 11.5 speed.

S. S. Eastern Sailor, 6060 gross; 415 long; 10.5 speed.

S. S. Fort Wayne, 6245 gross; 410-5½ long; 10 speed.

S. S. Hawarden, 6442 gross; 402-6 long; 11 speed.

S. S. Olen, 5311 gross; 380 long; 10.5 speed.

S. S. Orani, 6040 gross; 402-6 long; 11.5 speed.

S. S. Pomona, 7583 gross; 440 long; 10.5 speed.

S. S. Waterbury, 5990 gross; 401 long; 10 speed.

S. S. West Cayote, 6108 gross; 410-5½ long; 10.5 speed.

S. S. West Katan, 5656 gross; 410-5½ long; 10.5 speed.

S. S. West Kedron, 5621 gross; 410-5½ long; 10.5 speed.

The above-listed vessels operate between San Francisco, Seattle, Portland, San Pedro and United Kingdom ports, Havre, Antwerp, Rotterdam and Hamburg.

See also American-Hawaiian Steamship Company.

WILMINGTON TRANSPORTATION COMPANY, PACIFIC ELECTRIC BUILDING, LOS ANGELES

No report. Three steamships.

WOLFF, KIRCHMANN & COMPANY,

See Sanders & Kirchmann.

E. K. WOOD LUMBER COMPANY, No. 1 DRUMM STREET, SAN FRANCISCO

Branches or agencies: Portland, Northwestern Bank Building; Grays Harbor, Los Angeles, and Bellingham, Washington.

President, F. J. Wood; vice-president, W. T. Wood; general manager, C. A. Thayer; marine superintendent, George M. Magruder; assistant general manager, W. G. Richards.

Operating the following privately-owned vessels:

Schr. Alert, 623 gross; 174-5 long.

Schr. Dauntless, 548 gross; 162-2 long.

Schr. Defiance, 604 gross; 179-8 long.

Schr. Fearless, 736 gross; 182-5 long.

Schr. Fred J. Wood, 681 gross.

M. S. Lassen, 717 gross; 170-2 long; 9 speed; coastwise.

Schr. Resolute, 684 gross; 182-2 long.

S. Schr. San Jacinto, 614 gross; 158 long; 8 speed; coastwise.

S. Schr. Shasta, 878 gross; 195 long; 8 speed; coastwise.

M. S. Sierra, 1034 gross; 210 long; 8 speed; coastwise.

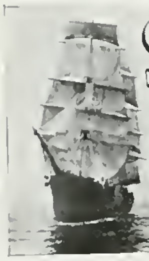
S. Schr. Siskiyou, 884 gross; 205 long; 10 speed; coastwise.

S. Schr. Tamalpais, 574 gross; 175 long; 10½ speed; coastwise.

Schr. Vigilant, 1603 gross; 262 long.

ASSOCIATIONS AND CONFERENCES PACIFIC MERCHANT MARINE

The Pacific American Steamship Association



SINCE the early days of Pacific Ocean shipping, and more especially during the last decade, a need had been felt for co-operation among steamship companies. The day of secrecy in ship operation has long since passed. The steamer revolutionized ocean transportation by enabling the operator to run his ships on schedule. Problems developed, common to every ocean carrier, and it was found on the Pacific Coast as well as elsewhere that individual companies were devoting a large amount of time and energy to solving the same problems.

For this reason steamship companies held meetings among themselves to discuss and dispose of such questions in the light of all information that could be supplied by everyone affected. These meetings were found to be exceedingly beneficial, and then and there the need for an organization to carry on this work was felt. For this reason a spontaneous movement throughout the United States sprang up, and steamship associations were formed throughout the country. At the outbreak of the great war the demand for tonnage became tremendous, and various steamship associations began functioning with great success. When this country entered the war, and the Shipping Board was formed, the need for these organizations was doubled.

Organized in 1919

A meeting of Pacific Coast steamship owners was held in the offices of the Pacific Steamship Company, 112 Market Street, San Francisco, on Tuesday, May 13, 1919. The following companies were represented: Robert Dollar Company, W. R. Grace & Company, Gulf Mail Steamship Company, Matson Navigation Company, Oceanic Steamship Company, Pacific Steamship Company, Pacific Mail Steamship Company, Struthers & Dixon, Swayne & Hoyt, Williams, Dimond & Company. At this meeting the Pacific American Steamship Association was formed. A temporary chairman and an acting secretary were elected. A committee previously appointed submitted a tentative draft of the by-laws, which were adopted at a subsequent meeting. Out of this meeting grew the Pacific American Steamship Association.

The association was formed for the specific purpose of providing a medium for discussion and action in matters involving national, state or municipal legislation and policies affecting owners or operators on the Pacific Coast of American vessels engaged in carriage of cargo, passengers or oil, and generally for the purpose of promoting the welfare of the American merchant marine.

The association has been very successful in its activities, and has been the means of focusing the opinion of Pacific Coast steamship owners and operators in such a way as to demand recognition. Through its representatives in Washington, and in close co-operation with the American Steamship Owners' Association, the association has been able to assist Congress in framing the Merchant Marine Act, which, when signed by the President on June 5, 1920, became the fundamental shipping law of the country.

Specialized Machinery Developed

The association has developed specialized machinery to handle current problems as they arise.

The board of directors has general supervision over the activities of the organization.

The executive committee deals especially with affairs connected with the Shipping Board.

The committee on legislation and policy functions as its name implies, and suggests the policy of the association on matters connected with legislation.

The advisory labor committee takes cognizance of labor matters which come before this organization.

The Shipping Board committee, accounts and commissions, supervises and takes care of accounting problems that arise between the membership and the Shipping Board.

The association is closely affiliated with the American Steamship Owners' Association, New York; United States Ship Operators' Association, New York; Northwest Steamship Managers' Association, Seattle; New Orleans Shipowners' Association, New Orleans; New York Boat Owners' Association, New York; and Lake Carriers' Association, Cleveland. Other organizations with which it is connected are the National Foreign Trade Council, New York, and the National Merchant Marine Association, Washington.

The benefits of the association have been far-reaching, have resulted in saving a tremendous amount of lost motion and duplication of effort, and materially assisting the United States Shipping Board in solving its problems on the Pacific Coast by co-operating with it.

Members and Officials

Board of directors and officers: Robert Dollar, president; A. F. Haines, first vice-president; Daulton Mann, second vice-president; J. P. Williams, secretary-treasurer; directors, Captain C. W. Saunders, J. C. Rohlfs, H. R. Struthers.

Executive committee: J. E. Cushing, F. M. Barry, Daulton Mann, Captain C. W. Saunders, M. F. Cropley, A. B. Cahill, Charles Belknap.

Committee on legislation and policy: Robert Dollar, chairman; H. R. Struthers, vice-chairman; J. C. Rohlfs, Captain C. W. Saunders, A. F. Haines, A. P. Hammond.

Advisory labor committee: F. M. Barry, Captain J. H. Rinder, Captain C. W. Saunders.

Shipping Board committee, accounts and commissions: H. E. A. Railton, chairman; H. R. Struthers, vice-chairman; A. A. Moran, F. M. Barry, F. M. Hooper.

The members of the Pacific American Steamship Association and their representatives are as follows:

Admiral Line: A. F. Haines, L. C. Smith Building, Seattle; M. F. Cropley, 112 Market Street, San Francisco.

Associated Oil Company: George D. Zeh, 55 New Montgomery Street, San Francisco.

China Mail Steamship Company: A. M. Garland, 510 Montgomery Street, San Francisco.

Columbia-Pacific Shipping Company: K. D. Dawson, 301 Board of Trade Building, Portland, Oregon; A. B. Cahill, 110 Market Street, San Francisco.

Robert Dollar Company: A. A. Moran, 311 California Street, San Francisco.

E. C. Evans & Sons: E. C. Evans, Jr., 454 California Street, San Francisco.

General Steamship Corporation: Charles Belknap, 280 Battery Street, San Francisco.

W. R. Grace & Company: F. L. Doelker, 332 Pine Street, San Francisco.

Hind, Rolph & Company: T. W. Bewley, 230 California Street, San Francisco.

Los Angeles Pacific Navigation Company: A. J. Frey, 787 Pacific Electric Building, Los Angeles.

Luckenbach Steamship Company: A. P. Hammond, 465 California Street, San Francisco.

Matson Navigation Company: Captain C. W. Saunders, 120 Market Street, San Francisco.

McCormick & McPherson, E. L. McCormick, 503 Market Street, San Francisco; Walter S. McPherson, 548 South Spring Street, Los Angeles.

Oceanic Steamship Company: F. S. Samuels, 2 Pine Street, San Francisco; J. G. Stubbs, 2 Pine Street, San Francisco.

Pacific Mail Steamship Company: Daulton Mann, 508 California Street, San Francisco; H. E. A. Railton, 508 California Street, San Francisco.

W. S. Scammell & Company: W. S. Scammell, 1 Drumm Street, San Francisco.

Standard Oil Company: J. C. Rohlfs, 200 Bush Street, San Francisco.

Struthers & Dixon: F. M. Barry, 343 Sansome Street, San Francisco; H. R. Struthers, 343 Sansome Street, San Francisco.

Sudden & Christenson: A. B. Cahill, 110 Market Street, San Francisco; C. H. Chandler, 1014 South Ferry Building, New York City.

Swayne & Hoyt: Charles E. Brown, 430 Sansome Street, San Francisco.

Thorndyke-Trenholme Company: H. W. Ross, L. C. Smith Building, Seattle; J. C. Ogden, 214 Front Street, San Francisco.

Union Oil Company of California: T. A. Hays, Mills Building, San Francisco; Max Dyer, Los Angeles.

Williams, Dimond & Company: J. E. Cushing, 310 Sansome Street, San Francisco.

Shipowners' Association of the Pacific Coast

THE Shipowners' Association of the Pacific Coast is composed of fifty-four members who operate and have entered in the association 153 steam and sail vessels. The members of the association hold their regular annual meeting on the last Wednesday in September, at which meeting a board of nine directors is elected to govern the affairs of the association for the ensuing year. The directors elected at the last regular meeting and the officers selected by the directors at the organization meeting of the new board are as follows: president, Fred Linderman; vice-president, S. M. Hauptman; secretary-treasurer and attorney, W. F. Sullivan; directors, Fred Linderman, S. M. Hauptman, James Tyson, W. S. Burnett, Otis R. Johnson, U. G. Richards, John L. Reed, W. R. Chamberlin and R. W. Myers.

There are five standing committees of this association, each of which is composed of three directors. The committees are: finance, arbitration, membership, grievance, and harbor and shipping. Action taken by any committee is subject to approval by the board of directors as a whole.

The association's headquarters are in the Santa Marina Building, 112 Market Street, San Francisco. Branch agencies are maintained as follows: Eureka, Captain H. H. Cousins; Aberdeen, Captain R. E. Peasley.

The Shipowners' Association of the Pacific Coast was originally organized in the early 90's by Pacific Coast sailing vessel owners and managers, chiefly as a shipping office and a sort of clearinghouse for seamen. In 1904 a number of steam schooner owners and managers, who were loosely organized as a Steam Schooner Owners' Association, amalgamated with the sailing vessel owners and incorporated under date of February 18, 1904, as the Shipowners' Association of the Pacific Coast. The objects and purposes of the association, as so incorporated, are expressed in its by-laws, viz.:

"To organize and maintain a business exchange, not for pecuniary profit or gain, but to promote and protect all interests connected with American shipping on the Pacific Coast;

"To provide for the ready transaction of the business of the association by obtaining general headquarters for the conduct and carrying on of its business, and for the interchange of ideas;

"To adopt rules for just and fair dealing among its members;

"To devise, propose and urge legislation for the promotion, advancement and betterment of said American shipping;

"'To secure to its members the benefit of co-operation in the legitimate furtherance of their pursuit, and to raise funds necessary to carry out the general purposes of said corporation."

Since the time of its incorporation the association has grown to include almost all of the owners and managing owners of steam and sail vessels operating coastwise on the Pacific Coast; and also includes in its membership a number of owners and managing owners of vessels, both steam and sail, engaged in the off-shore trades. During the years of its existence the association has been of great benefit to shipping interests and maritime commerce, particularly in the matters of encouraging wise and curbing foolish legislation, both national and state, and in treating with seamen and other marine workers, through their various unions, concerning wage and working conditions.

Names, Addresses of and Numbers of Vessels Owned by Members of the Shipowners' Association of the Pacific Coast

Albion Lumber Company, Hobart Building, San Francisco, 1. J. H. Baxter & Company, American National Bank Building, San Francisco, 2. George S. Beadle, Inc., 112 Market Street, San Francisco, 1. Bowes & Andrews, 145 Stuart Street, San Francisco, 2. Broughton & Wiggins Navigation Company, Portland, 1. Buehner Lumber Company, North Bend, Oregon, 1. C. & O. Lumber Company, Fife Building, San Francisco, 2. Caspar Lumber Company, Hobart Building, San Francisco, 2. W. R. Chamberlin & Company, Balfour Building, San Francisco, 3. Coast Shipping Company, 24 California Street, San Francisco, 1. Coos Bay Lumber Company, Oakland, 2. J. E. Davenport, Balfour Building, San Francisco, 2. J. O. Davenport & Company, Balfour Building, San Francisco, 2. E. J. Dodge Company, 16 California Street, San Francisco, 1. Robert Dollar Company, 230 California Street, San Francisco, 3. Donovan Steamship Company, Newhall Building, San Francisco, 1. Eschen & Minor Company, 24 California Street, San Francisco, 2. S. S. Freeman & Company, Fife Building, San Francisco, 5. Henry Gray & Company, 817 Sansome Street, San Francisco, 2. Gulf Mail Steamship Company, Fife Building, San Francisco, 3. Hammond Lumber Company, 260 California Street, San Francisco, 4. J. R. Hanify Company, 24 Market Street, San Francisco, 4. D. J. Hanlon, 112 Market Street, San Francisco, 1. Hart-Wood Lumber Company, Fife Building, San Francisco, 5. Charles H. Higgins, 216 Market Street, San Francisco, 3. Hobbs Wall & Company, Fife Building, San Francisco, 2. E. T. Kruse, 24 California Street, San Francisco, 2. Lewers & Cooke, Honolulu, 1. Loop Lumber Company, Central Basin, San Francisco, 2. Fred Linderman, 110 Market Street, San Francisco, 3. Little River Steamship Company, 112 Market Street, San Francisco, 1. Andrew F. Mahony, Fife Building, San Francisco, 3. C. R. McCormick & Company, Fife Building, San Francisco, 7. Monticello Steamship Company, Jackson Street Wharf, San Francisco, 4. J. J. Moore & Company, 215 Pine Street, San Francisco, 1. National Steamship Company, Crocker Building, San Francisco, 3. Goodyear Redwood Company, Crocker Building, 2. Oliver J. Olson, Fife Building, San Francisco, 2. The Charles Nelson Company, 230 California Street, San Francisco, 20. Pacific Freighters Company, 310 California Street, San Francisco, 5. Parr-McCormick Steamship Line, Fife Building, San Francisco, 1. Moore Mill & Lumber Company, Foxcroft Building, San Francisco, 2. Port Blakeley Mill Company, Balfour Building, San Francisco, 1. Redwood Steamship Company, Monadnock Building, San Francisco, 1. W. S. Scammell & Company, Fife Building, San Francisco, 4. The White Flyer Line, Fife Building, San Francisco, 1. C. Henry Smith, 311 California Street, San Francisco, 1. Sudden & Christenson, 110 Market Street, San Francisco, 7. Swayne & Hoyt, 430 Sansome Street, San Francisco, 1. Pan-American Line, 230 Front Street, San Francisco, 1. The Richardson Company, 324 Market Street, San Francisco, 1. A. F. Thane & Company, Hobart Building, San Francisco, 2. Wilson Brothers & Company, 110 Market Street, San Francisco, 3. E. K. Wood Lumber Company, Fife Building, San Francisco, 13.

Recapitulation: Number of members, 54; number of vessels, 153.

The Northwest Steamship Managers' Association

THE Northwest Steamship Managers' Association has its headquarters at 804 Hoge Building, Seattle. W. C. Dawson, president of W. C. Dawson & Company, is president of the association; and R. E. Borchgrevink, of W. R. Grace & Company, is secretary-treasurer. The executive committee is composed of H. C. Cantelow, chairman; Mr. Borchgrevink, K. G. Fiskin, A. W. Kinney and G. R. Walker.

The Northwest Steamship Managers' Association was formed in 1918 under the title of the Puget Sound Steamship Managers' and Operators' Association for the purpose of endeavoring to establish, if possible, uniform practices among various managers and operators of Shipping Board vessels. It appeared that the Shipping Board was not quite sure as to just how the vessels should be handled and various operators on Puget Sound were performing their duties in their own particular style without any apparent uniformity. It also was felt that the Shipping Board would be benefited by the assistance of an association of operators who would be in position to offer constructive suggestion for the improvement of the handling of our merchant marine.

On April 28, 1920, the name of the association was changed to the Northwest Steamship Managers' Association, this being brought about principally by reason of the Shipping Board's cancellation of the manager and operator scheme of allocation, about the time that the new MO3 agreement was placed in effect. The association at that time also took in members from Portland and the old name did not properly reflect the scope of activities. The name was changed, therefore, to the Northwest Steamship Managers' Association.

The association, although small, as compared with the

Pacific American Steamship Association at San Francisco and similar groups of operators on the Atlantic Coast and on the Gulf, has been of benefit to operators as well as to the board. When the Managing Operators' Agreement, commonly known as MO3, was placed in effect, the association immediately saw that it would not work satisfactorily and started out to prepare another scheme of operation for the Shipping Board, and as a result the association is the father of the present commercial plan, which the Shipping Board recently approved and which is being put into effect retroactive to March 1, 1920. The original plan of this scheme has, of course, been changed, but the principle of the plan was suggested by the association with only a few modifications as to rates and special terms. This is now the basis under which all Shipping Board tonnage, assigned to private operators, will be handled.

The Pacific Westbound Conference

THE Pacific Westbound Conference, having headquarters in Seattle and committees and agents in San Francisco and New York, governs all rates on goods moving from ports of the Pacific Coast to the so-called regular ports of the Far East: Nagasaki, Kobe, Moji, Yokohama, Shanghai, Hongkong and Manila. Supervision is exercised also over rates to "outports," in that members of the conference already maintaining services to ports other than those mentioned have filed their tariffs, and in the event of establishing new services file their proposed schedules, which are open to the inspection and discussion of other lines. These "outports" include many ports of Siberia, China, Japan, Indo-China, the Straits Settlements, East Indies and India.

Members of Conference

Members of the Pacific Westbound Conference are: China Mail Steamship Company, San Francisco; Pacific Mail Steamship Company, San Francisco; Java-Pacific Line, San Francisco; Los Angeles Pacific Navigation Company, Los Angeles; Toyo Kisen Kaisha, San Francisco; Pacific Steamship Company, Seattle; Osaka Shosen Kaisha, Tacoma; Nippon Yusen Kaisha, Seattle; Frank Waterhouse & Company, Seattle; Columbia Pacific Shipping Company, Portland; Struthers & Dixon, San Francisco; Trans-Oceanic Company, San Francisco; James Griffiths & Sons (representing Mitsui & Company), Seattle. In addition to these member-companies, the Blue Funnel and the Canadian Pacific Ocean Services work in close harmony with the conference and protect conference rates.

The conference has been in existence twelve years, but prior to October, 1920, it was known as the Pacific Coast Oriental Tariff Bureau, the name having been changed in that month. On March 25, 1920, an office was opened in San Francisco in charge of C. O. Burgin, agent; prior to that time the San Francisco committee had relied upon the Seattle office for the execution of routine work, such as the publication of tariffs. After the Vancouver meeting of the conference in June, 1920, an office was opened in New York, W. D. Benson being appointed agent, and a regular New York committee was formed with a view to working more closely with the Atlantic-Oriental operators than had been possible under the old system, by which Mr. Benson was maintained in an informative capacity and no regular committee had been in existence. As a result, the Pacific and Atlantic operators are kept more closely in touch with each other. C. E. Daymude of Seattle is secretary of the conference, and M. J. Mayfield is San Francisco agent, having succeeded Mr. Burgin, who is now in the service of the Shipping Board.

At a general meeting of the conference held in Seattle in November, the San Francisco and Seattle committees were given control over products peculiar to their own fields, such as oils to San Francisco and lumber to Seattle, so that in respect to these goods rates are made independently by the two committees.

A survey of the list of members of the conference will demonstrate that all the important American and Japanese companies are represented and that the large British groups are working in harmony with the organization, although some of the minor Japanese companies remain outside.

The three-masted auxiliary schooner Doris Crane, built by W. F. Stone & Son, Oakland, for the Fanning Island Copra Plantation. The Doris Crane is 138 feet long with a beam of 32 feet and is powered with a 150 horsepower four-cycle Union marine engine fitted to operate on kerosene.

The Shipping Board Conferences

In conformity with the requirements of the Shipping Board's managing agents' agreement for vessels on general cargo berth, three conferences have been formed on the Pacific Coast to have supervision of rate-making. These are: Trans-Pacific Outward Conference, Pacific Coast North Atlantic Eastbound Conference and Pacific Coast South American Conference.

Trans-Pacific Outward

The Trans-Pacific Outward Conference is divided into two sections but functions as a unit. Meetings are held in San Francisco and Seattle, the San Francisco members being: Pacific Mail Steamship Company, China Mail Steamship Company, Matson Navigation Company, Robert Dollar Company, Sudden & Christensen, Struthers & Dixon, and Los Angeles Pacific Navigation Company; while those of Seattle are: Frank Waterhouse & Company and the Pacific Steamship Company. F. B. Wurzbacher acts as chairman and secretary of the Seattle committee, and C. O. Burgin as chairman and secretary of the San Francisco committee.

Organization of the Trans-Pacific Outward Conference was completed July 15, 1920. Up to October 15 the conference had jurisdiction over trans-Pacific rates from Pacific Coast ports to the Orient, but subsequent to that date the rate-making authority has been vested in the Pacific Westbound Conference. The memberships of the two conferences virtually are identical, however, and most of the members of the Trans-Pacific Outward Conference are members of the Pacific Westbound Conference, in which they meet the foreign lines. The Shipping Board requires its operators to form conferences but also to work in harmony with those already in existence, hence the apparent duplication of organization.

The second of the three conferences is the Pacific Coast North Atlantic Eastbound Conference, which was formally organized September 8, 1920, to have control of eastbound rates from ports of the Pacific to those of the Atlantic. A similar organization in New York controls the westbound intercoastal rates. Members of the eastbound conference are: Swayne & Hoyt, Williams, Dimond & Company, North Atlantic & Western Steamship Company, Luckenbach Steamship Company, Matson Navigation Company, Atlantic-Gulf & Pacific Steamship Company, and Pacific Mail Steamship Company. Mr. Burgin is chairman and secretary.

South American Body

In the Pacific Coast South American Conference are: General Steamship Corporation, Swayne & Hoyt, W. R. Grace & Company, and Matson Navigation Company. This conference, organized September 2, 1920, has jurisdiction over all northbound and southbound rates from and to South American ports. In this particular, of having control over rates on freight moving in both directions, the conference is unique, as tariffs of other routes are controlled at the ports of origin, a Shipping Board conference having been formed in the Orient, for example, to supervise eastbound rates. Mr. Burgin is chairman and secretary of the South American conference also.

No conference exists in the Pacific Coast-Australasian trade. Only one Shipping Board company, the General Steamship Corporation, operate vessels to Australasia, so that no board conference can be formed; but an informal working agreement is maintained with the Oceanic Steamship Company and the Union Steamship Company of New Zealand, the other lines operating to the south. The first of these is American and the second British.

The Challenge of the Seas

By PERRIN HOLMES LOWREY

The wild, fierce freedom of the stubborn seas
Beats in our blood. The sunlit morning comes,
And down the dawn we hear great destinies
Calling our courage, like rich, distant drums.

ANCHORS AND ANCHOR CHAINS

By A. J. DICKIE

"AND fearing lest we fall upon rocks, they cast four anchors out of the stern and wished for the day." Thus Dr. Luke describes his experience on a lee shore in the Adriatic traveling with Paul from Caesarea to Rome in the first century of the Christian era. And how many mariners before that time and since in the same situation have cast anchor or anchors and "wished for the day" or for calm that they might be relieved from their distresses.

Ancient anchor picked up off the British Coast after having been lost by the Spanish Armada

Strange as it may seem, the anchors which the seamen of Luke's narrative cast out of the stern were substantially of the same form as those used by practically all mariners up to within very recent times; in fact, there was practically no change in the form of this useful friend of the seaman until the middle of the eighteenth century, when the crossbar or stock was added to prevent the tilting of the flukes out of the ground by the swinging of the ship on her cable. The original mariners undoubtedly used large rocks tied with a rope or bags of sand or any weight that was available.

Who first produced the fishhook form of anchor with one arm and fluke? Some Egyptian or Phoenician mariner doubtless of ancient fable days. It is related by Grecian historians that Anacharsis, a Scythian philosopher, who visited Solon at Athens in the seventh century before Christ, was the first to suggest the double hook form for marine anchors. This is probably the first instance in history of the co-operative relationship between pure science and marine practice that has been through all of the ages since so productive of useful inventions and new discoveries, and the anchor of Anacharsis was of practically the same form as that used in small boats today.

The word "anchor" has come to have a symbolical meaning in the languages of all maritime peoples, and numerous proverbs have grown up around the word. In the early Christian centuries we find it used very largely as the symbol of hope. In business proverbs it has come to have a symbolism of security.

Chain cables came into being in connection with anchors as ships began to grow in size during the first half of the nineteenth century. Prior to that time rope hawsers had been used. It was early realized by the marine insurance corporations and the classification societies that frequently the safety of a vessel and the lives of those on board depend upon the strength and condition of her anchor chain. We find that Lloyd's Register of Shipping in 1853 required a certificate of test for all chain cables supplied to vessels classed in its register; that in 1868 Lloyds established at their own expense a public proving house for testing cables in a licensed machine. In 1858 Lloyd's Register of Shipping had specified the length, size, and weight of chain cables required for vessels of different tonnage, and in 1871 the British government passed an act in Parliament known as the Anchor and Chain Cable Act, making it compulsory to test all anchors and chains supplied to merchant vessels of British registry.

Prior to the emergency shipbuilding effort of the United States government during the late war, anchor chains were invariably made of the finest quality of wrought iron. The chain smith was the highest class of artisan in the blacksmithing trade, and chains were carefully forged either by hand or by special machinery out of iron rods which were carefully tested for strength and ductility, and no material was even considered other than an especial grade of wrought iron which was specified to have a tensile strength of not less than 49,000 pounds per square inch nor more than 52,000 pounds per square inch, with an elastic limit of about 60 per cent of the breaking strain and an elongation of at least 30 per cent in a length of eight inches.

It may come as a shock to conservative old chainsmiths and master mariners to learn that in the great rush for large quantities of chain with which to fit out the new ships being rushed into service during the war, a substitute was found for wrought iron chains which bids fair to prove even better than that acknowledged "best material." The United States Shipping Board Emergency Fleet Corporation engineers invited the cooperation of a number of metallurgical experts in finding some method of producing chain more quickly than was possible by hand or machine forging, and several experiments were carried out by various firms to produce cast steel chain. The matter was finally turned over to the National Malleable Castings Company, who for many years had been producing cast steel car couplets which were daily under very hard usage, demonstrating their ability to withstand heavy strain and shock. This corporation cast studded link chain which under test proved to be much superior in strength to the wrought iron and to have equal, if not stronger, ability to withstand successive shocks over long periods of time. A large percentage of the emergency fleet built and operated under the United States Shipping Board is equipped with Naco cast steel chain.

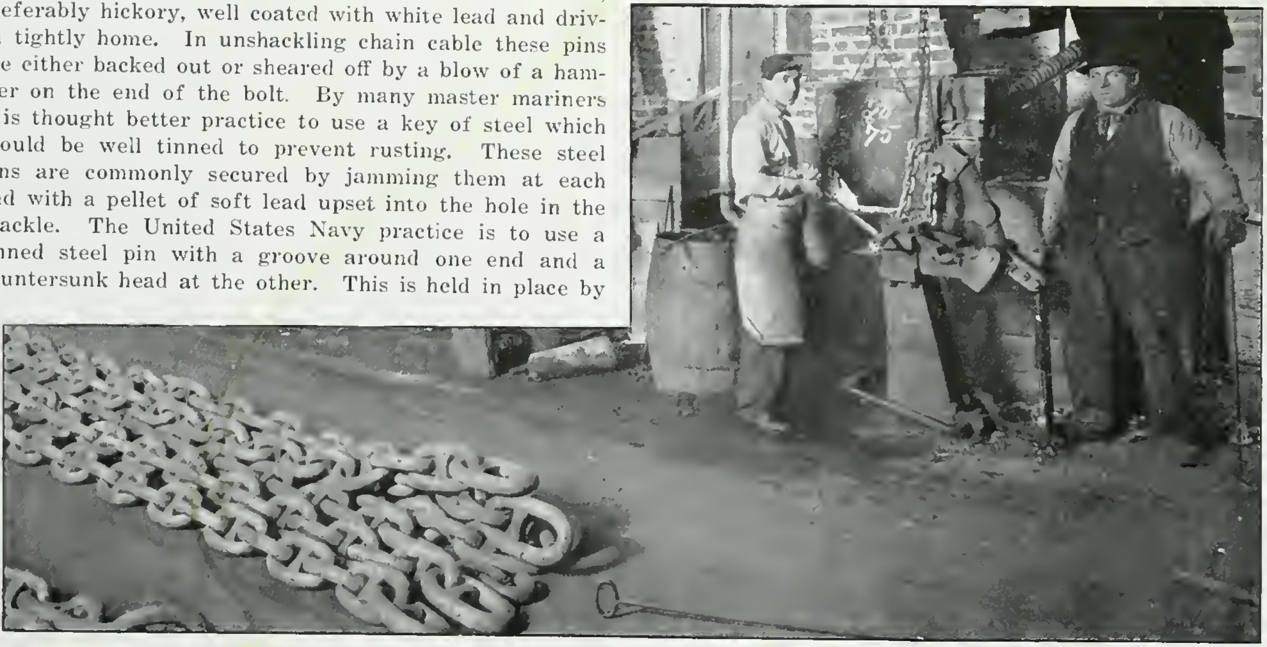
The problem of anchor chain in the merchant marine is a very live one at the present time, as is evidenced by the fact that many anchors are being reported lost through failure in chain cables from ships operating both on the Atlantic and Pacific Coasts. This condition is exceedingly serious in the merchant marine, not only through the actual loss of the chain and anchor, but through the danger which is evident on account of apparent weakness in the chain cable.

All anchor chain is made with what are known as stud links. The Navy authorities claim that the stud is of no appreciable effect in strengthening the link, but that its chief function is to prevent kinking in the cable and spreading of the link on the wildcat. All of this stud link chain is made up in comparatively short lengths, a length being known as a "shot." The standard length of the ordinary shot in the United States merchant marine and the United States Navy is fifteen fathoms. In the British Navy it is twelve and one-half fathoms. Merchant marine anchor cables are made up of straight standard fifteen-fathom shots with a shackle between each shot. All observations of anchor chain losses point to the shackle as the weak spot in the chain, considering all links as perfect. The United States Navy in its practice has recognized this fact, and in making up anchor chain cables they place a five-fathom shot next the anchor, which has its two outer links one-quarter inch diameter larger, and the balance of its links one-eighth inch larger, and its connecting shackle one-eighth inch larger than the balance of the cable. This stronger chain shot is so placed to provide for the shock to which this part of the cable is subjected in letting go the anchor. The second length of anchor chain cable on the Navy standard regulations is one of forty fathoms in length without shackle, the object being to prevent the possibility of having a shackle on the wildcat of the windlass when the anchor is breaking ground.

Some shackle bolts are round in section, some are oval; but in the latest United States Naval practice they are being made egg-shaped in section, giving an increased bearing surface for a given gross-sectional area and making it impossible to put the bolt in the wrong way, which is an important consideration in handling chain cable at night. The bolts in all anchor chain shackles are held in place by a forelock pin or key driven through a hole in the bolt and the enlarged end of the shackle. The forelock pin in merchant marine practice and according to Lloyd's rules is made of wood, preferably hickory, well coated with white lead and driven tightly home. In unshackling chain cable these pins are either backed out or sheared off by a blow of a hammer on the end of the bolt. By many master mariners it is thought better practice to use a key of steel which should be well tinned to prevent rusting. These steel pins are commonly secured by jamming them at each end with a pellet of soft lead upset into the hole in the shackle. The United States Navy practice is to use a tinned steel pin with a groove around one end and a countersunk head at the other. This is held in place by a ring of lead which is upset by a special tool into the groove in the pin. This lead ring is easily sheared by a tap on the grooved end of the bolt.

The United States Navy regulations call for frequent overhauling of chain cables, the chain being roused up on deck and each shackle, link and swivel being carefully examined. Every shot of Navy anchor chain bears upon the side of its forward link a serial identification number and the year of its manufacture. If any flaw is found in any link of a shot, that whole shot is condemned, except in the case of a missing stud, which may be easily replaced. Defective shackles are removed from the chain cable and replaced with spares. Every shot has to be unshackled, and the shackle, pins and keys cleaned and carefully coated with white lead and tallow. Swivels are well oiled and worked until they turn freely and without grinding.

The most favorable opportunity, of course, for overhauling chain cables is when a ship is in drydock and the anchor and cables can be lowered into the dock and handled and worked over more easily than they can on the forecastle of the ship. All anchor chains on board ship are stowed in chain lockers under the windlass, and great care should be taken in making fast the bitter end and in tiering the chain so that it will pay out without kinking. Notwithstanding the frequent careful overhauling of Navy anchor chains, no chances are taken at all and it is part of the Navy regulations that every shackle and every link should be examined each time the anchor is weighed. This is usually done by a man standing by with hammer and striking each link or shackle. If any link or shackle does not ring true, its location is marked and that part of the chain carefully overhauled before being used again. The adoption of these Navy regulations in merchant marine practice would certainly stop loss of anchors and add to the general security of sea-going vessels.



A master chainsmith and some of his product

COMMERCIAL HONESTY

By L. R. COFER

FOR the past five years our principal means of financing exports and imports has been through the medium of dollar exchange and dollar credits. The unusual conditions that established this procedure are fast disappearing.

On this coast our dealings are mainly across the Pacific, and our interest, therefore, lies in those countries which until very recently were only familiar with the Sterling credit, providing for payment by a London bank. For generations the bankers' letter of credit has been looked upon and everywhere accepted as an undisputed obligation of payment.

The financing of imports into America by the use of dollar credits providing for payment in the United States, aside from national pride, is more economical and satisfactory, and unquestionably should be continued. While generally accepted, from oversea sources, there has always been criticism concerning the wording and terms specified in some of the dollar credits opened by banks in the United States. With the severe drop in commodity prices these complaints have become more frequent. The following letter from the general manager of one of the leading banks in the Netherlands East Indies expresses what is becoming a general opinion on the part of many foreign banks on the practices of certain of our merchants and banks:

L. R. Cofer, vice-president and general manager, foreign exchange department, Wells-Fargo Nevada National Bank, San Francisco

In this issue Mr. Cofer calls the attention of merchants and banks to certain sharp practices which have recently become prevalent in financing foreign trading operations. The strictures are both pertinent and timely. All foreign trade is built up on mutual confidence, and if by even the suspicion of sharp practice American merchants or banks destroy that mutual confidence which should exist between themselves and foreign mercantile institutions, then foreign trade, as far as American operation thereof is concerned, will die.

"To our extreme regret we must inform you that lately both banks and merchants in Netherlands India feel some uneasiness concerning the possibility of a continuation of the close business relations which during the war have been initiated with your country and so far have gradually developed to the satisfaction of all concerned. This uneasiness which we are sorry to observe almost everywhere is due to bad experiences of late in reference to the attitude of American buyers toward their business contracts with Java sugar merchants.

"Refusals by American banks to honor drafts drawn under their letters of credit on the pretext of quite insignificant deviations from the literal wording of the letter of credit, have recently occurred again and again, notwithstanding bankers' guarantee regarding the redress of those small inaccuracies was immediately offered to them. Obviously it was at buyer's instigation that the banks were taking this attitude, and one cannot help feeling inclined to attribute the present change of attitude of the American merchants to the heavy drop in sugar prices.

"Though it may be that such methods have been practiced only by merchants already known in your country by their disreputable commercial practices, you will understand that victims here are apt to generalize, and thus great harm is done to the development of our trade with America, which our bank has always tried to promote with all the means at her disposal.

"The exchange banks in Java must, under these circumstances, feel reluctant to take American bills; hence the extent of our business relations may be seriously affected, which we wish to try our best to prevent.

"We deem it our duty to draw your attention to these facts, and trust your influence will prove powerful enough to bring home the conviction to American importers that acts as the abovementioned are ultimately seriously detrimental to the Java-American business relations, whose growth we have been watching all these years with utmost pleasure and satisfaction."

There can be no question that the action of any of our banks in refusing to honor drafts drawn under their confirmed obligation because of some trivial technicality must shake the confidence in all credis. The old theory that merchants knew with whom they dealt, and that banks were only expected to see that proper documents were forthcoming, seems to have been completely forgotten, and it is apparently the intention to hold the negotiating bank, and other holders for value, responsible for the actual shipment, quality, quantity and delivery of the merchandise.

In justice to the majority of San Francisco banks, who are familiar with universal custom in connection with letters of credit, it must be said that most of the complaints brought to my notice have been acts of interior banks, some of them in our largest cities, but nevertheless showing a woeful lack of that professional pride, which would naturally be expected, in protecting their letters of credit from criticism.

As a practical example of the extremely technical nature of some of these objections, I recall the case of a bank located in the second largest city in the United States, which refused a draft drawn under one of their credits, for the reason that the terms specified "Java weight certificate," whereas the document furnished was styled "weight specification," although it was accompanied by a certificate of the consul general of the country from which shipment was made, stating that the parties who issued the certificate were public weighmasters and authorized to issue certificates of weight.

Another bank which had issued a commercial credit on a lithographed form which embodied the usual statement agreeing to protect the drawers, endorsers and bona fide holders of bills drawn in accordance with the terms therein, has stated that it has been advised by its attorney that the credit is only a conditional promise to pay.

If the matter were not so serious, one could almost be amused at the efforts of some of those issuing credits to change vital terms that would make fulfillment impossible. In fact, it seems to me as if it will soon be necessary that a standardized form of commercial credit be authorized by the Federal Reserve Board which will actually be what it purports, an instrument which guarantees payment against documents, and not, as some banks even endeavor to prove, only a conditional promise to pay after inspection and approval of merchandise.

We often hear Americans speak in unflattering terms of the questionable commercial practices of merchants in other countries, but I think it would be well for us to heed the old adage, and first remove the beam from our own eye before looking for the mote in our neighbor's eye. Houses of high character, which carry out their own undertakings with foreign sellers, have had to bear a tremendous burden when confronted with breach of contract on the part of their American buyers.

Confidence is the real secret of all successful business association, and when that is lost, the whole structure of international trade relations must crumble.

In issuing letters of credit for use in the Orient and elsewhere, we must not lose sight of the fact that we do not pay out our own funds when the draft is negotiated, but only state that drafts drawn by the beneficiary will be protected when presented in the United States. We must put ourselves in the place of the foreign banker who, believing in the unquestioned character of our so-called confirmed bank credit, cheerfully puts out his good money and buys the bill, makes his necessary exchange transaction, puts the bill in transit, and on presentation on this side finds that, due to some trivial technicality, the bill has not been honored. He must then provide other funds to meet his own financial obligations which he based on the proceeds of such bills.

Bankers should realize the importance of protecting their good name, and if necessary, taking a loss themselves rather than permit clients to interfere with their negotiations of drafts drawn in good faith against their credits. The time to scrutinize and be technical with a credit is when application is made for its issuance.

If we desire to give our bank credits international circulation, we must expect to live up, in fact as well as theory, to the obligation usually appearing thereon: **"We agree with the drawers, endorsers and bona fide holders, respectively, of bills drawn in compliance with the terms of this credit, that the same shall be duly honored on presentation."**

SOME HUMBLE SUGGESTIONS

By ANDREW FARRELL

IN the maritime history of the world one fact shines with singular brightness: the great sea-going nations have been made great by their geographical situations and the conditions of their existence. Primitive, natural man, if such a being ever existed, did not take to the sea altogether of his own will; circumstances drew or drove him. He went down to the sea in ships because ocean offered him the easiest or only possible highway, because he inhabited, that is, a peninsula or an archipelago; or because the sterility and narrowness of his land forced him to make his living on the waters. At no time have the dwellers in the fat continents covered the sea with their sails. Tidewater was remote, for one reason; for another, life was easy and there was no impelling urge to send those peoples wandering.

A Place Called Salamis

Consider the great seafaring folk of antiquity. The Egyptians inhabited a narrow, rich river-bottom, closed in on either hand by unproductive sands; the Greeks occupied a small peninsula thrust from continental Europe into the Mediterranean; the Phoenicians had the sea at their faces, at their backs a desert. From the sea and the sea alone Tyre drew its wealth, traders from the entire Eastern Mediterranean and beyond gathered at the city to exchange their goods for Cornish tin and other products of the West. Of the early Babylonians, whose home was in interior Asia, we hear little; the Persians, also dwellers in great areas of land, made themselves somewhat of a naval power by sheer weight of numbers, but they had one sad adventure at a place called Salamis, and thereafter did not fancy the sea overmuch.

Later peoples also serve as examples. The medieval Italians were noted seamen, so were the Portuguese and Spaniards, all of whom inhabited peninsulas. Two of the leading maritime powers of today, the British and the Japanese, are island folk. The rise of the latter as a maritime people was one of the remarkable chapters of the nineteenth century. Repressive laws hindered and almost destroyed maritime development for two hundred years; once those laws were repealed, the rebound of the Japanese, aided by a wise governmental policy, but aided more by the fact that a hardy, adventurous race was crowded into a few small islands, amazed the world.

Geographical situation alone has not made some peoples seafaring; but no people has become great in the maritime world without the whip of necessity driving it on. Compare China and Japan, Russia and Great Britain.

China and Russia are two of the great continental nations of the world; a third is the United States. The merchant fleets of the first two countries are almost negligible; that of the United States, however, is second in the world and may become first. But the shipping of America has not been a thing of natural growth, as was that of Great Britain; it did not increase slowly and steadily through several centuries: it was created and fostered by unnatural conditions, by the necessities of war. Without the war the country today would be in the situation of 1914, when the American flag was never seen in some of the important ports of the world.

In Our Great Days

In the days of our maritime supremacy, prior to the Civil War, the population of the country was largely centered in the seaboard states, or in states immediately adjacent. When annexation gave the nation a clear road to the Pacific, and Washington, Oregon and California were added, a merchant marine was still more necessary, because communication across the continent was exceedingly slow, wearisome and dangerous. To this intercoastal service around Cape Horn a great portion of American tonnage was devoted; although we continued to send our vessels into the ports of the world, our great clipper fleets were engaged very largely in the California trade. Mark what occurred after the Civil War: transcontinental railroads were built and the nation turned to the interior, developing the country between the Mississippi and Rockies. Thereupon the American merchant marine, already weakened by our devotion to the wooden sailing vessel and doubtless also by the depredations of privateers, received its death-blow. After more than two centuries the country had become continental, not only in extent but in sentiment as well; and our merchant marine began to disappear.

Our situation today differs greatly, yet differs only in small measure, from that of 1914; greatly because we have a merchant fleet, we have learned something of the sea during the last six years, we have built up a foreign trade of huge proportions; in small measure because we still remain continental, with abundant resources of almost every description, with factories and the raw materials for them, with foodstuffs sufficient for our needs—in other words, we are a self-supporting, self-contained nation.

Britain Must Have Ships

Consider our situation as compared with that of Great Britain. If the British merchant fleet were to disappear overnight, the English, Scotch, Irish and Welsh literally would starve to death; they could find no possible salvation. If the fleet were reduced greatly in tonnage, but still remained adequate for the transportation of foodstuffs, the factories of the United Kingdom would close for lack of cotton and other raw goods. So with Japan. If the American fleet, on the other hand, were to be lost in a day, we merely would pay more taxes for several years and could calmly forget what the war had cast into our laps. In short, the United States, without the impelling urge of necessity, without the imperative need of securing raw materials for its factories and food for its population, inhabiting a continent that produces virtually everything that is needed, now finds itself, somewhat to its surprise, in possession of what no great continental nation ever has possessed — a large merchant fleet. In building and operating our numerous vessels, therefore, we are doing the unprecedented.

That a merchant marine is essential to the British and Japanese and to us only incidental, doubtless will be urged frequently enough during the future as a potent reason why we should abandon all effort to establish ourselves on the sea. The British and Japanese and Germans can serve us more cheaply than we can serve ourselves, we shall be told; let those nations serve us then; let us content ourselves with producing and consuming, leaving to the other countries that are better equipped for transportation of goods overseas, and which, moreover, are sorely in need of the business, the work of building and operating deep-sea merchant vessels. Those arguments will be urged widely, perhaps effectively.

We May Heed Them

We shall be in grave danger of heeding these arguments, of letting our new fleet slip through our hands through mere listlessness and indifference, we shall be in danger of becoming disgusted with shipping, after the present enthusiasm has died away, unless we deliberately find a substitute for the geographical situations and the necessities that have kept the fleets of Britain and Japan on the sea. As the American merchant marine was not of natural and spontaneous growth, so we shall be compelled to find somewhat unnatural methods of keeping the infant alive; we ourselves must do what circumstances have not done for us: we must make the fleet part of the daily existence of the people of the entire country, as the British merchant marine enters into the everyday life of virtually every man, woman and child in the United Kingdom and Ireland.

People Must Buy Fleet

To accomplish this, there is only one possible means: the purchase of the fleet by the people as a whole. "Where your treasure is there will your heart be also," is an economic doctrine applied theologically. And where the treasure is there will be a deep interest, a desire for the success of our shipping, a determination that propaganda from abroad and stupid legislation at home shall not drive us from the seas. But the people of the interior cannot come to the ships; many persons of the inland states, millions of them, must live and die without ever having gazed upon salt water; we must, therefore, take the ships to them. And that can be done only by disposing of stocks and bonds of shipping corporations in every city and every cross-roads town of the country.

The people already own the fleet through the Shipping Board, but they cannot feel the abiding sense of personal possession that would follow upon the actual purchase of shares in maritime corporations. And furthermore there is no other way of disposing of the government-owned vessels. New York, Boston, New Orleans, Galveston, San Francisco and Seattle do not possess the money; they cannot find the money; no existing or possible combination of capital would be sufficient. The sale of the fleet must be managed as the financing of the railroads and great industrial corporations was managed: by the peddling of securities in every corner of the country.

Such a task would be gigantic and would demand the most careful organization. Several considerations occur.

Education Must Precede

In the first place, the way must be prepared months in advance. Education must precede the salesman. The people must learn something of the fundamentals of shipping. They can be taught only by the magazines of general circulation and by the newspapers of the interior; upon those publications devolves the duty. That duty is pressing: it demands, however, more than good-will: it demands preparation and time for that preparation. But different organizations, such as the National Merchant Marine League, devoted to the fostering of shipmindedness, already exist; from them should come the conception and the worked-out plan.

Next should follow the organization of the shipping corporations to take over the government fleet. We have many, but shall need more. The officials must be men whose names command respect, not only in the shipping world, but in the financial world as well.

Why Not a National Week?

With this done, how shall the stocks and bonds be sold? What is Detroit's direct and immediate interest in shipping? How much flour does Minneapolis export? The cotton-growers of the South send thousands of bales of cotton to Japan and Great Britain; all these bales must go in the holds of steamships; here is an avenue of approach.

A single campaign by all shipping companies in concert should be cheaper and more effective than several minor campaigns, and would, moreover, command greater confidence. Why should not shipping securities be sold almost as were Liberty bonds? Why not have a merchant marine week, in a year or so, after the final sales policy of the Shipping Board is clearly and precisely known and after opportunity has been given to organize corporations for the purchase of the ships? A score of plans for pushing the disposal of stocks and bonds might be devised; for example, rid the world of the present absurd names of Shipping Board vessels and appeal to local pride by bestowing upon the vessels the names of cities and towns that buy fixed minima of securities.

That such pride might be made an agent of vast importance is evident when we consider the regard each state has for the dreadnought or other man-of-war that bears its name.

Merely selling stocks of our shipping companies will not be enough. If the stocks are sold in some manner as that suggested, the thousands of purchasers will demand accurate information of world shipping conditions. They will demand information that even the people of the seaboards are not getting now. They will demand that the newspapers give them reliable shipping news, on which they can rely as the Iowa farmer relies on the published prices of corn on the Chicago Board of Trade. And the newspapers will be forced to answer that demand.

With some honorable exceptions, the shipping-news columns of the papers are open to severe criticism—of the papers of general circulation, that is, because the commercial press, headed by the excellent dailies of New York, compels admiration. Two reasons for the low standing of the generally circulated papers appear: one, that the proper editorial attitude does not exist; the other, that the marine reporters often are manifestly ignorant and incompetent. Often, mark you, and not always: there are scores of "old-timers" on the waterfront who have a deep and abiding love for their beats, who know whereof they write. But they are in a decreasing minority.

That Pet Cobra

To amplify the first criticism, of the wrong editorial policy, we need only consider that a principal duty of shipping reporters is (or was, until quite recently) the boarding of passenger liners and the publication of a column or two of gossip about persons arriving from overseas. The young woman who has a pet cobra, the miss who shot a Bengal tiger three years ago, the man from Manila who owns the cane made of the tail of the ray-fish: all shall receive a half-column of type and perhaps a two-column cut as well. When the reporter has finished with the liner, or on days when no liners arrive, he has time to attend to the incidentals, such as the state of the market, the meetings of traffic conferences, the awarding of contracts for new vessels, which to some old-fashioned folk surpass in importance, if not in interest, all the chatter of the passengers. And even when the reporter has time to collect facts, to gather real news, he often fails of his mission.

Nor does the reporter alone fail. His editors are no less culpable; they also often are ignorant of the fundamentals of shipping. Else why all the absurdities published regarding the Shipping Board's new 535's and 502's? These vessels promise to do for the passenger-carrying business of the merchant marine what the fleet of freighters already has done for the transportation of freight; they are giving us a well-balanced fleet; on several sea-routes they will make it possible for an American to travel under his own flag instead of the British or Japanese. But no man who had the slightest knowledge of American shipping would assert that one of the new steamers was the "first ocean-going passenger vessel built in an American shipyard in nearly fifty years." That statement appeared in a paper published in New York, the maritime heart of the United States. Those who remember the Mongolia, Manchuria, Minnesota, Great Northern, Northern Pacific, to mention only a few trans-Pacific liners, may be pardoned for smiling. But what of the "man on the street"? He must believe what the editorial writer and reporter lay before him; what other sources of information has he?

If many of the seaboard newspapers of the United States offend so grievously, what opportunity has the inland press, which through the news agencies must rely upon the coast cities for its information? The inland press has no opportunity whatever. It cannot publish shipping news, because the news is not to be had; the young woman who owned the pet cobra has occupied all the waterfront reporter's time, to the exclusion, perhaps, of a slash in trans-Pacific rates or of an entirely new departure in intercoastal business.

A Man Named Nelson

Of the schools also much might be said. They might as well teach facts. We hear that certain histories are being revised nowadays to conform more nearly with what actually happened in certain times. Why not have a general revision of textbooks? There comes to mind especially a book written by a professor in Yale that purported to be a history of medieval and modern times. Purported to be: that is said advisedly; the book pretended to be what it was not. In one huge instance it omitted mention of a certain engagement, a sea-battle, that was not without marked effect upon history, that was as surely the forerunner of a world land-battle as Gettysburg was of Appomattox. So great does that clash bulk in the minds of a certain race akin to our own that the flagship of the victorious fleet was made permanent flagship of a great naval base. The ship in question is named Victory; she was the scene of the triumph and death of a man named Nelson at a battle called Trafalgar. And those unfortunate youngsters who are compelled to rely upon that particular so-called history for their knowledge must remain in ignorance of the profound influence of Trafalgar upon the whole after history of the world; they cannot know that without Trafalgar there might have been no Waterloo.

Our Old Battle-cruisers

If Horatio Lord Nelson cannot receive his due in the native land of Admiral Mahan, what chance has Farragut? Does not such sloth and indifference on the part of our textbook writers spell danger to both navy and merchant fleet? A few years ago a book was published, with the approval of officials of the Shipping Board, in which was glib mention of the battle-cruisers of the United States Navy. And the United States Navy is building the first of its battle-cruisers only now. The Navy League might co-operate with the Shipping Board in removing some of this ignorance of those who presume to teach.

When will the youngsters hear of the Flying Cloud and the Red Jacket and the old tea races from Canton and Shanghai? Boys, even girls, have been known to read tales of the sea not without zest. A man named Conrad succeeded in making himself known by writing nothing else; Messrs. Stevenson and London wrote ocean narratives that somehow continue to be read. Conceivably the same youngsters might be interested in a little history of things maritime, in fact, not fancy, but fact that is most engaging. The boy who can rattle off baseball batting averages can learn the record runs of the Flying Cloud, Lightning, Mauretania and Great Northern without a quiver; he might, too, be interested in the Diesel engine, a distant cousin to his father's automobile motor; he might take more than a passing interest in some of those splendid old paintings of American clippers. Those old fourth and fifth grade readers sometimes get monotonous; on the occasion of the next revision give the boys and girls something of the sea besides "The Wreck of the Hesperus." The ocean and its story really may be made interesting.

Such, it appears, is our merchant marine problem: to make the fleet a part of the everyday lives of the people of the country by selling stocks and bonds throughout the length and breadth of the continent; second, to give the oldsters through the newspapers and the youngsters through the schools an accurate knowledge of shipping.

SHIPS' OFFICERS' SALARIES

A Few Comparisons Between American and British Merchant Marine Practice

By J. C. ROHLFS

THERE has recently come into our possession a very authoritative statement concerning wages paid by British operators to the officer personnel in the merchant marine. This statement shows the various ratings and wages therefor according to tonnage of ships. The statement was in pounds, shillings and pence. British merchant marine practice is to pay in currency, and we have therefore translated these pounds, shillings and pence into an American equivalent based upon the present exchange of $3.56 per pound sterling and compared the result with wages paid equivalent positions in the American merchant marine.

This comparison shows rather surprising discrepancies and is a very eloquent argument for the necessity of adjustment of some sort in the operating expenses of American vessels competing in foreign trade. The salary given under the American column for the various ratings is the regular union scale for vessels of the tonnage described. In a future article we shall show a similar comparison between British and American crew personnel as to wages paid.

There has been a very great deal of matter published on this subject from various sources and in many mediums which in a general way would give the impression that the difference between American and British wages on board ship is a matter of very few per cent. Some really pessimistic writers have placed it as high as fifteen to twenty; more optimistic have reduced to five or six. We are not yet prepared to state exactly what is the difference on a percentage basis as covering the wages of the entire personnel on any one class of ship, but from what is indicated in the attached tabular statement it will be seen that the percentage, at any rate in the officer class, runs on the present rate of exchange at above one hundred per cent excess in favor of the American engineers and deck officers.

We would very much like to get on the band wagon, as it were, and throw up our hats and shout with the crowd that we now have a great merchant marine and that all our troubles in that connection are over, but we feel it our duty to point out to our ship-operating friends that under present conditions this vast fleet of cargo-carrying vessels is only a little cog in the wheel of foreign trade, and that its ownership, if it is to become a real asset and not a liability, must entail tremendous responsibilities for the upbuilding and the maintenance of a really constructive foreign trading policy.

The Republican President-elect has on numerous occasions indicated his policy to be that of fostering the American merchant marine, and he has publicly recognized the necessity for adjusting operating costs. His overwhelming majority at the polls may indirectly therefore be taken, from the marine operators' standpoint' to mean that the American people are also determined to underwrite any adjustment that is necessary in this matter. It will be the duty of Congress under its new leadership to determine the method and manner by which this adjustment will be made possible, and we conceive it to be our duty and the duty of all interested in the American merchant marine to give publicity to the arguments which show that such adjustment is necessary.

Without further apology for introducing here what may seem to be a note of pessimism to American operators, we submit the following tabular statement.

Comparison of Wages, British and American Vessels, on Tank Steamships

CHIEF ENGINEER, WITH CERTIFICATE OF RATING

Gross Tons	English			American Equivalent	American
	£.	S.	D.		
1000 - 3000	31	10	0	$110.88	$305.00
3001 - 5000	32	12	6	114.84	320.00
5001 - 7000	33	15	0	118.80	335.00
7001 - 9000	34	17	6	122.76	335.00

FIRST MATE AND SECOND ENGINEER, WITH CERTIFICATE OF SUPERIOR RATING

Gross Tons	English			American Equivalent	American
	£.	S.	D.		
1000 - 3000	27	10	0	$ 96.80	$216.25
3001 - 5000	28	12	0	100.67	222.50
5001 - 7000	29	14	0	104.54	228.75
7001 - 9000	30	16	0	108.41	228.75

FIRST MATE AND SECOND ENGINEER, WITH CERTIFICATE OF RATING

Gross Tons	English			American Equivalent	American
	£.	S.	D.		
1000 - 3000	26	8	0	$ 92.93	$216.25
3001 - 5000	27	10	0	96.80	222.50
5001 - 7000	28	12	0	100.67	228.75
7001 - 9000	29	14	0	104.54	228.75

SECOND MATE AND THIRD ENGINEER, WITH CERTIFICATE OF SUPERIOR RATING

Gross Tons	English			American Equivalent	American
	£.	S.	D.		
1000 - 3000	24	3	9	$ 85.14	$187.50
3001 - 5000	24	14	6	87.03	193.75
5001 - 7000	25	5	3	88.92	200.00
7001 - 9000	25	16	0	90.81	200.00

THIRD MATE AND FOURTH ENGINEER, WITH CERTIFICATE OF SUPERIOR RATING

Gross Tons	English			American Equivalent	American
	£.	S.	D.		
1000 - 3000	21	10	0	$ 75.68	$163.75

FIFTH ENGINEER, WITH CERTIFICATE OF SUPERIOR RATING

Gross Tons	English			American Equivalent	American
	£.	S.	D.		
1000 - 3000	20	8	6	$ 71.89	....

SECOND MATE AND THIRD ENGINEER, WITH CERTIFICATE OF RATING

Gross Tons	English			American Equivalent	American
	£.	S.	D.		
1000 - 3000	23	13	0	$ 83.24	$187.50
3001 - 5000	24	3	9	85.14	193.75
5001 - 7000	24	3	9	85.14	200.00
7001 - 9000	24	14	6	87.03	200.00

Ships' Officers' Salaries

The figures given in the above table are for present conditions and are from a very authoritative source. They are based on the actual fact that officers of American merchant ships are paid in American ports or in foreign ports in American gold or gold currency, while officers of foreign ships are paid in foreign currency.

From the bulletin of Dow Jones & Company of New York, the following figures are taken, showing comparison between the total wage for the crew of an 8800 deadweight ton coal-burning cargo ship and a tabular analysis of these figures for the entire personnel:

"Comparative costs of manning an 8800 deadweight ton coal-burning cargo ship under various flags, with pound sterling at $4.86, Norwegian krone at $0.26, and Japanese yen at $0.50, are: American $5315 a month, British (white crew) $3924, Norwegian $3378, and Japanese $2869. At present rates of exchange with pound at $3.45, krone at $0.14, and yen at $0.51, Japanese costs become $2926 a month, British $2735, and Norwegian $1820. In percentages the comparisons are, under nor mal exchange, American 100 per cent, British 74 per cent, Norwegian 64 per cent, and Japanese 54 per cent, and at present rate, American 100 per cent, Japanese 55 per cent, British 53 per cent, and Norwegian 34 per cent.

"Officers and men on the American ship total 48, on the British 45, the Japanese 59, and the Norwegian 40. On the American the deck department has 16 officers and men, British 18, Japanese 21, and Norwegian 17. In the engine department, American ship has 24 officers and men, British 21, Japanese 32, and Norwegian 20. In the steward department, American ship has 8, British 6, Japanese 6, and Norwegian 3.

"Comparative costs at present rates of exchange for the various departments are:

	American	British	Japanese	Norweg'n
Deck	$1948	$1123	$1202	$795
Engine	2677	1307	1580	900
Steward	690	305	144	125

"Following table gives crew distribution and monthly wages in dollars with normal exchange rate used for the various flags:

	American		British		Japanese		Norwegian	
Deck Department—	No.	Wage	No.	Wage	No.	Wage	No.	Wage
Master	1	$357.50	1	$258	1	$255	1	$268
First officer	1	228.75	1	165	1	148	1	195
Second officer	1	200.00	1	129	1	110	1	143
Third officer	1	176.25	1	109	1	98	1	104
Quartermasters	..	....	..	......	3	38	1	......
Carpenter	1	100.00	1	83	1	35	1	78
Boatswain	1	95.00	1	78	1	50	1	78
Able seamen	7	85.00	10	70	6	31	5	72
Ordinary seamen	3	65.00	2	44	6	30.50	5	44
Young men	..	....	..	......	..	......	1	29
Engine Department—								
Chief engineer	1	332.50	1	233	1	220	1	221
First engineer	1	228.75	1	165	1	138	1	182
Second engineer	1	200.00	1	124	1	105	1	143
Third engineer	1	176.25	1	109	1	98	1	104
Deck engineer	1	100.00	1	78	1	58	..	......
Storekeeper	1	95.00	1	78	1	58	..	......
Oilers	3	95.00	3	75	6	48	..	......
Firemen	9	90.00	8	73	12	32	11	73
Coal passers	6	75.00	4	70	8	25	4	49
Boy	..	....	..	......	..	......	1	23
Steward Department—								
Chief steward	1	135.00	1	97	1	35	1	156
Chief cook	1	115.00	1	92	1	26	1	52
Second cook	1	100.00	1	73	1	20	..	......
Utility men	1	70.00	1	68	..	......	..	......
Messenger	2	70.00	1	67	3	20	..	......
Messboys	2	65.00	1	41	..	......	1	23

It will be noted, in comparing these figures with those in the former tables, that these are based on normal exchange rates.

DIRECTORY OF PACIFIC SHIPBUILDERS

BARNES & TIBBITTS SHIPBUILDING & DRYDOCK COMPANY,
1 DRUMM STREET, SAN FRANCISCO

President, W. G. Tibbitts; vice-president, J. D. Barnes, secretary and purchasing agent, J. J. Barnes; engineer, R. B. Bird; superintendent machine shops, James Pringle; superintendent wood work, Sam Curtis.

BETHLEHEM SHIPBUILDING CORPORATION, UNION PLANT,
SAN FRANCISCO

General manager, Joseph J. Tynan; assistant genera manager, A. S. Gunn; assistant secretary and treasurer Arnold Foster; purchasing agent, O. W. Street.

B. C. MARINE ENGINEERS & SHIPBUILDERS,
VANCOUVER, B. C.

Managing director, Innes Hopkins; general superintendent, J. K. McKenzie; secretary-treasurer, C. J. Isted

N. J. BLANCHARD BOAT COMPANY,
SEATTLE

Superintendent and owner, N. J. Blanchard.

J. F. DUTHIE & COMPANY,
SEATTLE

President, treasurer and general manager, J. F. Duthie; secretary, H. G. Kessler; assistant general manager in charge of drafting department, Arthur Nation; purchasing agent, E. C. Gaumitz.

FELLOWS & STEWART,
WILMINGTON, CALIFORNIA

President, Joe Fellows; vice-president, H. H. Evans; general manager, secretary and treasurer, V. B. Stewart; auditor and cashier, Lynn Hurlbut; machine shop foreman, J. Evans; boat shop foreman, C. D. Stocking; paint shop foreman, A. Gaskin.

HANLON DRYDOCK & SHIPBUILDING COMPANY,
OAKLAND

President and general manager, D. J. Hanlon; vice-president and treasurer, C. J. Foard; secretary, E. L. Cramer; office manager and auditor, D. K. Byers; purchasing agent, C. H. Brown; plant superintendent, J. F. Mooney; port engineer, J. F. McIntosh; chief draftsman, R. M. Smith; superintendent hull construction, James Young; superintendent marine machinists, F. C. Henn; superintendent machine shop, E. J. Froggatt; riveter foreman, E. R. Rich.

HARBOR MARINE COMPANY,
VICTORIA, B. C.

President and general manager, C. J. V. Spratt; naval architect, J. S. Clark, M. I. N. A.; assistant naval architect and superintendent, C. E. Green; secretary-treasurer, B. L. Robertson; employment manager, L. Bullock-Webster; head of electrical department, E. F. S. Chitty; yard superintendent, J. M. Newcom.

KING & WINGE SHIPBUILDING COMPANY,
1030 ALKI AVENUE, S. W.,
SEATTLE

President, T. J. King; vice-president, B. Winge; secretary-treasurer, W. S. Bell; manager, J. E. King.

KRUSE & BANKS SHIPBUILDING COMPANY,
NORTH BEND, OREGON

K. V. Kruse and Robert Banks.

LOS ANGELES SHIPBUILDING & DRYDOCK CO.,
SAN PEDRO

Directors: J. F. Sartori, president Security Savings Bank; Erle M. Leaf, Dan Murphy, S. L. Naphtaly, Fred L. Baker. President and treasurer, Fred L. Baker; vice-president and general manager, S. L. Naphtaly; vice-president, secretary and assistant treasurer, Erle M. Leaf; vice-president and assistant treasurer, Dan Murphy; assistant general manager, James Reed; comptroller, F. G. Phillipps; works manager, John Murphy.

MOORE SHIPBUILDING COMPANY,
OAKLAND

Chairman, R. S. Moore; president and general manager, George A. Armes; vice-president and superintendent, Joseph A. Moore; treasurer, J. H. Small; secretary, L. V. Hedrick; assistant to the president, L. H. Cromwell; sales manager, G. M. Gliddon; purchasing agent, M. G. Waites; naval architect, B. Hedstrom; chief engineering draftsman, P. L. Joslyn; superintendent of machinery installation and repairs, F. Grimes; superintendent of hull construction and repair, H. Fawke; superintendent San Francisco shop, William Harrower.

NAVY YARD, MARE ISLAND,
VALLEJO, CALIFORNIA

Commandant and industrial manager, Captain E. L. Beach, U. S. N.

Aide to commandant, Commander C. S. Kerrick, U .S. N.

Aide and communication officer, Lieutenant-Commander H. S. Haislip, U. S. N.

Captain of the yard, Captain Hugo W. Osterhaus, U. S. N.

Public works officer, Commander L. M. Cox (CEC), U. S. N.

Construction officer in charge of hull division, Captain J. D. Beuret (CC), U. S. N.

Office and planning superintendent, hull division, Lieutenant-Commander H. E. Saunders (CC), U. S. N.

New work superintendent, hull division, Lieutenant Charles W. Colby (CC), U. S. N.

Chief draftsman, hull division, D. B. Brown.

Engineer officer in charge of machinery division, Captain M. E. Reed, U. S. N.

Shop superintendent, machinery department, Commander H. G. Bowen, U. S. N.

Office and planning superintendent, machinery division, Commander Bryson Bruce, U. S. N.

Radio officer, machinery division, Commander H. W. McCormack, U. S. N.

NAVY YARD, BREMERTON,
PUGET SOUND, WASHINGTON

Commandant, Rear Admiral H. A. Field, U. S. N.

Captain of the yard, Captain E. S. Kellogg, U. S. N.

Engineer officer, Commander A. T. Church, U. S. N.

Construction officer, Captain L. B. McBride (CC), U. S. N.

Public works officer, Commander E. R. Gayler (CEC), U. S. N.

Supply officer, Commander S. E. Barber (SC), U. S. N.

Inspection officer, Commander E. B. Armstrong, U.S.N.

Accounting officer, Commander M. C. Shirley (SC), U. S. N.

Disbursing officer, Commander C. R. O'Leary (SC), U. S. N.

Medical officer, Lieutenant-Commander A. B. Davidson (MC), U. S. N.

PACIFIC COAST SHIPBUILDING COMPANY, BAY POINT, CALIFORNIA

President, D. C. Seagrave; vice-president, George E. Billings; secretary and treasurer, Golden L. Downing; auditor, L. H. Heacock; plant superintendent, F. W. Small; marine superintendent, P. G. Pennington; hull superintendent, W. Donald; inside superintendent, J. G. Ennes; purchasing agent, J. A. Smiley; manager employment and welfare, E. B. Bull.

PACIFIC MARINE & CONSTRUCTION COMPANY, SAN DIEGO

President, E. M. Scofield; vice-president and treasurer, G. M. Scofield; secretary, C. L. Christie; chief engineer, E. M. Scofield; assistant engineer, hulls, F. J. Twaits; assistant engineer, outfitting, E. Cockroft; superintendent, yard and hulls, P. J. Hickey; superintendent, outfitting, L. M. Scofield; auditor, T. J. Landers.

PENINSULA SHIPBUILDING COMPANY, PORTLAND

Directors, A. L. Mills, J. C. Ainsworth, W. M. Ladd, James B. Kerr, F. B. Layman, Thomas Autzen, F. C. Knapp; president, F. C. Knapp; vice-president, A. L. Mills; secretary, James B. Kerr; assistant secretary and assistant treasurer, L. C. Logan.

ROLPH SHIPBUILDING COMPANY, ROLPH, HUMBOLDT COUNTY, CALIFORNIA

President, James Rolph, Jr.; vice-president, D. F. Ewart; secretary, John D. Stelling; superintendent, William McDade.

ST. HELENS SHIPBUILDING COMPANY, MAIN OFFICE, FIFE BUILDING, SAN FRANCISCO YARD, ST. HELENS, OREGON

President, Charles R. McCormick; secretary, E. H. Meyer; vice-president and treasurer, S. M. Hauptman; vice-president and manager, H. F. McCormick; engineer, W. R. Hewitt; superintendent, C. E. Christiansen; purchasing agent, A. F. Barnett.

SAN FRANCISCO SHIPBUILDING COMPANY, 310 CALIFORNIA STREET, SAN FRANCISCO, AND GOVERNMENT ISLAND, OAKLAND

President, W. Leslie Comyn; vice-president, John W. Lawson; treasurer, U. G. Hind; secretary, E. G. Sass; assistant secretary, F. R. Greenleaf; general manager, V. H. Poss; purchasing agent, E. F. Atkinson; superintendent, J. J. Fisher; chief draftsman, John Eden.

Purchasing department at Government Island, Oakland.

SEACRAFT CORPORATION, WILMINGTON, CALIFORNIA

President, E. A. Featherstone; first vice-president, Dustin Farnham; second vice-president, Thomas H. Ince; treasurer, Marco H. Hellman; secretary, William LaPlante; assistant treasurer, H. E. Roach; assistant secretary, R. R. Thomas; superintendent of works, C. D. Callahan; directors, Harry Keefe and J. A. Talbot.

SOUTHWESTERN SHIPBUILDING COMPANY, EAST SAN PEDRO

Board of directors, Marco H. Hellman, J. A. Talbot, William F. Howard, Irving Hellman, Emmanuel Cohen, Daniel K. Drake, Benjamin E. Page, J. W. Mason; president, Marco H. Hellman; vice-president and general manager, J. A. Talbot; vice-president, William F. Howard; treasurer, Irving Hellman; secretary, Emmanuel Cohen; works manager, O. B. Kibele; chief engineer, H. O. Shuster; naval architect, William Lambie; superintendent, J. J. Toohey; superintendent of engineering, J. D. Gunn; plant engineer, A. L. Ferver; purchasing agent, J. J. Wilson; auditor, H. A. Reed; paymaster, R. B. Hawthorne; general storekeeper, J. C. Richardson.

G. M. STANDIFER CONSTRUCTION CORPORATION, VANCOUVER, WASHINGTON

President, G. M. Standifer; vice-president, L. B. Menefee; vice-president and comptroller, R. V. Jones; secretary and treasurer, W. G. Davidson; executive assistant, N. C. Soule; assistant comptroller, J. W. Parker; auditor, H. G. Dexter; purchasing agent, H. Luckett; assistant to vice-president, T. V. Standifer; chief engineer, C. J. Snow; naval architect, S. A. Vincent; superintendent of hull construction, James McCall; superintendent of machinery installation, F. E. Hogan.

W. F. STONE & SON, OAKLAND

W. F. Stone and Lester F. Stone, co-partnership.

TODD DRYDOCKS, HARBOR ISLAND, SEATTLE

Board of directors, W. H. Todd, C. W. Wiley, H. W. Kent, H. W. Bogle; president and general manager, C. W. Wiley; vice-president and treasurer, H. W. Kent; seretary, O. M. Lund; assistant manager, A. R. Hunt.

TODD DRYDOCK & CONSTRUCTION CORPORATION, TACOMA

President, C. W. Wiley; vice-president and general manager, J. A. Eves; comptroller and treasurer, H. E. Coleman; secretary and assistant treasurer. Edward Nugent; purchasing agent, C. L. Bankson; naval architect, W. C. Nickum; chief engineer, John Gardner; superintendent of hull construction, Fred Mackle; superintendent of machinery, James Layton.

TREGONING BOAT COMPANY, BALLARD STATION, SEATTLE

Shipbuilding discontinued except for life boats.

UNION CONSTRUCTION COMPANY, OAKLAND

Directors: W. W. Johnson, H. G. Peake, W. H. Christie, Walter E. Buck, E. A. Christenson, C. M. Weatherwax, Victor Etienne, Jr.

Executive committee: Walter E. Buck, chairman; W. W. Johnson, H. G. Peake, C. M. Weatherwax, Victor Etienne, Jr.

President, W. W. Johnson; vice-president and general manager, H. G. Peake; secretary, W. H. Christie; auditor-treasurer, C. E. Mynard; assistant auditor, C. H. Morrison; cashier, E. C. Clarey; paymaster, Bennett James; assistant manager, industrials relations and production, John F. Johnston; assistant to general manager, E. G. Burr; manager engineering department, A. Andrew; chief engineering department, J. C. Flett; naval architect, J. J. Coney; chief draftsman, hull department, S. A. Knapp; master mechanic, W. D. Gardner; chief electrician, E. G. Thunen; employment manager, C. L. Foster; manager dredge department, A. P. Van Deinse.

Pacific Marine Review

The National Magazine of Shipping

January, 1921

Copyright, 1921, by J. S. Hines

MARINE ENGINEERING TRENDS

By A. J. DICKIE

MARINE engineering in its relation to the operation of ships in the merchant marine covers the generation and application of power on board ship and the application of shore power to all uses affecting the movement of ships and their cargoes. The activities covered by the latter part of this definition usually come under the purview of the mechanical engineer, but any marine engineer who wishes to be successful must consider these activities as being part of his stock in trade. The purpose of the present article is to review the progress that has been made in marine engineering as it is covered by the first part of the above definition and to attempt to analyze that progress and derive from the analysis some conclusions as to the future trend of improvements. In both the review and the analysis we shall attempt to consider the subject entirely from the viewpoint of the operator of ships.

We need not go back further in marine engineering history than the opening of the present century to trace the beginning of all of the present trends in the improvement of marine propulsion. At that time the reciprocating steam engine had reached practically the same degree of perfection which it at present holds. Passenger steamers on the North Atlantic were regularly making twenty-three knots at sea, the steam turbine had been successfully applied in direct connection with propellers, and Parsons had driven his torpedo boat Turbinia through the water at the then terrific rate of thirty-five knots per hour for several hours at a time.

Sir William H. White, late chief of naval construction for the British navy, writing in Cassier's Magazine for November, 1899, reviews the then state of steam navigation. At that time the Oceanic of the White Star Line, 704 feet in length, and the Kaiser Wilhelm der Grosse, 729 feet in length, were the crack passenger liners of the North Atlantic. The Germans had at that time laid down two larger steamers of heavier horsepower than these two and figured to make average speeds across the Atlantic of twenty-three and twenty-three and one-half knots. Sir William sums up the progress due to sixty years of continuous effort and strenuous competition in the following words:

"Speed has been increased from eight and one-half to twenty-two and one-half knots. Voyage time has been reduced to 38 per cent of what it was in 1840. Ships have more than tripled in length, doubled in breadth, and increased tenfold in displacement. Engine power has been made forty times as great. Ratio of horsepower to the weight driven has been increased fourfold. The rate of coal consumption measured per horsepower per hour is about one-third what it was in 1840."

These figures all refer specifically to progress on the North Atlantic ferry passenger liners. When we turn to cargo-carrying vessels we find that in 1900 there were in operation a number of such vessels from 500 to 600 feet in length and with gross registered tonnage running up to 13,000 tons and speeds up to sixteen knots, so that, during the first twenty years of this century, from the operator's standpoint, progress in steam propulsion has been and still is rather in the refinements of design and in methods of application than in any revolutionary changes in the prime mover itself. It may be said that the present application of steam power by means of triple and quadruple expansion steam engines directly connected to propeller shafts in the ordinary installations on our freight carriers is about on the same basis for economies of fuel per indicated horsepower that the best marine steam installations of the same character had achieved in 1900, and that this result has come about from refinements and standardization of design and manufacture of marine steam engines and boilers.

For that reason, although the great bulk of the merchant marine fleet of the world is still driven by reciprocating steam engines, we will not devote any space to their consideration in this review. They are so familiar to everyone connected with the merchant marine that it is not at all necessary for us to consider the trends of their development during the last twenty years. We shall have in conclusion something to say about them in connection with their boiler plants and future development.

Certain very well defined principles had come to the front in marine engineering at the close of the last century in connection with ordinary cargo steamers. These were at that time largely the result of rule of thumb methods and practical experience. Among them we may mention several which might well form a basis for judgment passed on any proposed installation for marine propulsion. It had come to be recognized that the unit of economy in a cargo vessel should be the over-all cost of operation per cargo ton mile; that figuring with this unit the most economical speed for cargo vessels was from ten to twelve knots at sea loaded; that this speed, other factors of the problem being equal, was most economically achieved by a propeller designed to give this speed at from seventy to ninety revolutions of the propeller per minute, and the plant which gave the most uniform turning movement at the propeller was the most efficient. These rules or principles, which were in 1900 largely the result of practical experience, have since been conclusively demonstrated by scientific experiments in naval and commercial experimental tanks.

Steam Turbine Drives

Aside from the reciprocating steam engine, the only marine drive which had been applied to marine propulsion at the opening of this century was the direct connected steam turbine drive, and we shall now attempt to review its application as it has developed during the last twenty years.

It became increasingly evident to mechanical engineers ashore during the early years of this century that through the use of the steam turbine and the refining and perfection of boiler room service and boiler design, much greater economies could be effected than were possible with the use of reciprocating engines. This fact was so conclusively proven by the results obtained in large central stations for the generation of electric power that very early in the present century marine engineers and mechanical engineers both in Europe and in America began to look for some method of applying the power generated in a light weight, high speed steam turbine to the relatively slow speed propeller of cargo vessels. This investigation led to the development of reduction gearing and to the successful solution of many problems connected with that method of power transmission, so that today what is known as the geared steam turbine drive is second in point of horsepower and tonnage to the reciprocating steam engine in the world's merchant fleets.

The advantages gained by applying reduction gears to steam turbines in marine propulsion are very numerous. The steam turbine reaches its highest economy and efficiency at very high peripheral speeds. It will be evident, therefore, that a steam turbine which is to turn at 100 revolutions per minute or less for direct connection to an efficient economical propeller for a merchant ship would have to be of very large diameter in order to have a high speed of the turbine blades in getting away from the steam nozzle. In fact, to achieve the most economical speed for the turbine blades at a low revolution of the turbine shaft the rotor and casing would have to be of such large diameter that it would be impossible to get them in the ship. Hence, all direct connected turbines which are a compromise between economical speed for turbine and economical speed for propellers show very poor over-all propulsive economy, while geared turbines show very high economy. High speed turbines, such as are used in the geared installations, show also a very decided advantage in the matters of space occupied and weight per horsepower when compared with reciprocating engines. Geared turbines, however, are somewhat limited in attaining the best possible economy on account of the physical limitations of the gears and on account of the necessity of incorporating in the main turbine units a reverse element for maneuvering purpose. Many articles describing in detail marine geared turbine installations have appeared from time to time in our columns.

Another form of speed reduction that has recently come into great vogue is the turbo-electric drive, in which the steam turbine is direct connected to an electric generator which, being driven at the most economical speed for both generator and turbine, makes a highly efficient and economical power generating unit. Power from this unit is led through a control switchboard to a motor direct connected to the tail shaft. This drive has been adopted for the large battleships of the United States Navy and has proven its superiority over the geared turbine drive in that it has greater maneuvering flexibility and in that it is capable with multiple units of several economical cruising speeds, thereby greatly increasing the cruising radius. This last advantage does not apply on a merchant vessel which travels for so large a proportion of its operating time at full speed. Turbo-electric drives of this character are now being placed on ten United States Shipping Board freighters. A detailed description of a 3000 horsepower turbo-electric drive installed on an American passenger steamer will be found on page 22 of this issue of Pacific Marine Review.

Perhaps the highest development of this form of drive has been in Sweden in connection with the Ljungstrom turbine. This turbine is of the radial flow type, having two rotors revolving in opposite direction, the shaft of each rotor being direct connected to an electric generator and these generators connected by wiring through control board to two motors at the stern of the ship which are geared down to a single propeller shaft. One or two installations of this character had been made on ships of from 1200 to 2000 horsepower shortly before the war broke out. There are now on order in Norwegian and Swedish shipyards over twenty-five standard cargo steamers of 5000 deadweight tons and over to be powered with this drive. Its great advantage is the compactness of the generating unit, the central athwartship compartment in a 5000-ton freighter housing two Scotch boilers and a Ljungstrom turbine generator unit mounted on its condenser between the boilers. Incidentally this arrangement has a very great advantage in that it keeps the watch engineer in the boiler room where he should be on all turbine installations. It is also very evident that this arrangement would insure free open cargo holds of maximum length and capacity for any given size of ship. The Ljungstrom steam turbo-electric drive is described in detail in the leading article in the issue of Pacific Marine Review for July, 1919. The steam turbine mechanically and/or electrically geared to propeller occupies less space, is more economical in steam consumption, and gives a much more uniform turning moment than a reciprocating steam engine of the same power. The steam turbine geared drive is decidedly, therefore, a step in the right direction.

It will be noted that all marine propulsion apparatus described heretofore is dependent for power primarily upon the steam boiler and on the development of the design, construction and installation of steam boilers has depended to a very large degree the increase in economies effected in marine propulsion during the last twenty years. One would be entirely safe in asserting that probably 90 per cent of the merchant shipping in 1900 derived its power from marine boilers of the Scotch firetube type, and one would be reasonably safe in asserting that the majority of boilers in the merchant marine are still of that same type. With the introduction, however, of the marine turbine, and even earlier in torpedo boat practice, there came into the marine game watertube boilers of many types, and much controversy, bitter and otherwise, has been waged between marine engineers for the last twenty years as to the relative advantages and disadvantages of these two types of boilers. With the introduction of oil fuel and the improvement of apparatus for the burning of oil under pressure has come a decided trend toward watertube boilers of light weight which shall be pushed to the limit, as by so doing economies in fuel can be effected which more than offset any increased cost of maintenance. This is the present trend, especially in naval work, and it is being strongly emphasized by the fine performance of many water tube boilers in the U. S. Shipping Board fleet. Those interested in a more detailed account of the relative merits of Scotch and watertube marine boilers are referred to an article on that subject on page 78 of the December, 1919, issue of Pacific Marine Review.

The development of apparatus for superheating of steam has had a very considerable effect on the economy of marine propulsion, and it is mainly in the application of superheating and of forced draft that the Scotch marine boilers of today differ from those of twenty years ago. Thus we find that one of the most modern of the Cunarders but recently launched in England and not yet in commission, the Scythia, is equipped with Scotch marine boilers with four furnaces to each boiler, equipped for oil burning, and fitted with superheaters of the locomotive type to produce steam at 225 degrees superheat.

The situation with reference to boilers might be summed up as follows: The majority of marine operators seem to have a very decided prejudice in favor of the Scotch firetube boiler. Watertube boilers have proven under the most adverse conditions that by their use superior operating economies may be effected, and nothing has ever been proven in operation against the reliability at sea of watertube boilers, but the prejudice sticks in the minds of nearly all of the older marine engineers and the more conservative ship owners, so that while these men freely admit the superior economies, they generally fall back on the Scotch boiler, which to them is synonymous with the term "Old Reliable."

We must now pass on to a phase in marine engineering development in which the steam boiler and the use of steam is entirely eliminated, and it is this development in the science of marine propulsion which peculiarly belongs to the twentieth century. We refer to the application of the internal combustion engine to marine propulsion.

In this class of engine liquid fuel is burned in the engine cylinder, and hence in a ship driven by an internal combustion engine we have all of the advantages connected with the burning of liquid fuel under steam boilers and the added economies due to the greater thermal efficiency of the heat cycle of an internal combustion engine as compared with steam. We use the term "internal combustion engine" instead of Diesel engine, because, while in the majority of installations now in use on large ocean-going ships the Diesel principle is used, recently developments and improvements in high power, slow speed marine engines have been getting away from the true Diesel characteristics.

It is not necessary from the operator's standpoint to go into the thermodynamics of the internal combustion engine. It is sufficient for his purposes to know that internal combustion engines have demonstrated in sea service over long periods of time that they can be depended upon to produce shaft horsepower at about one-third the fuel consumption of the ordinary steam boiler reciprocating engine plant and at less than one-half the fuel consumption of the ordinary geared turbine plant. Their reliability has also been proven beyond any possible doubt, and the fact that conservative British, French, Danish, Dutch and Scandinavian shipowners are very rapidly building at the present time great fleets of motor vessels driven by engines of this type should be sufficient proof to anyone that these engines have made good their claims and have come to stay. At the present time a properly constructed and installed internal combustion engine plant for marine propulsion is more costly by a considerable margin than a steam plant of the same power. But the great demand for these plants in Europe during the last two years has led to standardization in manufacture, so that in the not far distant future marine internal combustion heavy oil engines should be manufactured at a cost certainly not exceeding, and probably much less than, the cost of the steam engine and boiler plant. As that time approaches undoubtedly we shall see the limited number of conversions from steam to internal combustion which are taking place today increased to a practically unlimited extent.

The development of the internal combustion engine for marine propulsion has been directed almost wholly toward producing slow speed, heavy engines with as great horsepower as is practicable per cylinder. The farthest development in this direction in strictly marine work is found in Great Britain in the standard four-cylinder Doxford engine, producing 3000 indicated horsepower, 2850 shaft horsepower, at 77 revolutions per minute. These engines are being installed in cargo-carrying ships of 10,500 tons deadweight capacity and are guaranteed to produce a loaded sea speed of ten and one-half knots per hour on a fuel consumption of nine tons .14 gravity oil per twenty-four hours. This engine is described in detail on page 19 of this issue of Pacific Marine Review.

(To be continued)

OUR INLAND WATERWAYS

In Relation to the American Merchant Marine

By HON. J. W. ALEXANDER[*]

THE improvements of our rivers and harbors and their relation to our commerce, domestic and foreign, have been the subject of academic discussion for many decades. But as time goes by and the need for more adequate and economic means of transportation becomes more apparent and pressing, the more insistent should be our demand that the great projects already undertaken should be carried forward consistently, and without unnecessary interruption to their completion.

It has been the conviction of those who have given this subject their best thought and investigation that our waterways, including the Mississippi and her tributaries, constitute one of our greatest national assets and to postpone their utilization for the purpose of commerce is short-sighted and that their improvement merits greater consideration by the agricultural, mining, manufacturing and commercial interests of our country, and particularly of those states which lie in the greater Mississippi Valley.

True, we have expended more than one billion dollars, since the work was first begun, in the improvement of our rivers and harbors. More than one-half of this sum has been spent in the improvement of the harbors, for the most part on the Atlantic seaboard; but who will say the money was not wisely and judiciously spent?

Indeed, the improvement of the harbors at our great seaports, like New York, Boston, Baltimore, New Orleans, San Francisco and Seattle, has been indispensable in the interest of commerce and navigation. Without dredging and deepening the harbors in these ports it would be impossible to land the modern deep-draught ocean liners and cargo ships at their piers and docks, and a tremendous drag on our commerce would be unavoidable. Notwithstanding these expenditures we are still lacking in adequate facilities for the economic handling of cargoes from shore to ship, and vice versa.

What I have said of the ports mentioned is true in a large measure of all seaports on the Atlantic, Gulf and Pacific Coasts, and the studies and investigations of the dock and terminal facilities of our seaports is of the greatest importance and should have your continued and enthusiastic support. This good work should go on and every necessary expenditure should be made, and as soon as practicable, to meet the needs of our commerce, domestic and foreign, keeping in mind at all times the absolute need of reducing the costs of transportation, whether by rail or water, or both, including terminal and port, to the lowest practicable levels that there may be free and economic distribution of commodities from one community to another, and from the interior to the seaboard and from the seaboard to the interior. In this way we can bring the producer and consumer closer together and very materially reduce the high cost of living. And, unless we very materially reduce the transportation costs to our seaports on commodities having their origin in the interior and far remote from our seaports, it will not be possible for us to find a market for commodities in foreign countries. In other words, we will not be able to compete with our commercial rivals in the markets of the world. Transportation costs are now and will always be one of the prime factors in any equation upon the correct solution of which depends the prosperity of producer and consumer alike, and whether viewed from the standpoint of domestic or foreign trade.

There was a time in the not far distant past that we gave little concern to the development and extension of our foreign trade. We were devoting our time and energy to the development of the resources of our own country, and our home markets and foreign markets for our surplus products were mere incidents in our national life; but the time has come when our vision should extend to foreign fields, and now is the time to make sure our foothold in foreign trade so marvelously begun in the past war period. For the fiscal year ended June 30, 1920, our foreign trade amounted to the stupendous sum of $13,000,000,000. But world conditions are abnormal, the world is sadly out of joint. There is an active foreign demand for the products of our mines, factories and farms, but our would-be customers lack the ready money with which to purchase our surplus, and unfortunately the exchange situation abroad and financial situation at home seem to limit our ability to extend long-time credits in sufficient volume to relieve the situation.

Let us face the situation with courage and resolution and regard it as only temporary. The basis of our economic, industrial and financial situation is sound and what we most need is co-operation, team work under wise and responsible leadership, to restore confidence, stabilize business and insure great and long continued prosperity for ourselves and enable us to do our full share in promoting the happiness and prosperity of other nations with whom we would cultivate closer social, commercial and political relations to our mutual advantage.

American Merchant Marine

The report of the Commissioner of Navigation, Department of Commerce, for the fiscal year ended June 30, 1920, was 16,324,024 gross tons, three times the tonnage in 1914 of Germany, whose former place as the second maritime power the United States now holds. The year's increase in shipping has been 3,416,724 gross tons, an annual increase larger than the whole world's increase in any year prior to 1914.

The American ships built and documented during the year aggregated 3,880,639 gross tons, an output comparable to the world's pre-war record launching of 3,332,882 gross tons in 1913 and the British record of 3,808,056 gross tons under construction on June 30, 1920.

American ships registered for foreign trade on June 30, 1920, aggregated 9,929,595 gross tons, nearly tenfold the tonnage so registered in 1914.

This registered tonnage during normal domestic conditions of trade and production would suffice to carry about 60 per cent in value of the foreign trade of the United States, and, in fact, during the year ended June 30, 1920, has carried 45 per cent in value of our exports and 39 per cent in value of our imports, while in 1914 American ships carried only 10 per cent in value of our exports and imports.

The increases during the year ending June 30, 1920, in our tonnage registered for the foreign trade has been 3,258,869 gross tons, or virtually 50 per cent. The world's shipping in June, 1920, amounted to the grand total of 57,314,000 gross tons, of which about 20,000,000 gross tons were under the British flag, and 16,000,000 gross tons were under the American flag, and 3,245,194 gross tons were under the French flag, which ranks next to the American.

Our great merchant fleet was built up during and to meet the exigencies of the world war, and at tremendous cost, and it behooves us to utilize it to the utmost in the promotion and development of our domestic and foreign trade, and to continue to do so profitably is one of the very serious problems that now confront us, for ships without full cargoes at remunerative rates cannot long be operated under the American flag.

This leads me to discuss briefly the relation of our inland waterways to our merchant marine. As I have tried to point out, transportation costs are a vital factor in the movement of commerce, and the farther our industrial and commercial centers are removed from our seaports the greater the handicap upon their contribution to and participation in our foreign trade. The same is true of our mining and agricultural industries. Hence this will be an ever present problem pressing for solution by the chambers of commerce and other trade organizations in the Mississippi Valley.

It seems to be conceded on all hands that our present transportation facilities by rail are inadequate. The railroads are taxed beyond their facilities to take care of the traffic seasonably and with dispatch. As I shall show, freight rates have increased enormously and it is even claimed that at the present high levels they are not sufficient to pay 6 per cent interest on the capital investment.

It is made the duty of the Interstate Commerce Commission under the Cummins-Esch Act of June 5, 1920, to authorize increases in freight rates sufficient to assure that rate of income. So it is only reasonable to assume that there will be no relief in the matters of lower transportation costs in that direction. Nor can we expect transportation facilities by rail to be increased to meet the increasing demand made upon them until and unless the cost of construction, equipment and operation of the railroads is very materially reduced; hence we should approach the consideration of this question in a friendly spirit toward the railroads—indeed, we should invite the closest co-operation between rail and water services. All should recognize and appreciate the service rendered by the railroads in the development of our country. It would not have been possible to perform the stupendous task in any other way. They are indispensable to our national prosperity, and while grave abuses in management have adversely affected many of the roads, under the power now vested in the Interstate Commerce Commission they will be largely eliminated, and we confidently expect greater efficiency in the management and operation of all the railroads. The cold fact remains, however, that very great increases in freight rates have been made since July, 1914. The effects of these increases in freight rates, in an economic sense, has been to increase the distances between industrial and commercial centers and remove the hinterland proportionately that much farther from the seaports through which our exports and imports flow, and makes it correspondingly more difficult for us to furnish cargoes for our ships and compete with other nations favored with cheaper transportation costs in the world trade.

---

[*] Address of Hon J. W. Alexander, Secretary of Commerce, before the National Rivers and Harbors Congress, New Willard Hotel, Washington, D. C., Wednesday morning, December 8, 1920.

The Mississippi Valley Association has had a careful survey made of the resources of the Mississippi Valley and finds that it produces 75 per cent of the wheat, 60 per cent of the bituminous coal, 47 per cent of the lumber, 70 per cent of the cotton, 55 per cent of the wool, 69 per cent of the petroleum, 94 per cent of the iron ore, 85 per cent of the corn, 81 per cent of the hogs, 52 per cent of the sheep, and 74 per cent of the cattle.

It contains twenty-six cities each with a population in excess of 100,000 and having a total population of about 7,000,000. It contains the second largest city in the United States and the fourth largest in the world. It contains the largest iron and steel producing centers in the country. It is the center of the packing industry. It is one of the largest builders of locomotives, passenger and freight cars. Yet the industrial development of this great valley, so rich in resources, is and will be seriously handicapped for the lack of adequate and cheaper transportation facilities. Without these facilities, whether by rail or water, or both, our foreign trade will be seriously affected and whatever causes affect our foreign trade will be felt by our American merchant marine.

The Mississippi Warrior Service

In compliance with my request, Brigadier-General W. D. Connor, U. S. A., chief, Inland and Coastwise Waterways, has very graciously furnished me with information as regards the facilities for waterway transportation offered by the Mississippi Warrior Service, the operation of which is being maintained for the government under the supervision of the Inland and Coastwise Waterways Service.

The report shows that the government has at present available for service on the lower Mississippi River—that is, from St. Louis south—a total of six towboats and fifty-two barges, which fleet has an average rated capacity for 84,300 tons.

When this service was inaugurated in 1918 it was with the realization that the type of floating equipment then available by charter was by no means efficient, and that a profitable operating showing could only be made by the use of more modern barges and towboats; hence contracts were entered into for the construction of six towboats and forty steel cargo barges for the lower Mississippi service.

Of the cargo barges, thirty-eight have already been delivered and placed in service, the other two will be in service within the next thirty days. The six towboats are of the twin-screw tunnel type, each rated at 1800 indicated horse power and designed for burning oil with provision for conversion into coal burners should fuel conditions necessitate. One of these towboats is ready for delivery, and all the remaining five should be delivered by the middle of March, 1921.

In addition to this floating equipment the Railroad Administration contracted for a steel terminal barge at East St. Louis, the construction of which is being carried on under the Inland and Coastwise Waterways service, and when completed will permit direct transportation of freight between railroad cars and cargo barges without interference from the rise and fall of the river.

Warrior River

For the Warrior River, for service between Birmingham and Cordova in Central Alabama and Mobile, there are at present available for service a total of forty barges and five towboats, the latter old and inadequate for the service, which fleet has an aggregate rated capacity of 22,000 tons; three twin-screw tunnel-type towboats with 800 indicated horsepower and of the same general design as the towboats for the lower Mississippi River have been contracted for; one has been delivered, and the other two will be delivered before the first of the year.

Other equipment is being provided for these services under the far-seeing and able army engineers charged with this great task.

In this report attention is again called to the fact that there are at present available little or no adequate terminal facilities for the handling of merchandise in connection with the operation of these waterway fleets on the Mississippi and Warrior Rivers. On the Mississippi the largest available terminals are being utilized at New Orleans and St. Louis, the principal points of transfer. If the floating barge at St. Louis proves satisfactory, it is the purpose to urge the construction of similar barges at other necessary points on the river, namely, Memphis and Vicksburg.

What is true of the necessity for terminal facilities on the Mississippi applies with equal force to the Warrior River if the floating equipment is to be used to the maximum of its capacity.

This report states that thus far under the Railroad Administration and under the War Department, operations have been conducted at a considerable loss, but it is believed that with the delivery of new and more efficient floating equipment these operations may be made to pay splendidly; that there is certainly ample freight available for transport; that the problem being faced in the conduct of these lines is how it can be carried most expeditiously and economically; but the opinion is expressed that this freight cannot be carried by waterways with a material reduction in rail freight rates.

With the facilities available and under capable management and with hearty co-operation of the communities affected, it should be demonstrated whether or not transportation on the waterways will be economically practicable. Once proven that it is practicable, these services should be extended to the upper Mississippi and principal tributaries of that river.

Looking at this question from any angle we care to view it, the conclusion is manifest that the future prosperity of the great Mississippi Valley demands more adequate and economical transportation facilities, and the only practicable way to secure these would seem to be to utilize our great waterways and make them arteries of commerce, not only to the gateways on the Gulf of Mexico but from Duluth by way of the Great Lakes to the Atlantic.

The twin cities, Minneapolis and St. Paul, are keenly alive to this situation, as are the great commercial and industrial centers on the Great Lakes.

The problem is national in its scope; hence the deliberations of the National Rivers and Harbors Congress will be of the greatest importance.

The Department of Commerce was created to promote our foreign and domestic commerce, hence may be called very aptly the Business Department of the Government. The department is in a position to visualize some of the obstacles more or less serious that must be removed to promote the best interests of producers, distributors and consumers alike in our domestic trade and commerce, and make it possible under normal conditions to find a ready foreign market for our surplus products. I have tried to point out one of these very serious hindrances or obstacles, and that is the lack of cheap and adequate transportation facilities. This problem affects production and distribution and applies to every section of our country, but is of deepest concern at this time and in view of the very great increases in rail rates to those communities embraced in the Mississippi Valley. The situation as it affects the Mississippi Valley will become more serious every year.

There is no reason to expect that rail rates can be lowered in the near future, and while it is no doubt true that the efficiency of the service is increasing since the return of the railroads to their owners for operation, yet they will not be able to meet the increasing demands made upon them. This was demonstrated this fall when the Interstate Commerce Commission was called on to allocate all the open cars available to relieve the threatened coal famine this winter in New England and in the Northwest, while building operations in our great cities and highway construction and other internal improvements had to be suspended or delayed. The shortage of cars was seriously felt also in the movement of grain and fuel and other staple commodities in other parts of the country.

The farmers stand to lose billions of dollars by reason of the slump in the prices of farm products. The situation is indeed serious if not distressing.

There is great demand for our surplus cotton and food stuffs. Not only in the lack of facilities to extend long-time credits of concern to the farmers, but if such credits are provided the price the farmer will receive for his products will be very seriously affected by the high costs of transportation.

All will agree that if we would build up and maintain a great American merchant marine we must develop and foster a great foreign trade. The two go hand in hand. The Department of Commerce is deeply interested in both propositions; hence my concern as regards the transportation facilities of the Mississippi Valley, for there the situation seems to be most acute.

The larger part of our surplus for export must come from this great region. The question is of vital interest not alone to that section but to the whole country. Hence I am gratified to know that the great commercial, industrial and financial organizations affected are determined more than ever before to find an outlet to the sea not only by the Mississippi River and its tributaries but by the Great Lakes as well.

In other words, they are determined to bring the benefits of ocean transportation nearer to these great centers of industry and commerce and the only way to do so is by developing these potential highways of commerce and secure for themselves more adequate and cheaper transportation facilities.

This can be done without injury to our rail lines. It is the opinion of those who have given the question very careful consideration that it will contribute to the prosperity of both, hence should have their hearty co-operation.

It is my hope and expectation that the deliberations of the National Waterways Congress may result in further substantial progress being made in the accomplishment of the great purpose for which it was organized.

THE TUG

By BERTON BRALEY

The liner—she's a lady; that's the reason why, no doubt,
She always needs assistance gettin' in an' gettin' out,
She can't come up the river an' she dassn't dock alone
So she whistles for the tugboat in a most implorin' tone,
An' the tugboat takes the hawser an' goes puffin' up the stream
With his stack a-smokin' lively an' his engine spittin' steam,
Then he swings her an' pulls her—like a cowboy drivin' stock,
An' he hasn't got no manners—but he gits her in the dock!

He's short an' stout an' chunky
  Like a fat old goat,
An' he ain't no liner's flunky,
  He's a free-lance boat;
Yet it's easy, when you view him,
  An' you hear him pant,
To see there ain't much to him
  But his power plant.

When there's any job to tackle he will take it anyhow,
Whether towin' racin' liners or a garbage scow,
You will see him ploddin' heavy with a raft of rollin' logs,
Or a-pantin' down the harbor with a barge of squealin' hogs,
With a string of empty lighters or a ship from 'round the horn,
With a fleet of pleasure barges or a freighter full of corn;

A motor tug on San Francisco Bay

He yanks 'em through the river an' his husky whistle blows
As he tells the other steamers to be lookin' where they goes.

His captain is a feller
  That is **all there**, too,
An' there ain't a streak of yeller
  In the tugboat's crew;
What they promise they stand pat on
  An' if paid the rate,
They would tow the hull Manhattan
  To the Golden Gate.

The tug—he bucks the river when it's full of grindin ice,
An' when there's trade to handle, why, you needn't call him
    twice,
Fer he's out a-ridin' combers maybe fifty mile at sea
An' he doesn't stop fer danger when he's lookin' fer a fee;
He's the little giant helper, he's the live wire of the port,
He's a nervy, nifty snorter an' a winner an' a sport,
He's the snubby-nosed exploiter of the chances of the game
An' he's never much on beauty but he gets there just the same!

If there's any job to rustle,
  Any chance to take,
You'll see the tugboat hustle
  Like his gauge would break;
Two hundred pounds of steam on
  Make his engine throb,
He's the busy little demon
  An' he's on the job!

The Portland municipal tug in a storm off the mouth of the Columbia

TWO LARGE OIL INSTALLATIONS

The Union Steamship Company passenger steamer Tahiti

ONE of the most recent chapters in the transition from coal to oil as a fuel for the boilers of steamships was that seen recently in the large alteration and repair contract awarded by the Union Steamship Company of New Zealand to the Union plant of the Bethlehem Shipbuilding Corporation at San Francisco.

When the steamship Makura departed from San Francisco late in November for Vancouver to resume her place in the service of the Canadian-Australasian Line, the Bethlehem Shipbuilding Corporation had completed two of the largest reconditioning jobs ever done on the Pacific Coast. The Makura and Tahiti, both owned by the Union Steamship Company of New Zealand, were completely overhauled and fitted with oil-burning apparatus, replacing their old coal-burning equipment, at a cost of approximately $1,250,000 for the two.

Used as a Transport

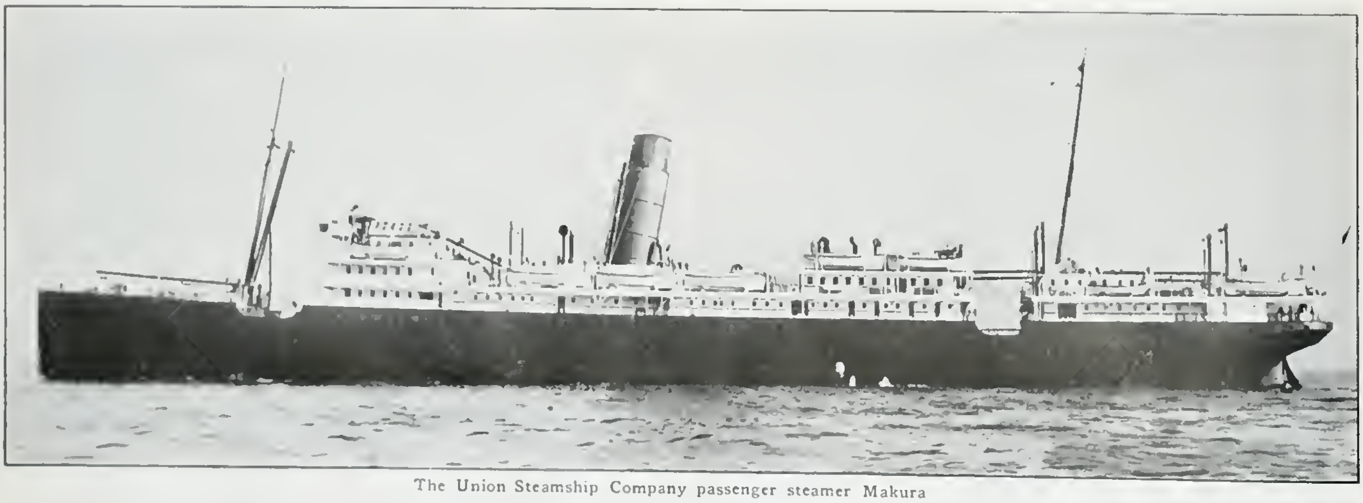
The Tahiti was sent to the Union plant of the Bethlehem Shipbuilding Corporation to be overhauled after use as a British transport during the war. In addition to completely overhauling her, painting her from keel to truck and refitting her cabins, the Union plant also installed oil-burning equipment, this job being probably the largest of its character undertaken in a Pacific Coast shipyard up to that time.

The Tahiti was built by A. Stevens & Sons, Glasgow, for the Union Steamship Company of New Zealand in 1904. She is of 7585 tons gross, 3841 net; 460 feet long, 55 broad and 24 deep; is twin-screw, each propeller being driven by a reciprocating engine 30 by 50 by 80, 54-inch stroke; and has six Scotch boilers, three of which are single-end and three double-end. Her coal bunkers were torn out and oil-tanks were installed to carry 16,500 barrels of oil; and the Bethlehem oil-burning system with mechanical burners of the Dahl design was installed. The work of refitting the Tahiti to serve as a passenger liner again also was extensive, inasmuch as all the first-cabin and second-cabin quarters had to be refitted. Besides this work, a new deckhouse was erected aft. The total cost of the entire job was about $750,000.

Cost More Than $500,000

After the Tahiti was completed in June, 1920, the Makura was sent to the Union plant, from which she recently steamed to Vancouver. This vessel was built by A. Stevens & Sons, Glasgow, for the Union Line in 1908. She is a vessel of 8075 tons gross, 4921 net; 450 feet long, 57 broad and 32 deep; and has twin-screw propellers, each of which is driven by a four-cylinder triple-expansion engine 28½ by 46 by 55 by 55 by 48, developing 4500 indicated horsepower. She has six Scotch boilers, working pressure, 190 pounds, four of which are single-end, 16-6 by 11-6, and two double-end, 16-6 by 21, equipped with Howden forced draft. The Bethlehem system, Dahl burners, was installed in thirty-two furnaces; oil-tanks were put in the hold; the main engines were completely overhauled, as was the electric lighting system; and all quarters were reconditioned. Her fuel tanks are capable of carrying 15,000 barrels. The cost of work was more than $500,000.

These two jobs, apart from their intrinsic importance, are significant as marking a turning from coal to oil by a large British colonial company, which in common with other Australian and New Zealand steamship lines, had held to coal for a long time because of the abundance and relative cheapness of coal in the Australian fields. The Niagara, the largest vessel of the Canadian-Australasian Line, has been fitted for fuel-oil, however. She is a triple-screw vessel of 13,415 tons gross, 7582 net, built by J. Brown & Company, Clydebank, in 1913, and is one of the largest vessels on the Pacific Ocean.



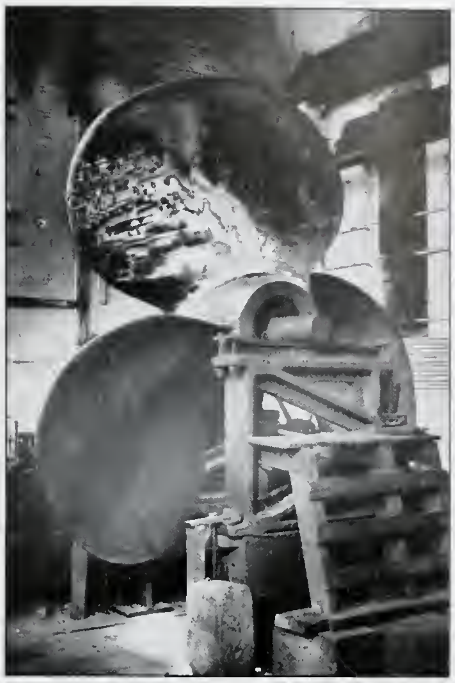
The Union Steamship Company passenger steamer Makura

IMPORTANT LAUNCHING AT TODD YARD

THE longest vessel launched on the Pacific Coast during the month of December and the most interesting, from a marine engineering standpoint, that has slid down the ways into the Pacific this year is the first scout cruiser built for the United States Navy at the Todd Dry Dock and Construction Corporation's yard, Tacoma.

This vessel, the Omaha, is 550 feet 6 inches over all, 55 feet 4 inches extreme beam, with draft loaded of 13 feet 6 inches and displacement at that draft of 7100 tons. She is chiefly interesting on account of the high speed and tremendous power for which she is to be fitted. There will be four propeller shafts, and partly for this reason the usual practice was discarded and the vessel launched bow first, as it was figured that it would be much easier and more economical to install the four large tailshafts with the stern at the inboard end of the ways.

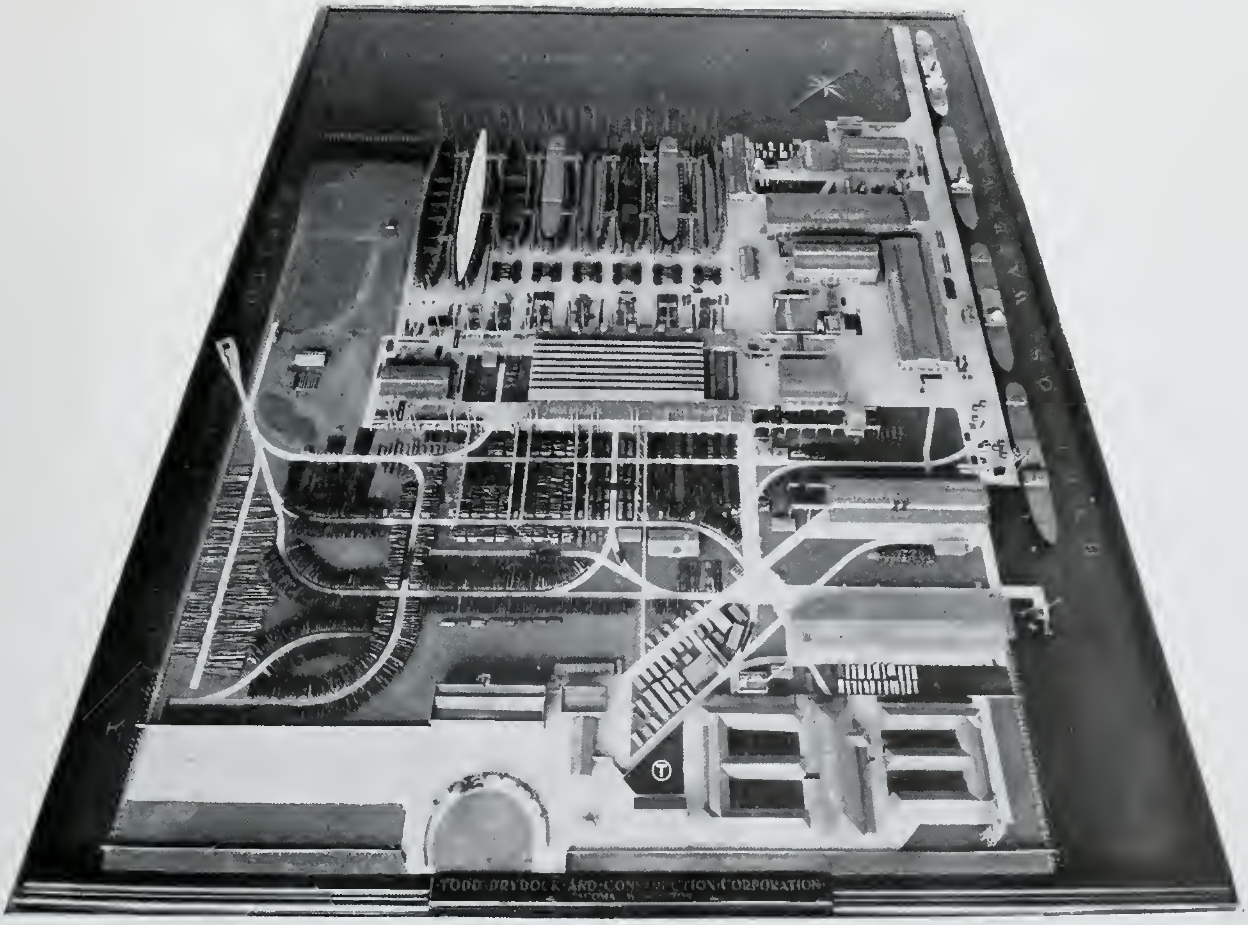
The power plant will consist of Westinghouse-Parsons steam turbines and twelve Yarrow watertube boilers, providing steam at a pressure of 265 pounds. The four turbines will develop a maximum of 98,000 indicated horse power, giving 24,500 horse power on each propeller shaft at 389 revolutions per minute. This is expected to drive the vessel at the rate of thirty-five knots per hour. Diameter of the tailshaft is fifteen inches.



View in the erecting shop of the William Cramp & Sons Ship & Engine Building Company, Philadelphia, showing one of the Parsons manganese bronze propellers for the scout cruiser Omaha building at the yard of the Todd Dry Dock & Construction Corporation, Tacoma.

The propellers for this scout cruiser and her two sister ships which are being built at the same yard were cast in the foundry of the William Cramp and Sons Ship and Engine Building Company, Philadelphia. We show herewith a picture of one of these propellers on the balancing trestles at Cramp's shop. It will be noted that the propeller hub and blades are cast in one piece. The material is Parsons manganese bronze. The finished wheel weighs about 13,200 pounds, is 11 feet 3 inches in diameter, and 11 feet 10 inches pitch. There will be two right-hand and two left-hand wheels for each vessel.

This scout cruiser is the highest powered vessel ever launched for the United States Navy and the highest powered vessel of any character, if our memory serves us correctly, ever launched in the United States, and the Todd Dry Dock and Construction Corporation and the city of Tacoma in the State of Washington are both to be congratulated on achieving this record. The Omaha when launched was approximately 85 per cent complete, and from present indications it is safe to predict that the Todd Dry Dock and Construction Corporation will in a very short time be running the trials of the largest marine power plant on the Pacific Ocean.



Model of the yard of the Todd Dry Dock & Construction Corporation at Tacoma, Washington. The outlines of the two scout cruisers can be plainly seen on the ways at upper left-hand corner

Pacific Marine Review
[illegible] Shipping

576 Sacramento Street
SAN FRANCISCO, CALIFORNIA U. S. A.

Official Organ of the Pacific American Steamship Association

Subscription Price, per year (Domestic) $3.00
(Foreign) $3.50
Single Copies . . . . 35 cts

J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor
J. G. BRAY . . . . . . Pacific Coast Adv. Mgr.
E. R. HARRIS . . . . Northwestern Representative

NEW YORK OFFICE
339 at 50 Church Street
M. B. STEWART, Manager

Pacific Marine Review is sold at all leading News Stands
Entered as second class mail matter at Postoffice
San Francisco, California

Published on the First of Each Month. Copyright
1921 in the United States by J. S. HINES

"ET TU, BRUTE?"

IN an editorial in our December issue we called atention to the injurious effect upon our merchant marine of the "investigation activities" of our Congress. In that editorial we stated that in our opinion our rivals across the water were laughing at our expense and that these investigations were playing into their hands. Confirming the opinion then expressed we quote in full a paragraph from the editorial page of Lloyds' List Weekly Summary for November 19:

American Shipbuilding Abuses

"That many of the vessels turned out in the United States during the phenomenal boom which is now ending were scamped to the last degree is well enough known to British shipping men. It was to be expected that much of the work would be amateurish, since it was admittedly produced by men for the most part untrained in the art of shipbuilding; but that a premium was put on bad work, that abuses were openly winked at, and that ships were built to be condemned in order that the grafters might profit, is more than even the severest British critic has dared to allege. Yet the New York correspondent of the 'Daily Telegraph' declares that all this has been frankly stated in the evidence submitted to the Congressional Committee on Shipping Board operations now sitting. Our contemporary's revelations are bound to excite particular interest in shipping circles here, for they are, without exaggeration, astounding, and will go far to strengthen the conviction in this country that government control is apt to open the road to the gravest abuses. The correspondent records the statements of a former hull inspector for the Shipping Board, who alleged that rotten rivets were used; that the work on some vessels was so defective that he could push the rivets from their plates with his fingers; that he reported these facts and sent a box of defective rivets to President Wilson and was dismissed from the service. Men, he added, were employed on riveting after three weeks' instruction! The vessels turned out were known to be unsafe by the men who built them. Another witness, a ship master, told how he lost his command because he refused to join in a plan to defraud the Shipping Board; how his chief engineer had never been to sea before and his second officer had no ocean-going license; how the propeller blades dropped off until he arrived at Rio with only one blade left, and how the vessel was put into dry dock for 49 days, her bunker coals sold, her propeller shaft and machinery condemned to the scrap heap 'in order that the grafters might secure commissions for new supplies.' After all, even our expensive bureaucratic departments manage things better than this."

Considering the source from which this matter is taken, it almost looks as though Lloyd's had reached its dotage. The great majority of the alleged frauds which have been under investigation by the Walsh committee took place during the war shipbuilding program and during the time immediately succeeding the armistice, and it is a fact not to be disputed—nay, one often boasted of by Lloyd's—that almost all of the ships built in America during that time for the United States Shipping Board were built under the supervision of Lloyds' Register of Shipping and all ships so built, practically without exception, received A-1 classification in Lloyds' Register.

Is Lloyd's giving A-1 classification to ships whose rivets are of such poor material and so inadequately driven that they can be pushed out of the hull before the little finger of a Shipping Board inspector? Are Lloyd's engineering inspectors giving A-1 classification to tailshafts and propellers which are so poorly joined together that the blades are being miscellaneously distributed over the beds of the Caribbean Sea and the South Atlantic Ocean? Was any shipyard in the United States during the three years of the war emergency shipbuilding boom closed to Lloyd's inspectors? Has any inspector of Lloyd's resident in America raised his voice hitherto in denouncing these "gravest abuses," this building of ships that "grafters might profit," this putting of a "premium" on "bad work?" Or are we to consider that this Walsh investigation, which is so obviously playing into the hands of British shipbuilders, is part of the British propaganda to discredit the American merchant marine and its operation?

Certainly we would expect to see articles and editorials of this sort in the British newspapers, but "without exaggeration" it is "astounding" that a dignified, conservative institution (such as Lloyd's has always held itself to be) should stoop to such muckraking tactics. Let us hope that the editorial censor was not on the job, and that we shall find an explanation or at least a palliative forthcoming in the near future.

Other technical and trade journals of Great Britain have treated the matter of the Walsh investigation committee much more wisely than has Lloyd's List Weekly Summary. Most of them very frankly and heartily laugh the matter out of court, a very good instance of which treatment is quoted below from Fairplay of November 25. It will be noted that Fairplay is here quoting the same New York correspondent of the London Daily Telegraph referred to in Lloyd's treatment of the subject:

According to the New York correspondent of the Daily Telegraph, a Captain Chambliss, of the Lake Elkwood, in the course of his evidence before the Congressional Committee on Shipping Board Operations, in proof of the amateurish way in which many government vessels have been constructed, stated that, in the case of his boat "on one voyage from Barbados to Rio de Janeiro, the propeller blades began to drop on an average of one per day, and finally Rio was made with one blade left." Rio, I may mention, is 3080 miles from Barbados, which would mean, in the case of the Lake Elkwood, about fourteen days' steaming. Deeming the matter worthy of further inquiry, I consulted an old-school merchant seaman, whom I happened to find looking for something at a few minutes before twelve, with the following result. Incidentally, I may remark, it is pleasant to think that we are still unbeatable on the waters, even with rum and yarns at 30 degrees under proof:

Though it's hard to beat a record so good
As that of the gallant Lake Elkwood,
Yet a tale told me, which I'll now relate,
Of a little tramp steamer, Calamity Kate,
By a blue-nosed, barnacled, seafaring wight,
Leaves the Lake Elkwood clean out of sight.

The Calamity Kate had a turn of speed,
A steady nine knots could she do at need,
And, so sweet to handle, alive seemed she,
But she had a peculiaritee,
She always dropped at noon each day
A propeller blade when under way;
And, being British, she took no stock
Of any time but the Greenwich clock.

At the date of my tale she was due to start
At twelve, midday, for a Western mart,
And due to arrive, so the owners reckoned,
In fourteen days to the very second.
Now the owners—McAbrahams, Stein and Marks—
As their names imply, were Scotch to their sarks,
So a fortnight's steaming could only mean
That Calamity Kate should have blades fourteen;
What they overlooked were the hours you lose
When lolling along on a Western cruise.
And, owing to this miscalculation
Regarding her daily propeller ration,
Kate, two hours from home, found her shaft as bare
As the postern end of a bob-tailed mare;
And yet blew in, all trim and taut,
To the very minute when due in port.

AMERICAN CLASSIFICATION

COMING down to the serious consideration of the American war emergency shipbuilding program and its results in sea performance of vessels built, it is most illuminating to examine the records of the ships in relation to their classification. The true test of any vessel is her actual sea record over a considerable period of time, and fortunately for our purpose the Shipping Board has kept a chronological "trouble sheet" listing all accidents and breakdowns and instances where repairs have had to be made on account of inferior materials and workmanship.

An examination of the official sheets covering the period from January 1 to June 30, 1919, shows that there were 158 instances of such trouble and that these 158 vessels were divided in their classification as follows: British Lloyds' 83, American Bureau of Shipping 54, dual class (ships classed by both British Lloyds' and American Bureau of Shipping) 20, Bureau Veritas 1. The Shipping Board in an official statement recites that of all steel ships operated during the period from January 1, 1919, to June 30, 1919, the American Bureau of Shipping had classified 217, British Lloyds had classed 297, and 309 vessels had been classed by both the American Bureau and Lloyds'.

A comparison of these figures will show that 28 per cent of the ships classed exclusively by British Lloyds' show up on the "trouble sheet," while only 25 per cent of the ships classed exclusively by the American Bureau of Shipping had to be laid up for repairs; so that it would seem as if the majority of these "lame ducks," so to speak, which are calling down the wrath of the Walsh investigating committee, had been supervised and classed by British Lloyds' and given the 100 A-1 rating in the Register.

These are official figures and speak for themselves. They prove quite conclusively, it seems to us, that America has a classification society which is measuring up to the responsibilities placed upon it by the great shipbuilding program and that we have no need to rely upon any foreign source for proper classification of American built ships.

In the past there have been many declarations—and not a little evidence—that the foreign classification societies had a stranglehold on the American marine insurance business, and if the loss of a considerable portion of that business is now causing some of them to sputter, we can well afford to have a laugh at their expense.

SOME TRAFFIC FIGURES

SOME very interesting and encouraging figures on the amount of traffic from various ports on the Pacific Coast have come to our office this month, and we herewith present a compilation for the benefit of our readers.

In the fiscal year ending June 30, the Panama Canal made an excess of revenue over cost of operation of $2,387,599, says the report of Brigadier General Chester Harding, governor of the canal. Receipts were $8,935,871 and expenses $6,548,272. An excess of $5,000,000 or more is expected after the end of the current fiscal year. Of particular interest to Pacific Coast operators is the statement that more than 14 per cent of the cargo passing through the canal since its opening was en route from the Atlantic Coast to the Far East. During the year 2745 vessels passed through the waterway. In September, 1920, twelve vessels laden with 50,450 tons of cargo passed from the Atlantic to the Pacific in the intercoastal trade, and eleven vessels laden with 59,781 tons passed from the Pacific to the Atlantic. In the same period fifteen vessels with 96,821 of cargo destined from the Atlantic to the Far East used the canal.

Northwestern Lumber Shipments

Waterborne shipments of lumber from Washington in the first nine months of 1920 increased 144,934,594 feet, or 25 per cent, as compared with the shipments for the corresponding period of 1919; Oregon increased 132,683,065 feet, or 40 per cent; British Columbia, 16,070,169, or 22 per cent. The aggregate for 1920 was 1,256,716,312 feet, as compared with 963,028,484 for the first nine months of 1919.

In the period January 1 - December 1, 216,542 tons of shipping from foreign ports entered Portland; the figure for the first eleven months of 1919 was only 12,164 tons. Vessels engaged in domestic commerce aggregated 1,024,633 tons as against 678,034 in 1919.

Seattle's Business

During November 359 deep-sea vessels of 347,412 net tons arrived at Seattle, as compared with 309 vessels of 284,137 net tons for November, 1919. Local vessels arriving during November, 1920, were 1683 of 434,884 net tons, as against 1948 of 509,071 tons in November, 1919. In the same month arrivals at San Francisco were 393, classified as follows: steam from foreign, 152,414; from American other than coast, 172,454; from Pacific Coast ports, 270,314, a total of 595,182 tons steam. Sail tonnage was 8239 from foreign; 2677 from American other than coast; 34,376 from Pacific Coast ports, a total of 45,292 tons, as against 68,528 for November, 1919.

COMMISSIONER OF NAVIGATION

THE annual report of the Commissioner of Navigation for the fiscal year ending June 30, 1920, together with the reports covering the same period from several of the departments under his jurisdiction, show some facts and figures which are of great interest to the American maritime world. We herewith summarize the report of the Commissioner, which shows a total American registered tonnage on June 30, 1920, of 16,324,024 gross tons, an increase of 3,416,724 gross tons over the total shown in last year's report. This increase alone is larger than the increase of the whole world's tonnage during any year prior to 1914.

American ships built and documented during the year aggregated 3,880,639 gross tons, an output comparable only to the world's pre-war record launching of 3,332,882 gross tons in 1913 and the British record of 3,808,056 gross tons under construction on June 30, 1920. At the end of December, 1919, American shipyards had built ships (including a small tonnage for foreign owners) at the rate of 4,258,141 gross tons per annum and at the end of March, 1920, our yards had built steel ships alone at the rate of 3,679,285 gross tons per annum. The peak of annual wooden-ship production, 1,021,020 gross tons, had been reached at the end of June, 1919. It declined to 297,864 gross tons during the past fiscal year.

American ships registered for foreign trade on June 30, 1920, aggregated 9,928,595 gross tons, nearly tenfold the tonnage so registered in 1914. This registered tonnage during normal domestic conditions of trade, control and production would suffice to carry about 60 per cent in value of the foreign trade of the United States, and, in fact, during the past year has carried 45 per cent in value of our exports and 39 per cent in value of our imports, while in 1914 American ships carried only 10 per cent in value of our exports and imports.

Increase in Foreign Trade Vessels

The increase during the year in our tonnage registered for foreign trade has been 3,258,869 gross tons, or virtually 50 per cent, and is by itself more than the tonnage under any flag but the British (which amounts to 20,582,652 gross tons), slightly exceeding the total of 3,245,194 gross tons under the French flag, which ranks next to the American. The clearances of American ships in foreign trade have aggregated almost 29,000,000 net tons, or close to 52 per cent of the total clearances and double the percentage of 1914. For the first time in a third of a century one-half of the officers and crews of American ships in foreign trade have been American citizens, born or naturalized.

These matters are not recorded in a boastful spirit, and we shall greatly delude ourselves and invite the fall that pride and vainglory usually precede if we do not consider the causes which have worked such results. All are directly attributable to ruthless German submarine warfare which on the one hand wrought vast losses to the merchant shipping of allied and neutral nations alike, and on the other hand impelled the American people pledging themselves to Liberty bonds and heavy taxes to vote through Congress vast appropriations to build ships to make good those losses and to win the war. The amount expended, $3,000,000,000, is more than all the ships in the world, 49,000,000 gross tons, were worth in 1914, and in interest and sinking fund contributions stands today for annual taxation to the amount of $225,000,000, to which annual depreciation of the ships will add $150,000,000.

The report covers in detail the progress of shipping and shipbuilding and furnishes the usual details of the operations of the bureau of navigation.

As explained in detail in the annual report for 1919, there is very urgent need for the construction of additional vessels for the Lighthouse Service to replace those worn out in service, those lost through various casualties, and to meet the considerable growth of the service, says the annual report of Secretary of Commerce Alexander. The total number of vessels available for this service is now actually less than it was ten years ago, although the number of aids to navigation maintained has increased 39 per cent in this period. The act of June 5, 1920, authorized a building program for vessels to the amount of $5,000,000, but no funds were appropriated.

In the section dealing with the Coast and Geodetic Survey, the necessity of an adequate survey of Alaska is stressed in view of the yearly toll in shipwrecks off its coast. For years the natural resources of Alaska have tempted vessels to venture into uncharted regions. To prevent this waste of life and property modern vessels for charting Alaskan waters are imperatively needed.

THE LIGHTHOUSE SERVICE

ONE of the least appreciated departments of the government is that under the Commissioner of Lighthouses. This commission being one of the many branches grouped under the Department of Commerce, is, if we may be allowed to make an unpardonable pun, hiding its light under a bushel.

A few figures from its annual report will serve to emphasize the magnitude of this organization, which is the most extensive lighthouse service in the world, "being charged with the lighting and marking of all coasts, lakes and navigable rivers under the jurisdiction of the United States, excepting the Philippine Islands and Panama. Its responsibility covers 49,000 statute miles of coastline and river channels, extending to the Virgin Islands, Porto Rico, Caribbean Islands, Alaska, Hawaii, Guam, and Samoa." There are maintained in all some 16,324 aids to navigation, including lighthouses, lightships, buoys, and beacons. This number is an increase of 256 since last year's report and requires 6002 persons for its operation. During the year there were reported from this force 129 instances of the saving of life and property, many of these instances at great risk to the lightkeepers and other employes of the service.

The Lighthouse Service is also urging a revision of pay schedules and calls attention to the fact that in many classes of the Lighthouse Service there has been absolutely no adjustment of pay since a time well before the beginning of the war. Probably no class of men in the world is more deserving of material recognition than are the lighthouse keepers, and no class is less urgent in pressing its own claims on the government.

Let us hope that the new Republican administration, if it must appoint investigation committees, will have a real investigation committee to look into the conditions and the pay of many of these faithful employes of the government, who are doing the real work in the out of the way places and are being paid wages which are close to the starvation point.

STEAMBOAT INSPECTION SERVICE

THERE has recently been issued from the Department of Commerce at Washington the annual report of the Steamboat Inspection Service covering the fiscal year ending June 30, 1920. During this time 8051 vessels with a total gross tonnage of 1,562,399 were inspected and certificated. Licenses were issued to 33,614 officers of all grades. Certificates of service were issued to 18,478 able seamen, and certificates of efficiency were issued to 8323 lifeboat men.

During that time the total number of accidents resulting in loss of life was 192. The total number of lives lost was 470, of which 42 were passengers; 145 of the lives lost were from suicide, leaving 325 lives fairly chargeable to accidents. This is a decrease of 73 as compared with the previous fiscal year. On the vessels required by law to make report passengers to the number of 368,870,327 were carried. In comparing these figures we get the very interesting and remarkable percentage of only one passenger lost out of 8,782,626. Nine hundred and eleven lives were saved during the year by means of lifesaving appliances.

The report goes on to show under various headings recommendations of the service which in its judgment are calculated to further the maintenance of the American merchant marine in a place of supremacy upon the high seas.

Under the head of "Classification of Vessels" recommendation is made for the creation of a board of naval architects in the office of the supervising inspector-general, which board would pass upon blueprints and specifications of all hulls of American merchant vessels, and also for the appointment of a corps of experts in boiler construction which would pass upon blueprints and specifications of boilers, the approved blueprints and specifications from these two boards to be sent to the field officers, who would then simply see that the ships and boilers were built to approved plans.

Under "Boiler Pressure" recommendation is made that the obsolete rule contained in the present law concerning steam pressure for riveted joints be cancelled and the working pressure allowable be determined by the rules of the Board of Supervising Inspectors.

Under the head of "The Transportation of Dangerous Articles" the bureau condemns sections of the revised statutes as being obsolete and states that it has prepared a bill for introduction at the next Congress.

Of great interest to marine engineers will be the section of the report proposing the extension of motorboat inspection. Under the provisions of the present section the Steamboat Inspection Service is doubtful whether it has any jurisdiction in the way of inspection of motorboats that are over fifteen gross tons, and suggests that the law be so amended as to give the service the requisite jurisdiction over all motorboats. The bureau suggests that motorboats of all character should be inspected and certificated, and the operators of motorboats should be required to be twenty-one years of age, citizens of the United States, and take a written examination to put them in the same class with the engineers of steamboats of similar sizes and on similar routes. The Inspection Service believes that the law should insist upon the proper kind of lifesaving equipment aboard even pleasure motorboats and that life preservers of an approved type should be required.

Under the heading of "Examination of Applicants for License" the bureau touches upon a very important matter, which Pacific Marine Review has often referred to editorially; that is, the need for special attention being given to the matter of licenses for the engineers of motorships. The report states that at the next annual meeting in January, 1921, the government expects to adopt definite and detailed rules with reference to the examination of applicants for this particular kind of license.

In common with all of the Federal bureaus, the Steamboat Inspection Service is feeling very keenly the inadequacy of the pay received in comparison to the quality and quantity of the work expected from the personnel of the bureau. This is true not only of field inspectors, who have never received pay commensurate with the services they are doing and who consequently are facing in many cases great privation in comparison with the personnel of similar services outside of the government, but it is also true and becoming increasingly so of all the clerks. Attention is also called to the inadequacy of the service to take care of the rapidly increasing American merchant marine and the need for a great increase in the number of inspectors. The landlord problem also comes in here because the steamboat inspection service has always been the "goat," so to speak, as far as quarters in public buildings were concerned, and has never known when it would be required peremptorily to move out and hire quarters in private buildings, this of course with small appropriations, working a great hardship and making it impossible to rent proper quarters.

The report closes with a recommendation, which we heartily second, that the supervising inspectors of the service be brought under civil service rules, as the local and assistant inspectors now are working. Supervising inspectors are almost entirely recruited from the local inspectors, but on being moved up they are immediately placed upon an insecure footing and subject to the whims of politicians. This feeling of insecurity should be removed by placing about them the protection that goes with the classified civil service.

COAST AND GEODETIC SURVEY

THIS is another important branch of the Department of Commerce—and we say "Important" with a capital "I"—for the work of the personnel of this bureau has been so important that it has attracted the favorable attention of the scientists of all civilized nations and the favorable mention and even envy of the governments of all civilized nations, except the government of the United States, for we find in this report, as we noted in a similar report from the same source a year ago, that while Congress during its last session, after great pressure and repeated requests had been made for a revision of salaries, had put the commissioned officers of the Coast and Geodetic Survey upon a pay status equal to that of the other commissioned forces of the Federal government, thereby saving this service from certain demoralization, still the computers, draftsmen and instrument makers connected with the bureau are on the same old basis, and the bureau is faced with a situation where all of its first-class men are leaving for better situations, and its labor turnover has become such as to threaten the integrity of the data issued by the bureau, and this integrity is only maintained by an immense amount of zealous, painstaking care upon the part of a few old, seasoned employes who have in their blood the traditions of this service.

Pacific Coast readers will be interested in the strong appeal made in this report for a more "rapid advancement of the Hydrographic and Geodetic Survey of the territory of Alaska" in order that the great annual loss in vessels wrecked and stranded in Alaskan waters may be minimized as far as is possible by accurate charting.

One interesting feature of the report is the recommendation for the use of the aeroplane in making surveys through aerial photography and photo-hydrography. This portion of the report shows some very interesting results achieved in actual practice through this method.

STEAMER SERVICE ON YANGTSZE

By ROBERT DOLLAR

THE Yangtsze-Kiang River is the principal artery of trade in Central China. From the oldest times in Chinese history there has been boat traffic on this river, and on its lower reaches in modern times there has been considerable steamer traffic. Of later years this steamer service has extended to include the upper reaches of the river. The service naturally divides itself into three separate and distinct divisions.

The first of these includes what is called the Lower River from Shanghai or from the ocean to Hankow, a distance of 740 miles. Fair sized modern freight steamers can reach Hankow at any period of the year, and at times of high water ocean going freighters can easily make that port.

The middle reach of the river from Hankow to Ichang has a distance of 370 miles, and on this reach fair sized steamers are running with considerable regularity. The country is so flat that at Ichang, over one thousand miles from the sea, the elevation above sea level is only 130 feet.

The upper reach of the river from Ichang to Chungking includes a distance of 462 miles.

Of the lower reach of the river there is little to write of any unusual interest. Regular steamer service is maintained with palatial passenger steamers and large freighters. The trade here is growing steadily and will continue to grow as the vast population living on the plains on either side of the river become alive to modern civilization.

On the middle run intermittent schedules and fair steamers with an increasing demand for better service are the rule.

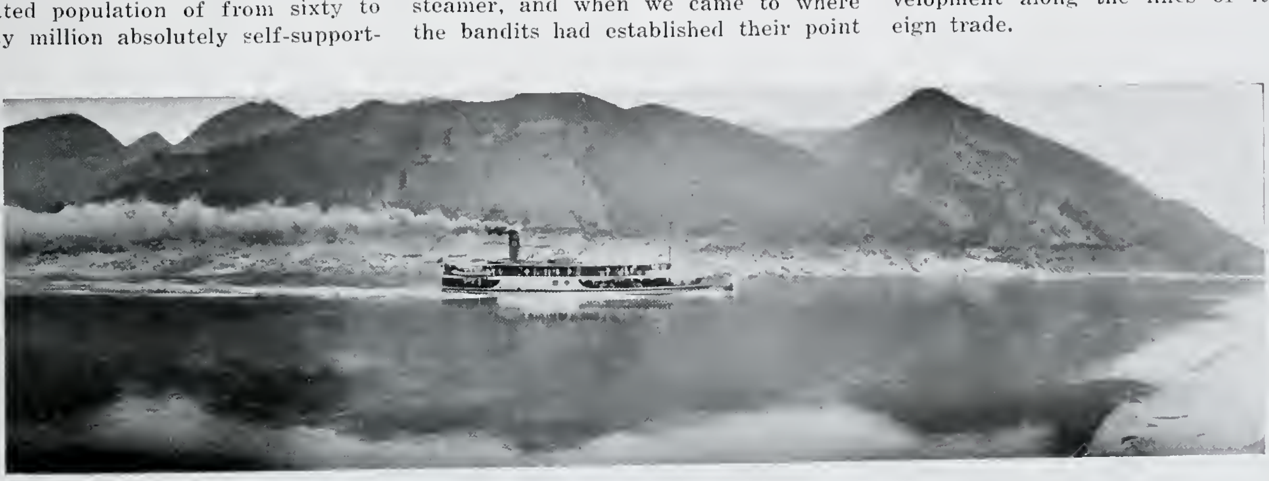
It is of the upper run that I wish to write more particularly at this time. This reach of the Yangtsze-Kiang River is practically the only communication from the outside world with the Province of Szechuen, the largest and one of the richest provinces in China, justly called in Chinese history "Nature's treasure house." This province has an estimated population of from sixty to seventy million absolutely self-supporting and having, as previously mentioned, no communication with the outer world except through this upper reach of the Yangtsze-Kiang River and by tortuous foot trails over very difficult and high mountains.

The upper reach of the river is through a series of deep gorges filled with strong rapids, which make navigation very difficult and dangerous and require shallow draft steamers of very high proportional horse power and of about sixteen knots speed. Some idea of the nature of the gorges may be obtained when it is stated that the average rise of the river in the gorges is about one hundred feet from low to high water mark. To give a specific instance, at the high water mark of 1920 it reached ninety-six feet. One of the most eloquent tributes to the patience and industry of the Chinese race is the fact that for thousands of years heavily laden river junks have been skillfully navigated down these rapids and dragged back just as heavily laden by sheer man power, the river coolies on the towpath dragging the boat over the heavy rapids by means of long bamboo cables.

Our company has recently placed on this route an American steamer, and in its navigation we have been having some experience which might be of interest to those operators who are interested in the development of Chinse trade. As is well known, interior China has been in a state of great unrest, and North and South China have been engaged in civil warfare along the banks of the Yangtsze-Kiang River and particularly along this upper stretch of the river, so that most of the Chinese owned steamers on this stretch have given up navigation. At first the troops on both sides were rather unwilling about allowing us to run, but on account of the friendship between Americans and Chinese they decided to adopt a policy of non-interference. The organized Chinese bandits, however, who infest the mountain stretches of the river, saw an opportunity and between the two armies they decided to compel our steamers to pay heavy tribute to them every time we passed. Knowing from previous experience that we might expect this, we arranged to have the American gunboat El Cano follow our steamer, and when we came to where the bandits had established their point for collecting tribute a few shots soon had them running for cover. However, the captain of the gunboat very rightly concluded that he could not be following us on every trip, so he put machine guns on our steamer and gave us three marines for each gun, the guns being covered with tarpaulins. On our next trip, seeing no gunboat on hand, the bandits immediately attacked the ship with musket fire. Our marines stripped the guns, and after a volley or two the bandits decided that discretion was the better part of valor. On subsequent trips whenever these bandits saw the Stars and Stripes they immediately ran for cover and we had no more trouble with them.

Changsha, the upper terminus of our route, is a walled city of nearly a million people. This summer Changsha was held by Yunan troops. These were driven out on the 24th of October, 1920, by Szechuen troops after sanguinary fighting, and when the firing ceased and our office employes had ventured out from under cover they found five dead soldiers on the street in front of the office. This will show a little of the varied adventures and experiences that are still found in the development of American trade in distant lands and in the gathering up of cargo for our trans-Pacific steamers.

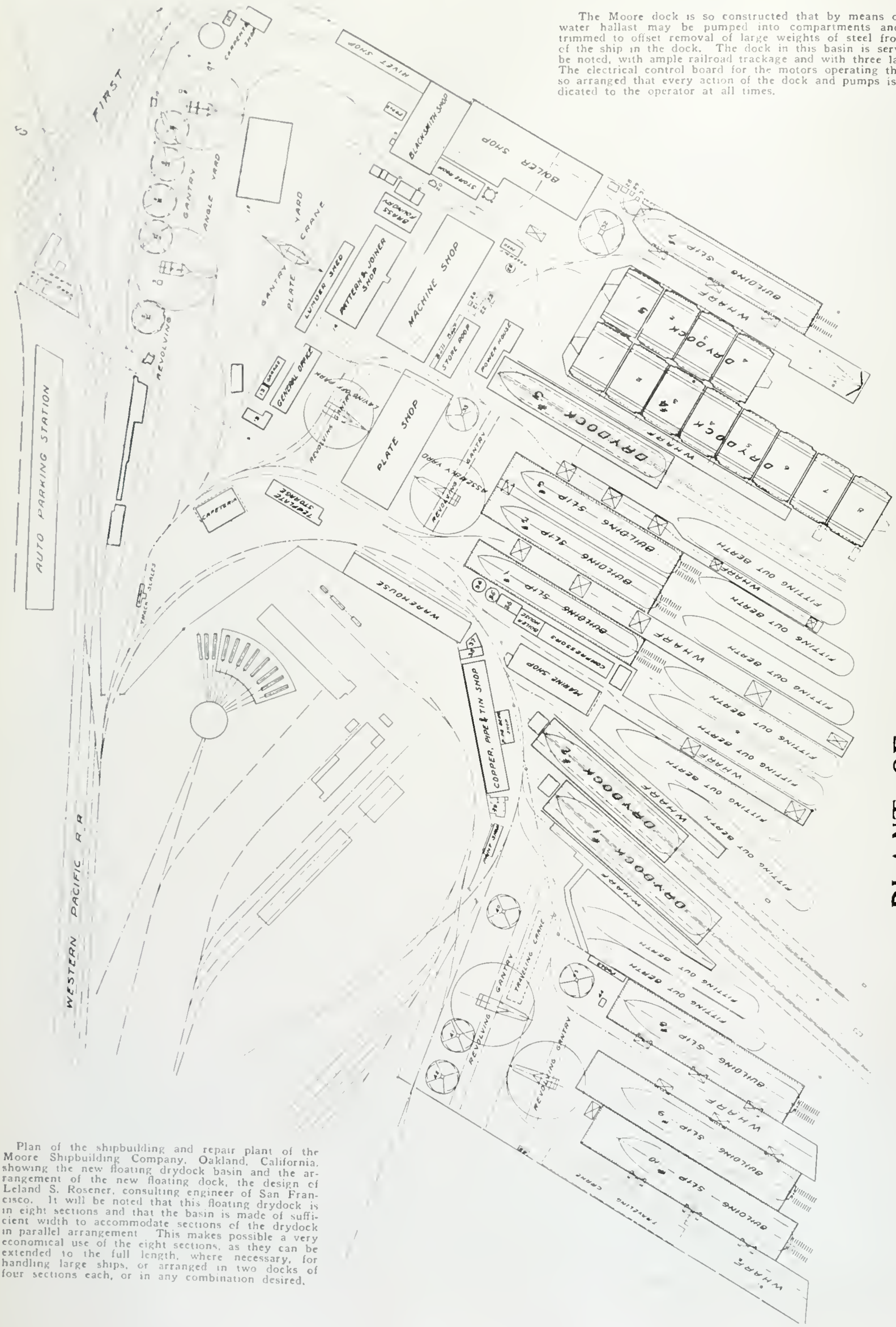
The Province of Szechuen has now quite a large export trade in bristles, hides, musk, silk, Chinese medicines, goatskins, wool, and many other commodities, and this trade is capable of almost unlimited development. Szechuen also possesses coal, copper, gold, petroleum and salt; in fact, is said to be one of the most highly mineralized sections in the entire world. It possesses some of the oldest engineering works known to man, many of which are still functioning as perfectly as in the day of their first installation. Its people are industrious to a degree possessed by perhaps no other people in the world, unless it be that other section of the Chinese nation so much in the limelight recently, the Province of Shantung. It has a larger area, a larger population, and greater natural resources than were possessed by Germany in her prime, and is one of the richest fields left in the world for development along the lines of its foreign trade.



River steamer forcing her way up the gorges of the Yangtze-Kiang

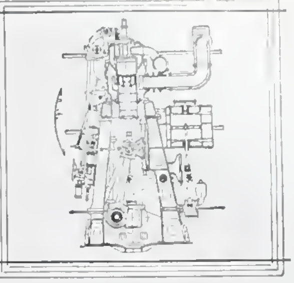
The Moore dock is so constructed that by means of manifolds water ballast may be pumped into compartments and the dock trimmed to offset removal of large weights of steel from one side of the ship in the dock. The dock in this basin is served, as will be noted, with ample railroad trackage and with three large cranes. The electrical control board for the motors operating the pumps is so arranged that every action of the dock and pumps is plainly indicated to the operator at all times.

PLANT OF MOORE SHIPBUILDING COMPANY



Plan of the shipbuilding and repair plant of the Moore Shipbuilding Company, Oakland, California, showing the new floating drydock basin and the arrangement of the new floating dock, the design of Leland S. Rosener, consulting engineer of San Francisco. It will be noted that this floating drydock is in eight sections and that the basin is made of sufficient width to accommodate sections of the drydock in parallel arrangement. This makes possible a very economical use of the eight sections, as they can be extended to the full length, where necessary, for handling large ships, or arranged in two docks of four sections each, or in any combination desired.

Oil Engines and Motorships



THE DIESEL ENGINE

Its Development, Design and Construction, Particularly as Applied in Marine Propulsion

IV.

AFTER the high over-all efficiency of 33 per cent to 35 per cent of the Diesel engine and also its reliability in continuous operation was proven beyond doubt, it was natural that the shipping interests also tried to benefit from this new type of prime mover, and efforts were made to study its adaptability to marine purposes.

The main reason for the greater thermal efficiency of the Diesel engine is the complete combustion of the fuel in the working cylinder itself. All the losses of the transformation of heat energy from the fuel to the steam of the boiler plant are avoided. But the engine, as brought out in the foregoing, was a single cylinder, single acting, non-reversible stationary engine. To make this engine fit for use as propelling machinery aboard ship it had to be built and equipped with means for starting and reversing from any position, the engine being direct connected to the propeller shaft. Neither the means for reversing engines of the gasoline, kerosene and hot bulb type, nor the reversible propeller could be considered for high power installations. Another alternative was electric drive, and this as a matter of fact was used on the first boat equipped with Diesel engines, the cargo boat Verroge on Lake Geneva, Switzerland. This boat was equipped with an 80 B. H. P. two-cylinder engine direct connected to a generator, driving a reversible motor on the propeller shaft which was controlled from the bridge by the captain. Today new efforts are being made toward this type of drive, and for some installations this system will no doubt have advantages over the direct reversible engine.

The selection for the positive reversing and maneuvering was found when it was decided to use compressed air for this purpose. This air was to be furnished by special compressors and stored in tanks and used just as the steam from the boilers is used in the steam engine.

On account of the greater thermal efficiency of the Diesel engine over steam, the weight of fuel oil for a Diesel motorship is one-fourth to one-third of the weight of coal to be carried for a coal-burning steamer of equivalent power and steaming radius, while the fuel consumption of the Diesel motorship is one-third to one-half of the consumption of an oil-burning steamer.

A drawback in Diesel marine installations was the question of the handling of the deck machinery, steering gear, and engine room auxiliaries. The use of donkey boilers or compressed air for this purpose was wasteful and unsatisfactory, and the only way out was to develop a new line of machinery suitable for electric power.

The Diesel Process of Operation

In the Diesel engine pure air, with which the engine cylinder is filled during the admission stroke, is compressed by the piston on the second or compression stroke to a pressure of 450 to 500 pounds. The temperature increase due to this compression is approximately 1000 degrees Fahrenheit. At or near the upper dead center of the piston, fuel is sprayed into the cylinder gradually and in a finely nebulized condition. The fuel is gasified and ignited by the heat of the compressed air without any supplementary means. It burns during the first part of the third or working-stroke, after which the hot gases in the cylinder continue to expand and perform work on the piston until during the fourth stroke they are exhausted from the cylinder.

The rate at which the fuel is injected is so adjusted that its ignition and combustion take place without explosive violence and with substantially no change of pressure (see diagram Fig. 30), for which reason this type of engine is sometimes referred to as the "constant pressure" type to distinguish it from the "constant volume" type, such as gas, gasoline, and hot bulb oil engines, and engines improperly designated "semi-Diesel," in which the combustion takes place substantially without increase in volume and, therefore, with an explosion-like increase in pressure.

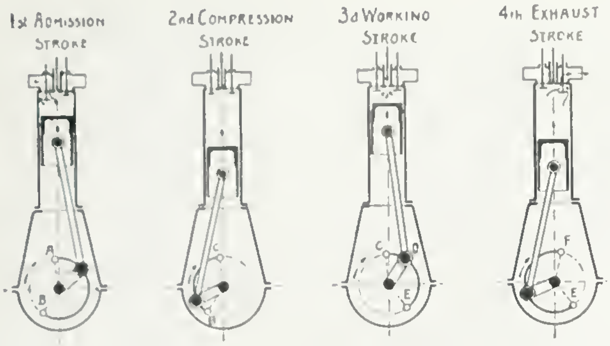
Diesel engines are built to operate on either the four-stroke (four cycle) or the two-stroke (two cycle) system. In a four-cycle engine four strokes of the piston, or two revolutions of the crankshaft, are required to complete the cycle of operations. These are illustrated in Fig. 29. Fig. 30 shows a typical crank and indicator diagram from a four-cycle engine, on which diagram the lines representing the various operations are lettered to agree with Fig. 29. The constant pressure combustion, which is unique in the Diesel engine is obvious in this diagram.

In a two-cycle engine two strokes of the piston, or one revolution of the crankshaft, are required to complete the cycle of operations. These operations are illustrated in Fig. 31. During the first part of the stroke the fuel is injected and burnt and the gases expand. During the latter part the piston uncovers the exhaust ports through which the burnt gases escape, thus reducing the pressure in the working cylinder to atmospheric. Now the scavenging valves in the cylinder head open and the cylinder is purged by the entering scavenging air until the piston on its return stroke covers the exhaust ports. The valves now close, and from this point the compression of the air takes place for the rest of the upstroke of the piston, completing the cycle of operation. Fig. 32 shows a typical indicator diagram of this two-cycle process. In Fig. 33 the relation of a pressure and temperature diagram is shown for the two-cycle process of operation.

Four-cycle Versus Two-cycle

As has been shown in the foregoing, the Diesel process of operation can in a theoretical way be accomplished equally well by using either the two or the four-cycle principle of operation, and the two-cycle system seems to offer many advantages. To double the power strokes should result in a lighter and less expensive engine for a given horse power, and it must seem wasteful to use machinery of such heavy design as the working parts of a Diesel engine for such simple functions and such low pressures as are involved in the suction and exhaust stroke. But in practice it was found that to produce a successful two-cycle engine many difficulties had to be overcome, and this is no doubt the reason for the relatively recent appearance of successful engines of this type.

A thorough scavenging of the working cylinder is absolutely necessary, and to obtain this, special means had to be provided which tend to complicate the construction. Incomplete and short scavenging of the cylinder results in an insufficient amount of fresh air for combustion and a consequent reduction of the mean effective pressure and output. However, the problem of efficient scavenging has been solved very satisfactorily on several types of two-cycle engines without sacrificing reliability in the mechanical sense. To accomplish this it was necessary to provide for special pumps to give the necessary amount of scavenging air, which resulted in a somewhat lower mechanical efficiency, but this was more than offset by the inherent advantages of the two-cycle system such as an increased and more uniform torque for a given number of working cylinders, together with reduction in weight and



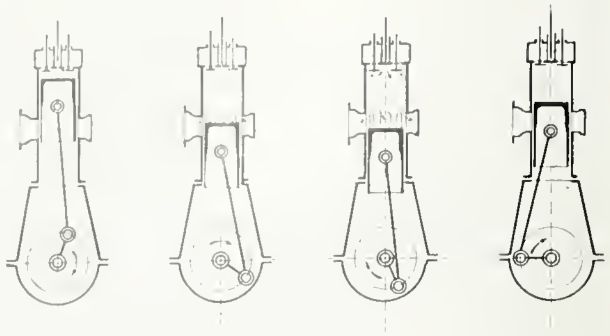


Fig 31

Diagrammatic Representation of Two Cycle Operation in Diesel Engine Cylinder

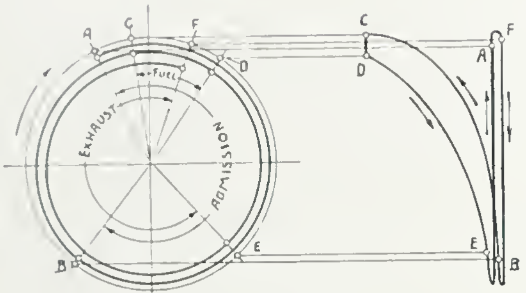


Fig. 2

Crank & Indicator Diagram

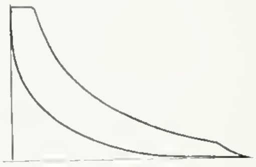


Fig 32

At left: Figures 29 and 30, showing diagrammatically the four-stroke cycle in the Diesel engine and crank and indicator diagrams therefor. Above: Figures 31 and 32, showing similarly the operation of two-cycle engine.

space and possible first cost per horse power.

These advantages increase in importance with the power output, and for large units the two-cycle engine is today unquestionably the leading type. It has never been, and probably never will be, possible to build four-cycle engines of a cylinder output equal to that obtained in two-cycle types. If in the construction of large engine units the number of cylinders was increased instead of the output per cylinder, it was done because the demand for large engine units was ahead of the development work, but today such practice can hardly be justified. It may be said though that, while the operating results of motorships show an apparent advantage for the four-cycle type, it must be taken into consideration that this type of engine could more largely benefit that could the two-cycle from the experience gained during the last twenty years.

An advantage not to be overlooked in judging the two types is the fact that on account of somewhat higher cylinder temperature and the absence of exhaust valves, lower grades of fuel can be handled successfully in the two-cycle engine. Incomplete combustion in a four-cycle engine will result in a rapid fouling of the exhaust valves and necessitate shut-downs, which although of relatively short duration, may occur at frequent intervals and may cause very embarrassing situations. The absence of admission and exhaust valves in the two-cycle results also in a much simpler valve gear, at least where port scavenging is resorted to.

Starting and reversing of a marine engine must be not only possible but sure at any and all positions of the cranks. To accomplish this at all a four-cycle engine must have at least six cylinders, while the four-cylinder, two-cycle engine has a starting facility equal to that of an eight-cylinder, four-cycle.

Considering all these inherent advantages that the two-cycle system offers, there is little cause for surprise that some manufacturers concentrated their efforts on this type, and it is gratifying to see these untiring efforts now meeting with success after the disappointing results from some of the earlier engines.

DIESEL ENGINE DESIGN

It may appear that after the long and thorough experimental work done to produce the first successful Diesel engine, all further development work would be along the line of improving this fundamental type, and by using the experience gained, but many engineers thought differently. The number of manufacturers increased rapidly, especially after the basic patents ran out. Among these were many shipyards that entered the field, led not by their own desires but in answer to the wishes of operating companies. Most of these firms did not have engineers with Diesel training and experience, neither did they have adequate facilities for testing. The result was that many of the quite often distinctly new types produced did not always come up to expectations, and instead of furthering the cause proved a setback.

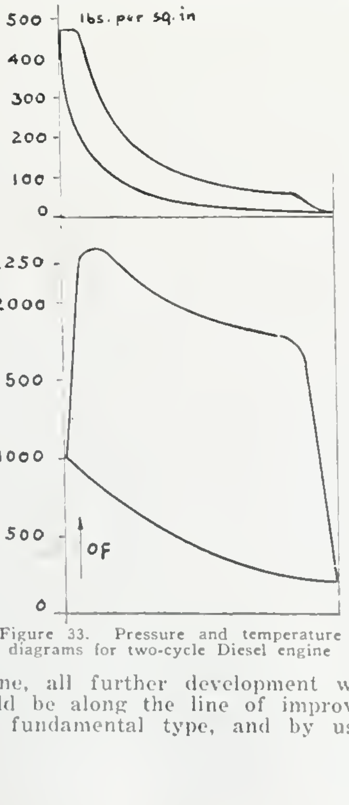


Figure 33. Pressure and temperature diagrams for two-cycle Diesel engine

Vertical or Horizontal Type

On account of the space conditions on board ship only the vertical type can be considered. For naval purposes some horizontal installations have been proposed, but only for naval architectural reasons. With the exception of this special case, the vertical type is preferable, as it requires less floor space, offers more favorable stress conditions for piston rods, frames and foundations, and avoids uneven wear of the working cylinders.

With or Without Crosshead

The high combustion pressure in the Diesel engine necessitates a greater number of piston rings than is called for in practice on steam engines, and it was at first thought that the long trunkpistons could easily take care of side thrust, but the trunk piston guide soon proved itself insufficient. To insure tightness of the piston even for moderate cylinder diameters, long and heavy pistons had to be used, and to avoid this, special constructions were resorted to with adjustable guides in the pistons, but these designs were merely makeshifts and could not give any lasting satisfaction. Today most firms building marine Diesel engines are using the crosshead type, even though it results in an increase in engine height equal to the length of connecting rod.

Single or Double Acting

The double acting type makes the crosshead an absolute necessity. The design of the lower combustion chamber and the effective cooling of the piston rod presented considerable difficulties, as did also the placing of the valves on account of the reduced space on the lower cylinder head due to the piston rod and stuffing box.

On the other hand, the desire for increased cylinder output was a continuous spur for the introduction of this type, and it presented also a tempting solution, to increase the economical uses of the engine without an undue increase in weight and number of parts.

The solution of the problems presented by the double acting type demanded great expenses and efforts from the builders, but the motorships built by Blohm & Voss, Hamburg, and equipped with double acting engines, which visited New York some time ago, gave hope that this type might prove itself successful as a commercial marine engine.

Number of Cylinders

The reasons for multi-cylinder arrangements in marine Diesel engines are entirely different from steam engine practice. Triple and quadruple expansion steam engines have their multiple cylinders so proportioned and designed as to secure maximum thermal efficiency, while in internal combustion engine practice the multi-cylinder arrangement is resorted to for mechanical and manufacturing reasons. The number of working cylinders for direct reversible commercial marine engines varies between three for double acting, two-cycle type, and eight for single acting or four-cycle type.

Multi-cylinder arrangements are made for the following reasons:

1. To get a more even turning moment without the use of heavy flywheels and the resulting increase in weight.
2. To increase starting and maneuvering facilities
3. To be able to keep the engine in service even if one of the cylinders should fail.
4. To reduce cylinder diameter, not only for the reasons of lightness and more economical production, but also to avoid the greatly increasing difficulties encountered with large cylinder dimensions due to increased wall thickness and consequently insufficient cooling.

In addition to the above, it must be considered that the combustion pressure acts on the piston only every fourth stroke, and in the two-cycle every second, and that the pressure drops very rapidly during the working stroke but all parts of the engine must be built to withstand the maximum stresses. This results in very large shafts, cranks, and other parts and correspondingly heavy weights, so it is necessary for this reason also to keep cylinder diameters down.

(To be continued)

DIESEL ELECTRIC TANKER

Considered in Connection With Section XI of the Merchant Marine Bill

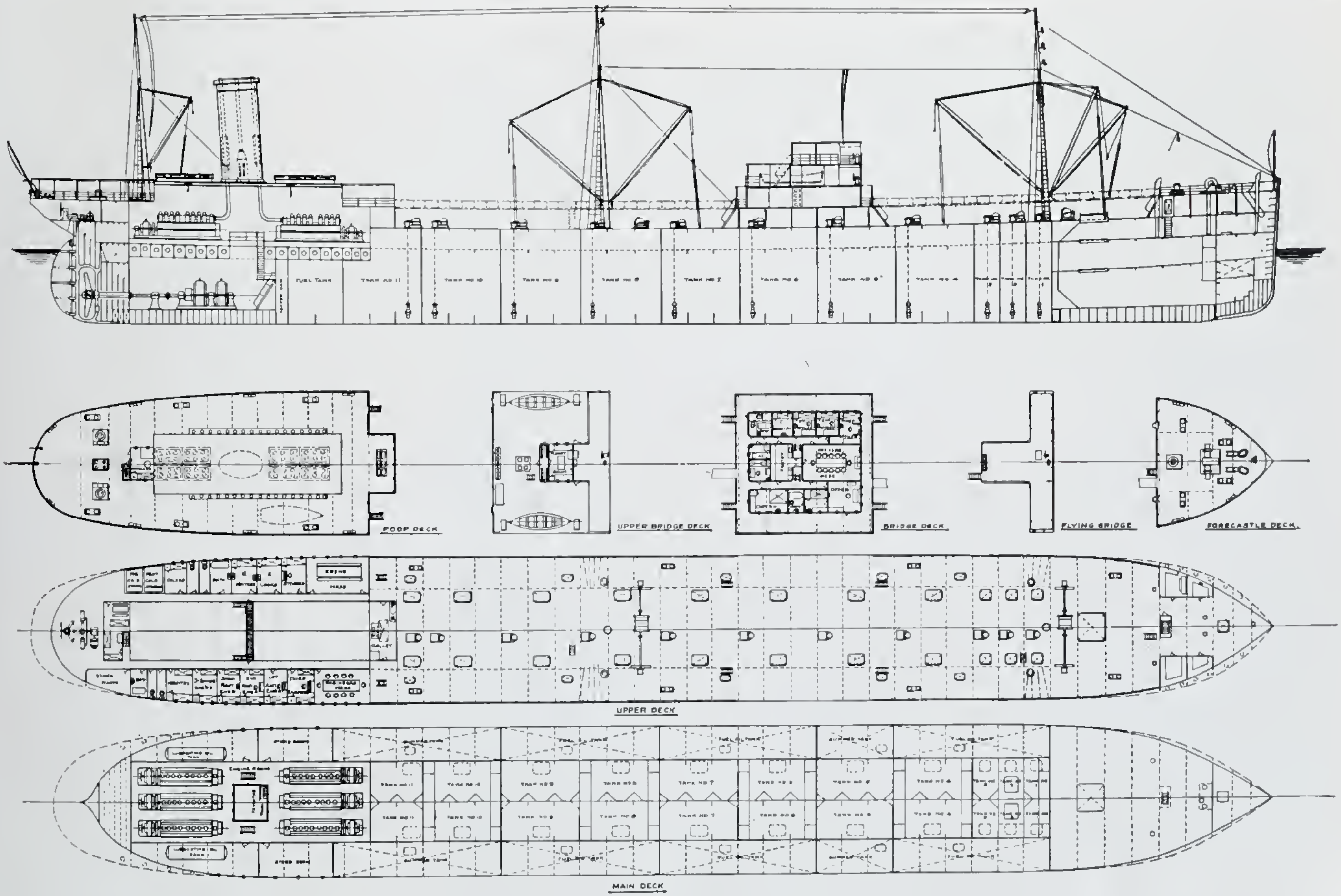
By D. W. & R. Z. DICKIE

THE possibilities of the Diesel electric drive for ship propulsion seem to be ideal for a ship designed to carry liquids in bulk. The drawing reproduced herewith illustrates such a plant installed in a 10,000-ton tanker carrying 70,000 barrels of oil more or less, depending on the length of the voyage, this being a vessel similar to the tankers La Brea and Los Angeles, in service since 1916. The dimensions are as follows:

Length, B. P.	435 feet
Beam	56.2 feet
Depth of hold	33.6 feet
Molded depth	33 feet 6 inches

The engines of the La Brea are geared turbines of 2600 brake horsepower, propeller turning 85.75 revolutions, 3 Scotch boilers carrying 200 pounds of steam, 50 degrees of superheat, 28½ inches vacuum, heating surface 8640 square feet.

The main engine of the Los Angeles is a triple expansion with cylinders 27 inches by 47 inches by 76 inches, 48-inch stroke, turning 65.94 r. p. m., taking



Inboard profile and deck plans showing Diesel electric system of propulsion applied to a 10,000-ton tanker of the La Brea type steam from three Scotch boilers with 9405 square feet heating surface.

The Diesel electric tanker has six engines of the Winton full Diesel type, eight cylinders, 12-15/16-inch bore, 18-inch stroke, 260 r. p. m., driving a 125-volt generator each. The current is stepped up in series from generator to generator to 750 volts and delivered to a double armature motor connected to the propeller shaft.

In suggesting a change of method for driving ships, several great practical questions must be given consideration.

First—Reliability: A vessel when it leaves port must do so with every promise of arriving at its destination on time. The Diesel electric drive employs the Diesel principle for the engine without the reversing feature. The Diesel engine has been tried out thoroughly and unquestionably has made good. A few years ago the Diesel installations suffered from lack of experience in design and installation, but at the present time sufficient experience has been acquired to guarantee successful operation. Omitting the complications of reversing tends toward greater simplicity.

The electric part of the installation is direct current, probably the best known of the electrical systems and certainly the one used aboard almost every ship afloat at the present time.

Second—Economy: Any method of propulsion that saves fuel or wages must, in the long run, displace more expensive methods of propulsion.

The admitted economy of the Diesel engine delivering a horsepower for .45 of a pound of fuel per hour, as compared with the geared turbine consumption of 1.02 pounds and the reciprocating steam engine of 1.13 pounds per horsepower per hour, leaves a large margin of possibilities for making a saving.

A still further economy is derived from the constant angular velocity of the propeller in the Diesel electric drive. For example: with the turbo-electric drive it has been found that with exactly equivalent power in sister ships the electric drive gives the same speed as the reciprocating engine with 10 per cent less horsepower, either brake or indicated.

The latest available data shows that the losses in the reversing part of the geared turbine, due to the windage friction, are greater than the electrical losses of the turbo-electric plant, so that the turbo electric drive gives greater economy than the geared turbine.

The many auxiliaries about the ship and engine room being motor-driven is a very important economy, as whatever may be said about steam auxiliaries, even their most ardent advocates will admit that they are not economical on steam, especially the pumps, winches, steering engine, etc.

Third—Upkeep: If any part of the machinery requires more than ordinary care and attention upon arrival at the port of destination, the whole investment is tied up and has to stand the loss.

One of the great causes of upkeep expense is in the boiler room aboard ship. To keep any structure tight with ever changing temperatures, especially the temperatures of burning fuel, has been definitely shown to be impossible where there are as many joints as are in the present boiler. Also one must remember the valve troubles on the simplex pumps for boiler feed. The turbo-electric drive and the geared turbine, while enjoying the place of highest economy in steam practice, still retain the disadvantages of boiler upkeep.

With six engines employed the loss of one of them causes only a little loss in speed and with the ordinary Diesel engine practically all of the adjustments can be made at sea.

Fourth—Simplicity: In order to effect economies the modern steamship has accumulated units of widely diversified principles and of ever increasing numbers.

The question was raised that with six main engines the number of units was too large to be practical, but it is not generally realized how many units are in the steam power plant of a modern cargo ship.

Table number 1 was prepared to illustrate this point, and not only are there less units on the Diesel electric ship of 2500 horsepower, but the number of mechanical, thermo-dynamical and electrical principles involved are very much less.

TABLE NUMBER 1: LIST OF UNITS IN POWER PLANT OF VARIOUS TYPES OF VESSELS

Reciprocating Engine

1. Boiler.
2. Boiler.
3. Boiler.
4. Oil pumping system.
5. Oil heating system.
6. Engine.
7. Thrust block.
8. Oil filtering system.
9. Condenser.
10. Circulating pump.
11. Air pump.
12. Hotwell, feed and filter tank.
13. Main feed pump.
14. Grease extractor.
15. Feed heater.
16. Auxiliary feed pump.
17. Evaporator.
18. Evaporator feed pump.
19. Distiller.
20. Distiller circulating pump.
21. Auxiliary condenser.
22. Auxiliary air and circulating pump.
23. Fire pump.
24. Ballast pump.
25. Engine bilge pump.
26. Trimming pump.
27. Bilge pump.
28. Sanitary pump.
29. Fresh water pump.
30. Steam electric light engine.
31. Steam electric light engine.
32. Switchboard.

Turbo-Electric

1. Boiler.
2. Boiler.
3. Boiler.
4. Oil pumping system.
5. Oil heating system.
6. Turbo generator.
7. Oil cooling system.
8. Lubricating oil pump.
9. Lubricating oil pump.
10. Oil filtering system.
11. Switchboard.
12. Motor control.
13. Driving motor.
14. Thrust block.
15. Condenser.
16. Circulating pump.
17. Air pump.
18. Hotwell, feed and filter tank.
19. Main feed pump.
20. Grease extractor.
21. Feed heater.
22. Auxiliary feed pump.
23. Evaporator.
24. Evaporator feed pump.
25. Distiller.
26. Distiller circulat'g pump.
27. Auxiliary condenser.
28. Auxiliary air and circulating pump.
29. Fire pump.
30. Ballast pump.
31. Engine bilge pump.
32. Trimming pump.
33. Bilge pump.
34. Sanitary pump.
35. Fresh water pump.
36. Steam electric light engine.
37. Steam electric light engine.

Turbo-Gear Reduction

1. Boiler.
2. Boiler.
3. Boiler.
4. Oil pumping system.
5. Oil heating system.
6. Turbine.
7. Reduction gear.
8. Oil cooling system.
9. Lubricating oil pump.
10. Lubricating oil pump.
11. Oil filtering system.
12. Thrust block.
13. Condenser.
14. Circulating pump.
15. Air pump.
16. Hotwell, feed and filter tank.
17. Main feed pump.
18. Grease extractor.
19. Feed heater.
20. Auxiliary feed pump.
21. Evaporator.
22. Evaporator feed pump.
23. Distiller.
24. Distiller circulat'g pump.
25. Auxiliary condenser.
26. Auxiliary air and circulating pump.
27. Fire pump.
28. Ballast pump.
29. Engine bilge pump.
30. Trimming pump.
31. Bilge pump.
32. Sanitary pump.
33. Fresh water pump.
34. Electric light engine.
35. Electric light engine.
36. Switchboard.

Diesel Electric Drive

1. Main engine generator.
2. Main engine generator.
3. Main engine generator.
4. Main engine generator.
5. Main engine generator.
6. Main engine generator.
7. Oil filtering system.
8. Switchboard.
9. Motor control.
10. Propelling motor.
11. Thrust block.
12. Auxiliary electric engine.
13. Circulating pump.
14. Circulating pump.
15. Motor-driven air compressor (spare).
16. Fire pump.
17. Ballast pump.
18. Engine bilge pump.
19. Trimming pump.
20. Bilge pump.
21. Sanitary pump.
22. Fresh water pump.
23. Hot water boiler heated by circulating water without other heat.

(To be continued)

MOTOR SHIPBUILDING IN EUROPE

It is realized by the more far-sighted shipowners that something of a boom in motor shipbuilding is approaching, in spite of general depression, and as the number of firms which can at present deliver motorhips within a reasonable period and have had fair experience in their construction, is limited, some shipowners are obtaining options for the construction of ten or twelve motor vessels at such periods as they may require them. For instance, the Transatlantic Steamship Company of Gothenburg, which owns about twenty-five steamers and three motorships, has another three similar ships on order with the Gothenburg Shipbuilding Company and an option for seven more to be built at a later date. Again, the Grangesberg Ore Company has four ore-carrying motorships on order with the same builders and has contracted for twelve more ships of the same type, leaving open the question of machinery until the boats are actually laid down. There is no question, however, that they will all be Diesel-engined vessels, so that it will be realized orders are now being placed for motorships on a grandiose scale.

These ore-carrying ships are of exceptional interest, since they do not, as a rule, trade on long voyages, where the motorship shows to greatest advantage. They are employed mostly between the Norwegian ore ports and Great Britain and also in the Baltic during the summer season. They are designed to carry 8000 tons of cargo on a draught of 24 feet 6 inches, being 399 feet in length over-all and 385 feet between the perpendiculars. Technically the motor ore-carrying vessel has great advantages over the steamer. The engine room is shorter, there are no cross bunkers, and it is possible to arrange the distribution of cargo in a more satisfactory manner, while the separate heaps of ore may be of less weight owing to the greater space available. The hull is thus not subjected to such heavy stresses as is the case with the steamer, and for these reasons, as well as on account of the general economy, the owners decided on the construction of motor vessels. Incidentally they have just built two steamers of the same size and comparative trials will be run when the motor vessels are completed.

The activities of the Transatlantic Steamship Company of Gothenburg in connection with motorships should be closely watched, for there is no more enterprising firm in Europe. In addition to the ships just mentioned on order for the Transatlantic Company, in which Burmeister & Wain type engines will be installed, this firm has ordered three 10,000-ton cargo boats with Doxfords of Sunderland, each to be equipped with one of the new Doxford 3000-horsepower opposed piston oil engines. The first of these ships, the Yngaren, is already launched, and the installation of the engine will take place very shortly. It is by no means unlikely that the owners will contract for a large number of similar vessels and, incidentally, it may be mentioned that two other ships are being constructed in Sweden in which Doxford engines are to be installed, making a total of five in all. Apart from the interest in the new machinery in this class of craft, it is important to note that in each case only a single engine is fitted instead of the usual twin-screw arrangement which is almost universal with motorships. The advantages of a single-screw are obvious, and this is one of many reasons why European shipowners are watching the development of the Doxford engine with the closest attention.

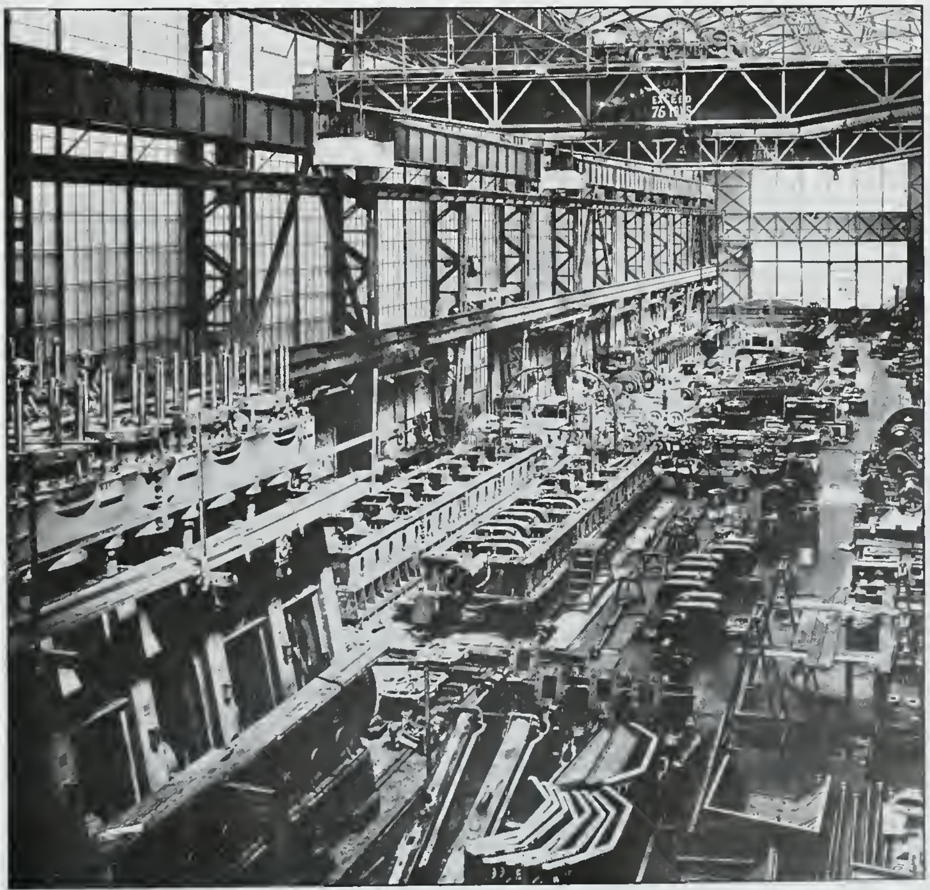
Even this does not give the limit of the Transatlantic Company's activities. They had intended to commence upon the conversion of all their steamers to motorships by taking out the steam machinery of the Bolmen and replacing it by a Polar Diesel engine of about 1800 horsepower. The engine has been constructed, but the estimated cost of conversion was so high, owing to the rates current in the shipbuilding yards, that the owners decided it was preferable to build a new hull for the engine, which they are now doing. This Polar Diesel motor was built by the Atlas Diesel Company of Stockholm and is a two-cycle type with port scavenging, of which large numbers have been built in smaller sizes for several years past.

More 14,000-Ton Motorships

The construction of the standard 14,000-ton motorships for the Glen Line for service between London and the Far East continues apace, and the second and third vessels, the Glenapp and the Glengarry, have both been launched, while the first named is now practically completed and will sail on her maiden voyage almost immediately. There are three more of this class to follow before the end of 1921, and it is interesting to note that the East Asiatic Company has just ordered an almost exactly similar type of craft from Burmeister & Wain of Copenhagen. Harland & Wolff have thoroughly standardized their 3200-horsepower eight-cylinder engines for installation in these vessels and do not anticipate making any marked modifications for a long time to come. The first voyage of the Glenogle proved completely satisfactory, and the anticipated fuel consumption of eighteen tons of oil a day was not exceeded (this for a ship carrying 14,000 tons at a speed of about 12½ knots).

Harland & Wolff's new engine shops near Glasgow, which will about double their present capacity, will soon be in full swing, and to show the preparations which are now being made for the future development of motorship construction on a large scale, it may be mentioned that Lord Pirrie, who is the head of Harland & Wolff, has in the first place acquired an enormous foundry for the production of all the special castings required in Diesel engine manufacture, and, secondly, has taken over a large harbor to facilitate discharging ore from Spain. His policy is evidently to render himself entirely independent of outside resources, and no doubt finally he will work right back to the source and purchase ore mines so that Harland & Wolff will be entirely self contained, from the mining of the ore to the completion of the finished ship.

The same activity is to be found in other Diesel engine building works in Great Britain. Doxfords have already taken over half their boiler shop for oil engine manufacture, and are spending £100,000 in its equipment. It is the ultimate aim of this firm to develop exclusively in motorship construction, and apparently this is also the object of Harland & Wolff.

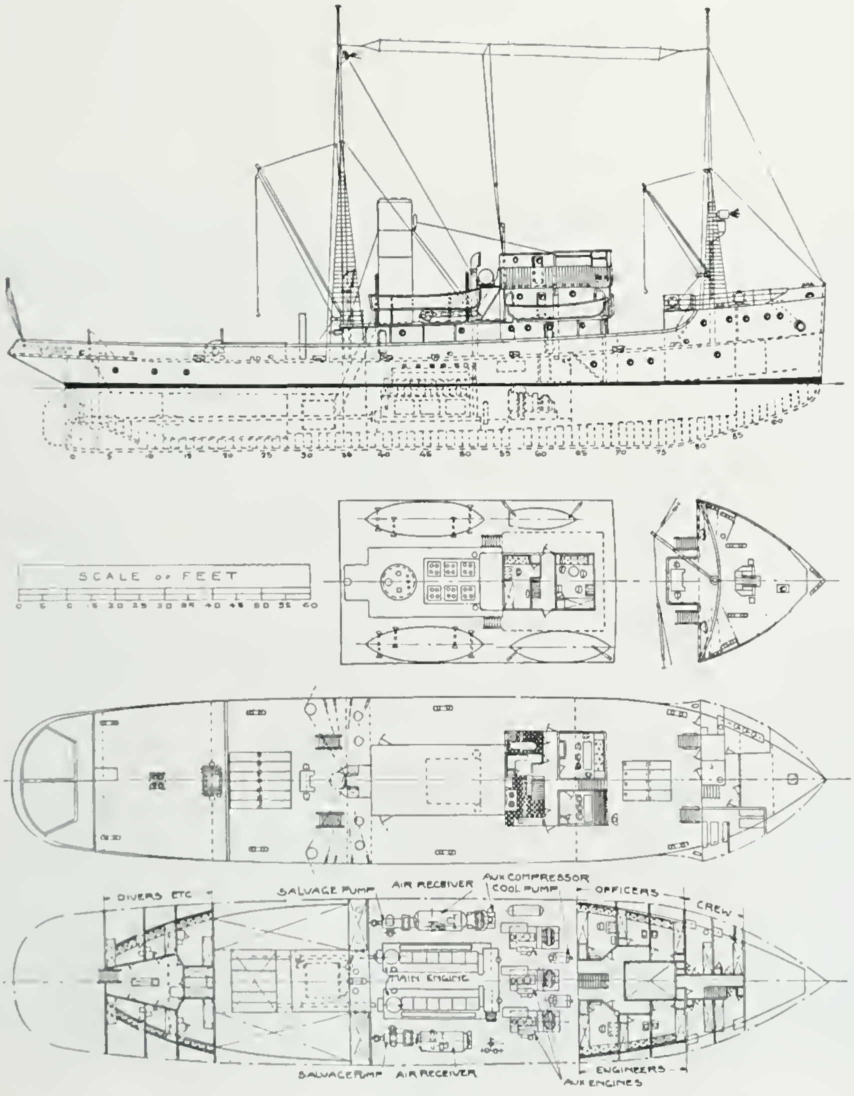


A corner of one bay in the Machine Shop of the North British Diesel Engine Works at Glasgow showing the engines of the M. S. Narragansett on the erecting floor

All manner of conversions to motor vessels are now being carried out, including pure sailing ships converted into auxiliaries and steamers modified by the installation of oil engines, but the most interesting that has yet been effected is that recently carried out at Danzig, when an old German light cruiser, the Gefion, was converted into a motor cargo-carrying vessel. It was hardly to be anticipated that it would make an ideal ship after the oil engines had been installed, but nevertheless, after modification, the deadweight carrying capacity amounted to 2700 tons and the cost of conversion has worked out at less than 3000 marks a ton deadweight, which is, of course, very considerably lower than the price of a new ship of the same size. The motors were obtained relatively cheap, as they were of the submarine type, each developing 800 horsepower. They were built by the M. A. N. and are of the usual four-cycle German submarine engine design, which proved so very successful during the war. Admittedly, it is not an entirely satisfactory proposition to install submarine Diesel engines in merchant ships, as their reliability is not so great as slow-speed mercantile sets. Nevertheless, the results achieved by the installation of Vickers submarine Diesel engines in cargo ships have proved on the whole satisfactory, and no doubt the German vessel will be equally successful. With the two 800-horsepower engines a speed of 13 knots was attained on trials. Naturally the revolutions of the engines have been reduced considerably, their normal output at full speed having been 1200 b. h. p. The converted vessel will be put in the Mediterranean trade, and the conversion is interesting, as it gives the lie to those who are asking for the destruction of Diesel submarine engines on account of their not being of any value except for installation in submarines.

Many New Motorship Orders

Many orders continue to be placed for new motor vessels throughout Europe. The British Tanker Company, Ltd., one of the largest oil transport concerns in Great Britain, has contracted for a 10,000-ton tank vessel, now being built by William Denny & Brothers of Dumbarton, in which two 1350 b. h. p. Sulzer Diesel engines will be installed. The Chargeurs Reunis, one of the leading shipping companies in France and owners of about thirty steamers, has ordered its first motorship, of 11,700 tons deadweight capacity. In this vessel, which is 450 feet in length, two Sulzer engines of 1700 b. h. p. will be installed, and it will be gathered that Sulzer engines are now finding much favor among European shipowners. The Brocklebank Company, for whom the small motor coaster Fullager was built, fitted with the first Camellaird Fullagar engine, has ordered a 4000-ton ship in which two engines of 500 horsepower of the Camellaird Fullager type will be fitted. One of these will be taken out of the Fullager, which is overpowered, as it is only a 500-ton craft, and the other will be built similar to the Fullagar engine. According to the owners, the behavior of the engines of the motor coaster Fullagar has been all that could be desired, and she has now run 10,000 miles without any mishap whatever, very large numbers of interested shipowners and engineers being present at various periods. It is stated that Messrs. John Brown & Company of Clyde Bank, who have a license for the construction of the Camellaird Fullagar engine, are preparing plans for the manufacture of very large sizes for trans-Atlantic liners, and that the Cunard Company are definitely interested in this development.



Swedish Diesel engined salvage ship Fritiof. Outboard profile and deck plans

Several motorships have been launched or completed during the past month. One of these is the Indien, which sailed on her maiden voyage in November and which was constructed in Denmark by the Nakskov yard for the Orient Company. Interest in this vessel centers round the fact that the Orient Company was really established to buy all the steamers from the East Asiatic Company when the latter decided to abandon steam in favor of motor power. The Orient Company has, however, itself become convinced that the motorship is the ship of the future and, and has therefore ordered motor vessels for its own use. The new ship carries about 9500 tons of cargo and is a standard type fitted with two 1550 i. h. p. Burmeister & Wain Diesel engines.

A new ship of very much the same type was launched at the beginning of November from the Gothenburg Shipyard for the North Star Company of Stockholm. This vessel, which is named the Canada, is the tenth motorship owned by the North Star Company, who built their first vessel, the Suecia, in 1912.

A more novel but exceptionally interesting motorship which is now approaching completion at Gothenburg is the motor salvage ship Fritiof, built by the Gothenburg Towing & Salvage Company, one of the large Scandinavian salvage concerns. The Diesel engine has the exceptional advantage for such craft of being ready for immediate service at a moment's notice without any loss of fuel, such as is occasioned in steam salvage vessels by the necessity of keeping the fires banked.

She is 170 feet in length, with a beam of 34 feet 9 inches, and carries 250 tons of oil, which is sufficient to take her a voyage of about sixty days' duration without rebunkering. Two Burmeister & Wain type Diesel engines of 625 i. h. p. each are installed, running at 150 r. p. m., and perhaps there is more interest in the salvage pumps, which for the most part are electrically operated. Naturally a large auxiliary plant is needed, and this comprises three 90 i. h. p. Diesel engines coupled to generators supplying power for eight salvage pumps in addition to the regular auxiliary and other pumps. In this vessel the steering gear, winches and windlass are steam driven, while there are also one or two of the smaller pumps coupled to steam engines.

The Still Engine

Those who remember the stir which was created last year by the publication of details of the Still combined steam and oil engine will be interested to learn that Scotts Shipbuilding & Engineering Company, the well-known Clyde firm, has now completed its first experimental engine, and it is running its trials. It is a single-cylinder unit, designed to develop 400 b. h. p., and, if satisfactory, it will be standardized as a six-cylinder set developing about 2400 b. h. p. The usual Still principle is adopted with a cylinder in which the top half serves as an oil engine and the lower half of the cylinder is, in effect, a steam engine. Steam is raised by the heat of the cylinder jacket water and exhaust, and this is used on the lower part of the piston. Otherwise the engine acts as an ordinary two-cycle Diesel motor, but it is, of course, started and reversed on steam, so that some simplification is obtained in this respect. On the other hand, a boiler is necessary, but the inventor claims that this is no disadvantage, since steam is always desirable on a ship for driving the auxiliaries. Against this it must be remarked that frequently motorships are not provided with steam except for heating purposes, as all auxiliaries are electrically operated. However, the results of the test on the Still engine will be awaited with keen interest, for there are many people who consider that this type of motor will be widely adopted in the future.

THE DOXFORD MARINE OIL ENGINE

THE completion of the first of six 3000 i. h. p. marine oil engines of the Doxford type marks one of the most interesting developments in British marine engineering of the past year. This engine is the outcome of about twelve years' continuous work by the builders, Messrs. W. Doxford & Sons, Ltd., of Sunderland, and represents a very considerable departure from past marine Diesel engine practice in many particulars. It is, moreover, a step in the direction of the production of high-powered engines suitable for fast passenger liners, and in producing 750 i. h. p. per cylinder at the low speed of revolution (77 r. p. m.), the builders have attained a higher power per cylinder than has ever been reached in any commercial marine oil engine. Tests on the engine were carried out at the makers' works during November with exceedingly satisfactory results, the motor starting up the first time with the greatest ease, as if it had been in service for months.

There are three unusual points in the design of this motor which cause it to differ radically from the average Diesel type, and indeed it is doubtful whether the Doxford engine can be said to operate on the pure Diesel cycle. These characteristics are the following:

1. The adoption of opposed pistons.
2. The employment of solid or mechanical injection of fuel at 8000 pounds per square inch.
3. The low compression pressure (about 300 pounds per square inch).

The idea of opposed pistons for Diesel engines was first developed by Junkers in Germany. In the Doxford motor the two pistons move in a single cylinder which is open at both ends and the crosshead of the top piston has long side rods on each side which drive the crankshaft, the cranks being on each side of the main crank, which is driven from the bottom piston. The two side rods can be seen projecting at the top in the illustration herewith.

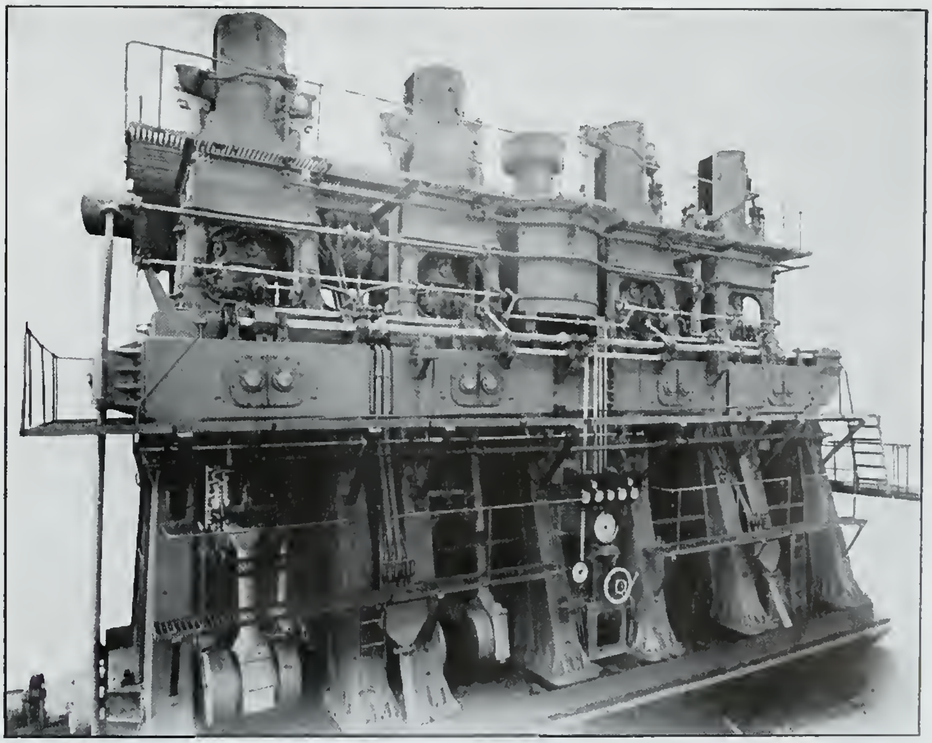
The Doxford engine is of the two-cycle type. Fuel is injected between the two pistons when they are nearest thē center, having compressed the air between them on their inward stroke to about 300 pounds per square inch. There are two fuel valves for each of the four cylinders, one at the front and one at the back, actuated indirectly from cams on two separate horizontal camshafts.

The scavenging air is admitted at the bottom of the cylinders through ports occupying the whole periphery, these being uncovered when the lower piston approaches the bottom of its stroke. This scavenging air, which is at the very low pressure of 1½ pounds per square inch, sweeps right throughout the cylinder and drives out the exhaust gases through exhaust ports at the top, discharging them into a water-cooled silencer. Obviously a well-nigh perfect scavenging effect is obtained in this way. By this means the number of valves is reduced to a minimum, these comprising the two fuel valves mentioned, one starting valve in each cylinder and a release valve. The starting valve, which is just on the left of the front fuel valve, is in each case, however, a non-return valve with no working parts; the actual starting valves, which control the timing of the admission of the starting air, being located in pairs between Numbers 1 and 2 and Numbers 3 and 4 cylinders, and are operated from cams on the camshaft.

The scavenging air is obtained from a centrally situated scavenging pump of the double-acting type driven from the crankshaft, the air being delivered into the scavenging trunks which surround each cylinder. The inlet and outlet valves of the pumps are of the automatic disc type, the air being taken in at the top through the hollow piston rod. As solid injection is employed, no air compressor is required, and all of the auxiliary pumps for cooling water or lubrication are driven electrically, power being supplied from the auxiliary generating sets. The main fuel pumps are operated from the flywheel end of the crankshaft, and consist of four horizontal plungers driven through spur gearing. These pumps are interesting owing to the high pressure at which they work and the absence of packing, which, it is found, is detrimental to satisfactory working at high pressures. Incidentally, packing glands for high pressure pumps and solid injection have also been abandoned by Vickers.

The cylinders are supported by four cast-iron columns, the arrangement of the framing being clearly seen in the illustration. Between the columns are light plates which can be readily removed and the top plates need not be placed in position, since there is no splashing of oil. The cylinder liner, which is one inch thick, is shrunk into the cylinder jacket at the center portion, slotted ribs being provided for this purpose, through which the cooling water can pass. Both for pistons and cylinder cooling, fresh water is used, the pistons being supplied through semirotary joints driven off the connecting rods. Those at the top are visible in the illustration of the engine.

In order to effect ignition at the low compression pressure of 300 pounds per square inch, at the top of each piston is a forged steel plate, the temperature of which is maintained very high, as it is not cooled by the piston-cooling water. As the engine would not start without the piston being heated, steam



New Doxford Marine Oil Engine now installed in the motorship Yngaren, 3000 I.H.P. on 4 cylinders at 77 R.P.M.

is passed through it for a few minutes to raise the temperature to a sufficient degree.

Maneuvering is carried out by means of the lower handwheel seen in the center and the small reversing lever on the right. The smaller handwheel on the left is merely for controlling the pressure of the fuel. On the camshaft are two cams for each fuel valve and two for each starting valve. These are side by side on the camshaft and one is for ahead and the other for astern running. When the engine is driving ahead and the order is received to go astern, the maneuvering wheel is first brought to the stop position, which lifts all the rollers of the valve levers off the cams. The reversing lever is then pushed over to its astern position, which causes the camshaft to move fore and aft and bring the astern cams into position for operating the astern valve levers. The maneuvering wheel is then turned through a slight angle to the starting position, which causes the rollers of the valve levers operating the air-starting valves to come in contact with their cams, thus admitting compressed air to the engine, which begins to turn. After two or three revolutions the maneuvering wheel is given a further movement in the same direction, which brings the fuel valve cams into action, admits fuel into the cylinders and lifts the air-starting levers off their cams, thus shutting off the air supply. Variation in the speeds of the engine is accomplished by turning the maneuvering wheel, which has the effect of giving a greater lift to the fuel valve. At the same time the small wheel controlling the pressure of the oil is turned in order to regulate the pressure as required according to the speed. So satisfactory is this system of control that the engine will run continuously at speeds well below 20 r. p. m. Its maximum speed for an output of 3000 i. h. p. is 77 r. p. m.

The Doxford engine has cylinders 580 millimeters diameter, while the combined stroke of the piston is 1160 millimeters. The mean effective pressure in the working cylinders is about 80 pounds per square inch and the mechanical efficiency is said to be in the neighborhood of 90 per cent, thus giving an output of approximately 2700 b. h. p.

ISLAND WRECKS IX

By ANDREW FARRELL

IN the year that the schooner Tetauta arrived at Hookena, Hawaii, after drifting for eighty-two days, the crew of an American ship also arrived at that place on November 25, 1898, having sailed 2000 miles in ship's boats.

The W. H. Starbuck was bound from Port Blakeley for Delagoa Bay via Cape Horn with a cargo of lumber. At 10 o'clock in the evening of November 5, in latitude 13:10 north and longitude 121:45 west, she caught fire in the forepeak. Four hours later the whole deck and fore-rigging were in flames, and the fire was spreading rapidly through her cargo of cedar doors tied in bundles, which may have ignited from friction. As the ship's boats pulled away in the early dawn the whole dry mass was casting flames far into the air and the ship was ablaze from stem to stern. In suddenness and completeness, this fire is surpassed only by that of the Hornet.

Second Mate's Boat Lost

After lying by the ship for a day, during which she burned to the water's edge, the boats pulled off. In one was Captain McDonald, his wife and three children (daughter, fifteen years old; son, seven, and an infant of a year); in another was the first mate, the cook and five seamen; and in the third were the second mate, the steward and four seamen. All the boats were provisioned for thirty days. Captain McDonald and the first officer had sextants, chronometers, compasses and charts; the second mate had none of these; and he was warned not to lose sight of the others.

After a few days the boats were joined together by hawsers, the second mate's boat being in the center; but for some reason the lines were cast off; and the second mate disappeared the fourth night out, November 10, never to be heard of again. It was difficult to explain how he could have lost sight of the others, inasmuch as a light was set in the captain's boat each night, the glow of which was reflected from the sail.

Boat Capsizes; One Drowned

On the night of November 18 the first officer's boat capsized in the heavy seas, and the crew clung to the bottom until the captain could heave to and take them aboard. All were saved except the cook, who sank immediately. In order to make room for the new passengers, everything not needed was jettisoned by the remaining boat, surplus clothing and instruments included. There were now fifteen persons in the craft, dependent on supplies intended for nine, so that the former allowance of one pint of water a day was cut in half. Of canned fruit there was plenty. Although the nights were misty and raw, there was not enough rain to permit of water being caught.

Clipper Ship Rock at French Frigate Shoals

For twenty days an average of 100 miles was made, 2000 miles in all, before a northeast trade, and on the morning of November 25 Mauna Kea pierced the horizon.

Abandoned Burning at Sea

The British bark Fannie B. Kerr, from Newcastle April 7, 1902, with coal for San Francisco, was abandoned at sea May 29, 800 miles northwest of Kauai. At 2:30 o'clock in the morning of May 28 smoke and gas had appeared at the after ventilator. There was no hope of digging into the cargo, and Captain Gibbons decided to batten down the hatches in an endeavor to smother the fire, but also, as he was on the starboard tack, to stand for Honolulu. There was no further sign of fire until 2 o'clock in the morning of May 29, twenty-four hours after smoke first was discovered. At that hour the entire crew was awakened by a heavy puff, followed an instant later by a brilliant glare; the cover of No. 4 hatch was sent flying high above the jigger mast and the ventilators were cast so far that they were not seen again. As the liberated gases streamed into the air the flame followed, leaping to a height of 150 feet on the first explosion, but subsiding afterward.

During the day the decks became hot and the entire ship was smothered by dense gas and smoke, although the forward portion of the vessel remained cool; and on the afternoon of May 29 Captain Gibbons decided to abandon the ship. This action now appears to have been hasty, almost precipitate.[*]

Dismal Setting for Departure

Captain Gibbons took his son, who was third officer, and ten men; the first mate had eleven, besides himself; the second mate and three men had the dingey; and the boatswain and three were in the gig. Ample provisions and water were stored in the craft and all had charts, sextants, almanacs and chronometers, except that of the boatswain, who did not understand their use. "Rain squalls made the Pacific gray and cheerless, the wheel was lashed and the course set north-northeast. The bark was barely making a knot an hour, just holding their own under three lower topsails and the jigger topmast staysail. Lazy, torpid smoke came slowly but steadily from the after hatches and floated reluctantly to leeward. The scene was a dismal setting for the departure." It was in latitude 26:30 north, longitude 169 west, that the Fannie B. Kerr was abandoned.

Two hours after the boats pulled away from the bark, a heavy sea began to run, and the dingey began to fill, forcing Captain Gibbon to take the second mate and three men from that boat and cut her adrift. The addition of four men crowded the captain's boat so that each person was compelled to cast overboard everything except food and the clothing in which he stood. During the night the boats became separated. With plenty of food, the captain's craft made Kauai on the eighth day, after failing, on the preceding day, to attract the attention of the Pacific Mail liner Gaelic, which passed within a few miles.

---

[*] There is little room for argument. Ten months after the Fannie Kerr was abandoned the steamship Heathdene sighted her, still smoking, near the coast of Formosa, thousands of miles from Hawaii. In April, 1903, the Shell steamship Volute sighted the Kerr fifteen miles off Formosa. The first officer of the Volute boarded the derelict and took away a bell, the remnant of a chronometer, a molten cruet and metal plates and spoons. He discovered that all the decks had fallen through and five of the beams were gone; but portions of the salon were intact. In descending by the companionway he stepped into hot cinders to his hips. After failing once to find the Kerr, the Japanese warship Yamato succeeded on the second attempt. I do not know whether the hulk was towed into port.

The Boatswain Speaks

On the ninth day the first mate's boat was picked up by the Inter-Island steamer Mikahala, and at dusk that evening the gig made Niihau. Those of the gig complained bitterly that the mate had deserted them. The boatswain told the story:

"When we was about to leave the ship, I was standing under the gig and the mate asks me if I'm going in that boat. 'I'm going where I'm ordered,' I says, and he says alright go along in that boat. I thought I might as well go in her as in any other. She and the mate's boat were the two best boats aboard the ship. The cook, a negro named Prince Thompson, come up and said he'd go along with me and so did Sam Murphy and Ed Coleman.

Like a Blooming Fool

"When we was ready I asks what provisions we was going to get and the mate said that would be all fixed after we got away from the ship. So we gets away and began stowing away and sharing provisions. The mate has two spare sails under his thwarts, but he takes my jib and leaves me with a spritsail only. Afterwards we made shift to make a jib out of some old canvas. Like a blooming fool I handed over a beaker of water, he had three already, two sides of bacon and a leg of ham, thinking I was going to get something in return and he hands me two tins of sardines. That settled it with me. I said I'd be at the bottom afore I'd eat those sardines. Oh yes, we had a can of lobster too, I nearly forgot that. When he left us finally we had a few pannikins of muddy water in the bottom of a sixteen-gallon tank, a chunk of raw pork not big enough to bait a shark and half a bag of bread.

"'Wot'll we do after dark?' says I. 'We'll give you a tow,' says he and I let it go at that. He gave us a tow the first night and the second night and maybe the third night, I ain't going to swear to that, and I'll swear to all the rest I'm telling you, and then he informs us that we wasn't going fast enough to please himself, that he was running short of provisions and the tow was taking him too far to windward. He tells that we've only made 180 miles from the ship since we left and us slipping along with a fine breeze at six knots an hour for four days and then says 'steer S. S. E. and be damned to you,' like the bloody liar he is. I won't swear to the 'be damned to you,' but he meant it if he didn't say it. He had the best boat and the best chance of getting safe. If we hadn't turned up, nobody would have known nothing about it, but we got clear the same as he did through no hope or help of his.

I Ain't a Bird

"Then we began chasing him like a lot of blooming dogs after each other, never knowing if he was ahead or behind. Sometimes in the morning we'd be way ahead and then we'd be way behind and a precious lot he cared about it. I don't know any more about navigating than that blooming door, and he knew it.

"One day we saw Bird Island, Murphy saw it and we was ahead. I put the boat about and sailed back to the mate. 'There's land over there,' says I. 'When did you see it?' 'Three hours ago,' says I. 'Why the hell didn't you say so?' says he. 'I ain't a bloody bird,' I says. 'I sailed over to tell you right away.' Two or three days before we got ashore we went up to him to ask him how near land we was and he sails off in the other direction without a word. That was the last we saw of him until we got together on the steamer and it's the last I'd ever want to see him if it warn't for getting in.

Bare as a Monkey

"We plugged along in the rain and the sun with them two tins of sardines and the can of lobster. We chafed our hands and wore out our clothes till I was as bare as an Andaman monkey. When we got in sight of land we saw a lot of natives beckoning to us and we didn't know where we was, so we wasn't going to run any chances with cannibals. We run around the island and found a nice little cove and a good landing. Then I climbs up a mountain and I thought I saw a light and so did Murphy. Some of 'em thought it was a star, but I'd never seen a star like that and it turned out to be the masthead light of the Mikahala."

Storm-Beaten or Becalmed

On June 16, 1903, the French bark Conetable de Richemont sailed from Hongkong for Taltal, Chile, where she was to load nitrate. For three months she remained in the China Sea, lying becalmed, or beaten upon by one storm after another, so that she was unable to make her way into the Pacific. Eighty days out of Hongkong, on September 4, she sighted the Pacific Mail liner City of Peking, which responded to her signals of distress and sent her a boatload of provisions. At length, the Richemont wandered into the Pacific and down near the Ladrones; and again she ran short of provisions.

At this crisis a Swedish steamer hove in view, but her master, in response to the Richemont's request for provisions, said bluntly that he had scarcely enough for himself. And then Captain J. Rault decided to try for Honolulu. West of Midway he sighted a Japanese passenger steamship, apparently the Nippon Maru of the Toyo Kisen Kaisha. For the third time distress signals fluttered, and for the second time no aid was given; for the Japanese altered his course not a single point and steamed over the horizon.

Strikes French Frigate Shoals

More trouble was to come. In the early morning of October 10, 1903, a short time after midnight, with the weather fair but very dark and the vessel sailing easily, the lookout picked up the loom of canvas plain above the horizon—a full-rigged ship on the port bow. She displayed no lights, which the Frenchmen thought was quite strange, but they held on in the chase, hoping to get provisions.

And then the three-masted ship suddenly became a 120-foot rock; a line of breakers appeared under the bows of the Richemont, dead ahead; her course was changed, fruitlessly; she struck, in a smooth sea, and jammed fast on the coral of French Frigate Shoals.† All efforts of the crew failed to float her. His lack of provisions left Captain Rault no choice. He must make Hawaii immediately; and at 6 o'clock in the morning of October 11, in three boats, having provisions and water for fifteen days, the crew sailed for Honolulu with eight men in each boat.

Rain Falls in Time

On the morning of the third day the mate's craft was missing, and the boatswain's also disappeared on the fifth night out. In the afternoon of October 18, seven days out, Rault arrived at Niihau, himself the only man who had suffered greatly. Three days later the mate's boat made Kailua, Hawaii, after a more severe voyage, for half the biscuit was spoiled by sea-water the second day and the men were on short rations thereafter. The boatswain was at sea thirteen days before he landed on Niihau. His water gave out Thursday night, October 15, and the boat headed for Neckar Island, where no water was to be had. With throats and tongues parched and swollen, the eight decided to return to the wreck on French Frigate Shoals and had covered 150 miles when rain fell, and the voyage was resumed to Hawaii. In the rough seas the boat opened and was bailed steadily for three days.

---

† A steamship, sent from Honolulu to the wreck, found it capsized and submerged, except for a portion of the bow; and eventually the hulk disappeared altogether, swallowed up, probably, by the sands.

NEW BOND BUYING PLAN

TWENTY - TWO thousand employees of the Western Electric Company are being offered an opportunity to be among the holders of bonds of their corporation. The board of directors has approved an extension of the plan to enable its personnel to purchase Western Electric 5-year, 7-per cent convertible gold bonds. Instead of limiting its investment arrangements to its older employes as has been the custom in the past, the big electrical concern is encouraging those who have six months or more continuous service by December 1 to acquire their quota of the securities.

The older employes will also benefit under the new offer. Those who did not subscribe when the bonds were issued originally can apply for their share now. In no case, however, can the total face value of any employe's holdings in the issue exceed $100 for each $300 of his annual rate of pay.

The sale to the employes is under an installment basis, payment being made in a manner similar to that used during the Liberty Loan drives. The subscribers receive interest on the money they pay in and also on the bonds themselves, so that, instead of paying the full subscription price of $98.50, the employe's cost is only $89.84 on each $100 bond or about 8.9 per cent a year return on the investment. These bonds are now quoted on Wall Street at about 99.

FIRST TURBO-ELECTRIC PASSENGER SHIP

By JAMES A. KELLEY*

THE steamship Cuba, now running between Jacksonville, Florida, and Havana, Cuba, and operated by the Miami Steamship Company of New York, is the latest product of the Morse Dry Dock & Repair Company, Brooklyn, New York.

To the Cuba belongs the distinction of being the first passenger ship in the world to be driven electrically, and to the Morse Dry Dock & Repair Company the distinction of installing the machinery, which was furnished by the General Electric Company of Schenectady, New York:

Characteristics

The principal dimensions of the Cuba are as follows:

Length over-all	320 ft. 0 in.
Length B. P.	300 ft. 0 in.
Beam molded	40 ft. 0 in.
Depth to superstructure deck	34 ft. 11 in.
Draft, mean	17 ft. 0 in.
Displacement at 17 ft.	3580 tons
Block coefficient	0.61

A sea speed of 17.28 knots was obtained on recent trials with the machinery installation delivering its full power of 3000 indicated horsepower.

Accommodations

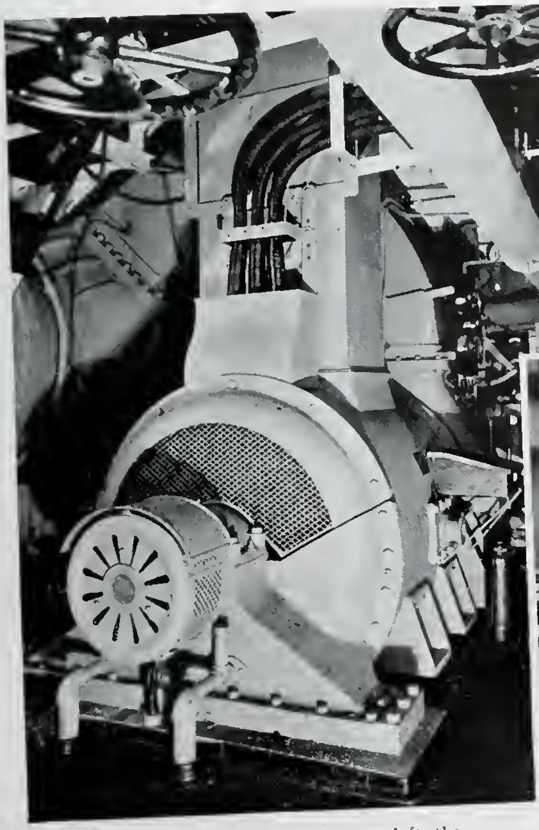
In the design of the vessel and its accommodations, considerable attention has been given to the run in which the vessel will be placed. Everything for the comfort and pleasure of the passengers has been accomplished and the ves-

Above—Gracefully designed saloon staircase. At the left—Smoking room. Below—Dining saloon, showing arrangement of small tables and attractive rubber tile floor covering.

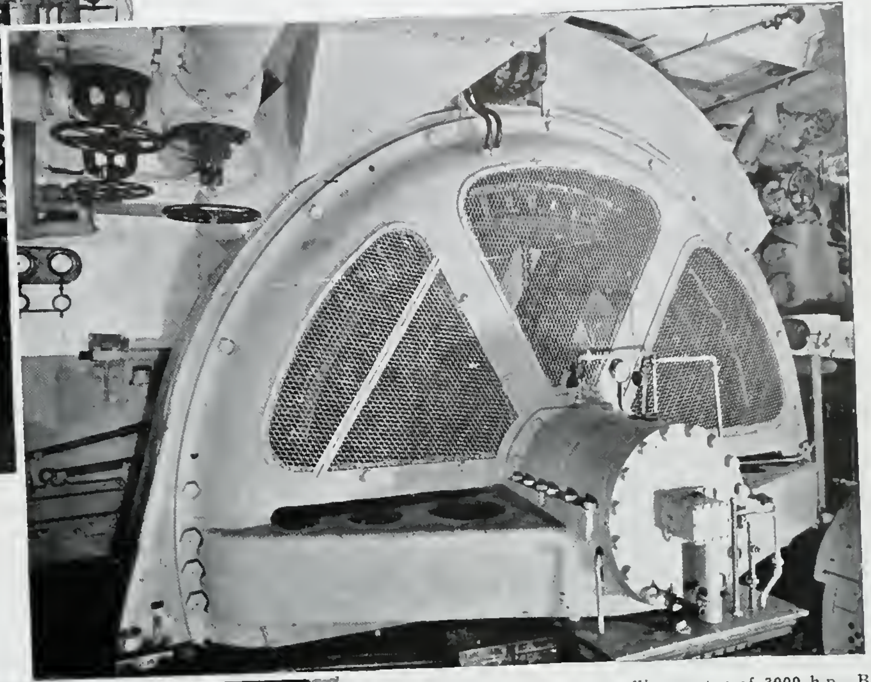
At left—Shower bath in corner of one of the many bathrooms, where both salt and fresh water are available for bathing. The picture at right gives some idea of the completeness of the galley equipment.

---

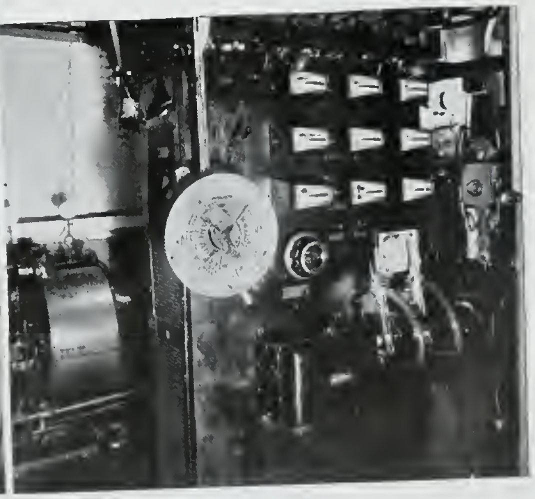
* Naval architect, Morse Dry Dock & Repair Company, Brooklyn, New York.



Above—The turbo-generator. Note at left the condenser connection from turbine and above generator the duct by which the ventilating air from this unit is conveyed to the forced draft in the boilers. The arrangement of fans and ducts for ventilating motor and generator is shown in greater detail in the illustration below.



Upper—Main propelling motor of 3000 h.p. Below—Main switchboard with controller panels for propelling motor and auxiliaries.



sel could well be called a luxurious yacht rather than a passenger steamship.

It is not contemplated to carry any cargo with the exception of a few automobiles on the main deck forward and a small amount of refrigerated cargo such as tropical fruits, etc., in the refrigerator compartments below decks. To facilitate the loading and discharging of the automobile cargo carried forward, a large auto port has been provided in the side of the vessel. This port is of sufficient size to allow the largest limousine built to be driven aboard instead of being hoisted in the usual way.

General Arrangements

As usual on ocean going ships, quarters for the deck officers and the wireless officers are located on the boat deck, as is also the wireless room. A card room, which is decorated in white panel work with mahogany wainscoting and fitted with typical card tables, is placed aft of these quarters.

Farther aft on the boat deck is a smoking room with a large bar attached thereto and aft of this a veranda cafe. The bar is completely fitted with a mahogany bar and a large ice box which is cooled from the ship's refrigerating plant. The smoking room is done in old English oak with a large skylight trunk extending the full length of the room. All furniture in this room is of wicker in a shade that matches the old English finish of this space.

The veranda cafe has been designed to represent as nearly as possible, on board the ship, a typical veranda with running vines on trellis work. The windows, as will be noted from the detail plans, are exceptionally large, and when open the enclosed space will derive the full benefit of the ocean breeze. The furniture in this space is quite attractive, being in ivory and green.

On the superstructure forward will be found the special staterooms which are fitted with double berths and private baths. The forward entrance hall on this deck is fitted in circassian walnut panel work and the after entrance hall with crotch mahogany panels. All the staterooms are fitted with mahogany berths and furniture.

The dining saloon is designed for individual table service, each table being arranged for four or six persons. The chairs fitted are not of the ordinary ship revolving type, but are large, comfortable tapestry upholstered chairs. A specially designed indirect lighting system is provided for the dining saloon, which adds considerably to its attractiveness.

The galley and pantry are situated below the dining room and are equipped in the most up-to-date manner, including glass pantry, silver pantry, scullery, cold pantry and a bake shop with an electric oven as well as an electric roll warmer.

Boilers

The boiler plant consists of four Scotch boilers 13 feet inside diameter and 10 feet 6 inches long, each with three furnaces of the Morrison type. The length of grate is 5 feet 6 inches and the grate area for each boiler is 53.7 square feet. The boiler tubes are 2½ inches outside diameter and the total heating surface for each boiler is 1900 square feet. The boilers operate at a pressure of 190 pounds and are fitted with the White Fuel Oil Company's system of oil burners and with superheaters furnished by the Locomotive Superheater Company, which deliver steam at a superheat of 200 degrees.

Fuel Oil

A fuel oil capacity of 1772 barrels is provided for the vessel. This oil is carried in tanks built separate from the hull and located forward of the boiler room.

Forced Draft

A scheme for ventilating the turbo-generator and motor and supplying the pre-heated air to the boiler has been developed on this vessel and during the trials it proved very efficient. By a series of dampers in the various ducts the hot air is taken from the motor and from the turbo-generator and delivered through a 25,000 cubic feet per minute American Sirocco fan to the boilers at a mean pressure head of three inches.

As auxiliary American Sirocco fan supplied by the American Blower Company, Detroit, Michigan, has been placed in the after end of the engine casing to provide means for cooling the motor in case of breakdown of the large fan. This fan will discharge the air directly overboard, and in case of insufficient ventilation in the engine room it is used as an exhaust fan.

Main Propelling Machinery

The main propelling machinery consists primarily of a turbo - generator, main propulsion motor, two exciters, and control equipment.

The turbine drives the alternating current generator which supplies current to the synchronous motor through a three-wire system. The necessary excitation current for the main generator and motor fields is furnished by one of the exciters, which also supplies the light for the boat and power for the auxiliaries.

The control equipment enables the engineer to maneuver by simply operating two levers, one for reversing and one for varying the speed. The motor is started, stopped and reversed by means of the high and low voltage contactors of the control group. In starting from rest, the motor operates without its direct current field as an induction motor. When the motor is nearly up to speed field is applied and operation continues as a synchronous motor.

In reversing, the motor is automatically connected to function as a generator returning power to the generator, thus electrically braking the propeller. It then operates as an induction motor to start the propeller in the reverse direction, and finally as a synchronous motor.

The turbo-generator set of the horizontal, high pressure, eight-stage, impulse, condensing type built by the General Electric Company has a rated horsepower of 3350 and a speed of 3000 revolutions per minute. Current is generated by the unit at 1150 volts.

The main propelling motor is of the General Electric synchronous type with a rated horsepower of 3000, running on alternating current of 50 cycles, at a speed of 100 r.p.m., and having a forced system of ventilation.

Two General Electric turbo-generator sets of 150 kilowatts each are installed for excitation and lighting and power for auxiliary machinery. Each unit consists of a 300-horsepower turbine running at 3600 revolutions per minute, driving a 150-kilowatt generator through reduction gears made by the Poole Engineering & Machine Company, Baltimore, Maryland, at 1200 revolutions per minute. The generators are rated at 600 amperes and 250 volts.

The main switchboard, supplied by the General Electric Company, contains one main control panel and three exciter panels with seven power circuits.

A one-half kilowatt, 2500 revolutions per minute motor generator set made by the Holtzer-Cabot Electric Company, Boston, Massachusetts, has been fitted on the upper deck for supplying current to the wireless at 120 volts and 500 cycles. A spare steam driven lighting set is installed in the main engine room. The set consists of a 50-kilowatt, 3600 revolutions per minute, 2-stage General Electric condensing turbine, driving a 4-pole, compound wound interpole machine at 3600 revolutions per minute, which generates current at 400 amperes and 125 volts.

An emergency lighting set driven by a four-cylinder gasoline engine built by the Universal Motor Company, Oshkosh, Wisconsin, is located on the upper deck. The generator for this set is a two-wire, eight-pole, compound wound machine, manufactured by Kurtz & Root, Appleton, Wisconsin. The speed of the unit is 1150 revolutions per minute. It generates current at 110 volts and thirty-seven amperes.

Propeller of the Cuba

The vessel is supplied with a built-up type propeller with a cast iron hub and four manganese bronze blades. The characteristics of the wheel are as follows:

Diameter, 15 feet; pitch, 18 feet 9 inches; projected area, 52.32 square feet; developed area, 70.06 square feet; disk area, 176.71 square feet; projected area divided by disk area, 0.296; developed area divided by disk area, 0.396.

The propeller was supplied by the Columbian Bronze Corporation and was balanced to within two pounds. The blades are arranged for a variable pitch of six inches.

Lifeboat Equipment

The lifeboats are of the American Balsa standard type and comprise two 20-foot metallic lifeboats, six 24-foot standard metallic lifeboats and two 24-foot Lundin boats.

Handling Equipment

The deck machinery has been supplied by the American Engineering Company of Philadelphia, and comprises an electrical capstan, driven by an enclosed motor of the General Electric make. The steering gear is the well known American Engineering steam and hand control, with a steam drive through a worm gear. The steering engine has two cylinders of 7 inches diameter and 7 inches stroke.

The anchor windlass is of the spur gear type capable of lifting the bower anchors of 5110 pounds each. There is a deck winch fitted for taking care of the refrigerated cargo. This winch is electrically driven.

Two eight-ton Brunswick refrigerating machines are installed on the deck forward.

NEW SHOP FOR RADIO SPECIALTIES

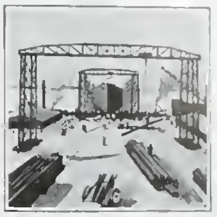
WITH the perfection of the radio telephones has come an increase in demand for delicate electrical instruments. Apparatus for measuring the most minute currents which formerly was not to be found outside of scientific laboratories has become an every - day necessity. This demand is being met by the Western Electric Company, the oldest manufacturers of telephone equipment in the world, by the establishment of a factory at Philadelphia where what are known as precision products will be made. The new shop is located at 1601 Glenwood Avenue, Philadelphia.

Precision products is a term for electrical instruments of extreme sensitiveness. For example, the new shop will manufacture a thermionic manometer. As nearly as it is possible to explain the contraption to any ordinary human being unencumbered with a scientific education, it is a device for measuring the amount of nothing inside of something full of emptiness. It is said to be capable of measuring a vacuum of one-hundred-thousandth of a millimeter of mercury, which comes so near to being airless that it would make the inside of an incandescent light bulb seem as drafty as a suit of beevedes in a blizzard.

Another object upon which the new shop will concentrate is the vacuum thermocouple for measuring very small currents. The householder of today is used to the meter which measures in watts the electricity he uses. Let him try and imagine the sensitiveness of the thermo couple which measures the same currents by one-ten-thousandths of a watt.

The new instrument shop is located near the North Philadelphia station of the Pennsylvania Railroad. It occupies a four-story building containing about 60,000 square feet of floor space. The personnel will consist of about 900 employes, many of whom have been drafted from the Western Electric works at Chicago because of their expertness in instrument making. D. A. Wallace, formerly chief draughtsman at the Chicago factory, is assistant superintendent of the new shop stationed at Philedalphia, while F. W. Willard, the new plant's superintendent, will continue to be located at the Hawthorne works.

Material Handling



CHECKING THE PASSING BUCK

By HARWOOD FROST

A POPULAR realization of our deficiencies in methods of transporting and handling goods is causing the men concerned with handling and transportation problems to consider means of instituting more efficient, and consequently more economical, methods.

The subject was brought up at the annual meeting of the American Association of Port Authorities, held in Chicago during the first week of October, in connection with the handling of goods through our marine terminals, and the relation of the cost of this handling to general business welfare.

It is generally recognized that in the handling of loose flowing bulk materials such as grain, ore, etc., our American terminals are the best equipped in the world, but, unfortunately, for the handling of packed goods, the same cannot be said.

At both railway and marine terminals there is a lack of knowledge of mechanical material-handling appliances. Further, operators about the terminals, from the man who pushes the truck up, in many cases, to the executive in charge, have shown a lack of appreciation of the far-reaching effects of their work. Very few have given serious consideration to the close relation that exists between the operation of the port and the general public—the millions of consumers of commodities far and beyond the narrow limit of the port itself and its adjacent territory, and yet there is no other industry the operations of which have such a marked effect on the "high cost of living" and the cost of production. The cost of commodities is largely influenced, and in some cases actually governed, by the cost of transportation, and in this cost of transportation the most serious item is the expense of handling goods in storage and in transfer through the railway and marine terminals.

As a simple example of this, it is authoritatively stated that the waste caused by idleness of motor trucks at terminal points due to inefficient loading and unloading methods and congestion, is over $250,000,000 a year. This one item of waste multiplied by our middleman method of distribution places on the consumers of the goods handled a burden of a billion or more dollars that can be greatly reduced by efficient machinery and methods.

The handling of commodities is a purely non-productive expense. No amount of trucking, piling, loading or other shifting of goods from one point to another adds one iota to their intrinsic value.

So, in the handling of the millions and the hundreds of millions of tons of miscellaneous freight that pass through our terminals, wasteful methods add to the burden of the consumer, while quick and efficient methods reduce the burden. There are men, many holding high places in business, who do not understand this. They say they are not interested in the terminal affairs of New York, New Orleans, Seattle or others of our ports; but whether they are interested or not, they are affected by each one of these ports in the price of their food, clothing and other necessities and comforts of life. They readily accept an increase in the price of commodities said to be due to the increase of labor costs or freight rates, but they do not seem to realize that anything that affects handling costs at the large terminals becomes a matter of direct concern to them.

Whenever the cost of any single element of transportation, such as unloading of boats, piling for storage, or loading of trucks, rises above a fair normal level, it becomes a tax on business generally, which the ultimate consumer must pay. Prices of commodities can be materially reduced by the substitution, wherever possible, of machines for men in the handling of these goods at terminal points.

Each terminal presents its own individual problem, and to successfully meet this problem requires a combination of mechanical, electrical and certain specialized knowledge and some practical experience, as well as a creative faculty. In order to give our ports efficient merchandise-handling installations, there should be a combination of machinery properly co-ordinated for the progressive and forward movement of goods from their receipt until their final disposition, so far as the terminal is concerned. Such a system depends for design on many factors, such as local rail and water conditions, insurance and legal regulations, etc.

Every handling problem can be analyzed into a certain definite cycle of operations, and there are on the market machines of various types for the mechanical handling of goods that will meet the needs of all of these different operations. All these various types of equipment have their own individual uses, but they may be also combined to effect wonderful results in quickness and efficiency of handling—cranes can deliver goods on industrial trucks or trailers or directly on conveyors which may, in turn, be combined with tiering machines; gravity carriers may be used in combination with power conveyors or vertical tiering machines or automatic floor-to-floor elevators, to reduce a complicated handling process to a single operation; a boom with a continuous-motion carrier may be built into a traveling bridge or semi-portal type of frame, and many other combinations may be successfully made.

Time or labor can be reduced wherever or whenever more than one or two men are employed in the transfer of material from one point to another, or wherever the physical effect required is greater than one man can perform. If conditions can be improved by the use of machinery, it can be estimated to a fair degree of accuracy how much labor will be required by the proposed new method, and a comparison of this with the old method will give approximately the savings that can be effected.

As to the kind of apparatus best suited for the work, there is today a wide variety of material-handling equipment offered. There are limitations to the economical possibilities of each class, but almost unbelievable results in handling economies can be obtained by the proper synchronization of different kinds of appliances, frequently involving the products of four, six or even more manufacturers. The saving thus effected in the handling costs will in many cases be as high as 80 per cent of the cost of doing the work by manual methods, with a time saving in proportion.

In this country, we have not made extensive use of the crane as in Europe. This has been partially due to the fact that foreign ships which controlled our American traffic previous to the war drew their fires at home ports but kept them up in American ports, thus providing power for the operation of the ships tackle. Furthermore, the crew was usually signed up for the return trip and this labor was available in America, while at home they did not have it. The use of the crane is extending in America and must extend if we expect our American merchant marine to successfully compete with foreign carriers.

The greatest value of industrial trucks and trailers lies in their use in conjunction with other appliances. The small platform lifting truck is coming into extensive use in industrial plants and in general warehouses, and it has its use in terminal work in conjunction with other equipment.

The most common means of horizontal transportation is by the continuous motion conveyor in its various types. The most valued feature of this class of conveyor is its unlimited capacity for the forward movement of goods without waste of time or men, made possible by its continual presentation of an open space to receive goods.

General cargo, as it comes from the ship's hold, is usually of a miscellaneous character, and it is almost invariably necessary to sort it. Such goods are placed on the dock by the crane or the ship's winch and sorted there, or placed directly on trucks, trailers or conveyors, thereby necessitating sorting on the floor before piling. The most serious handicap in overcoming the difficulties involved in sorting is that there is insufficient pier space. Most of our piers are too small in size and too obsolete in design and construction to readily admit of much space for the sorting of freight.

In many terminal warehouses goods are piled over a large area to a height of five, six or eight feet, with an air space above of twenty feet — empty. There is no need of this waste of air space; it is not needed for ventilation, and if used for storage by high piling would save much money and time in trucking goods over the larger area. In hand piling, as ordinarily done, two men are needed for each four-foot level; to pile eight feet, four men are needed; to pile twelve or fourteen feet requires six men or 200 per cent more than to pile four feet, and this percentage of increase is maintained as the pile grows in height. There are mechanical piling machines that elevate goods up to thirty feet at no greater expense than piling by hand to six feet.

The problem of economic handling by mechanical appliances has another phase than that of the available and proper machinery—the human element. At many of our piers the cargo is handled by stevedoring companies which are not interested in time and labor-saving devices. It is supposed that longshoremen are not pleased with mechanical labor-saving devices, but labor has seen that machinery ultimately increases the worker's income, and we now seldom hear of labor opposing its introduction.

This fear of labor trouble following the installation of machinery has been one of the reasons for lack of equipment in our terminals. That objection may be said now to have remedied itself. There are several other objections to the installation of machinery which might be successfully overcome by educational methods. One of the most important reasons for our lack of terminal equipment is the skepticism of managers, foremen and contractors in charge of terminal and warehouse work, which can only be met by well-directed education and impartial and unbiased advice.

Although the problems involved in moving goods are among the most important in all of our industrial activities, it seems that the subject of "transportation," except as it refers to the railroads, is too little appreciated by political leaders or the general public, or even by many of our transportation executives, who seem to think that their service ends with the movement of the freight car or boat. With our terminal problem mastered, however, many of our transportation troubles would pass away.

There is need of a greater understanding of "Transportation"—the link that binds essential activities of production, distribution and consumption—not merely of information regarding railways, cranes or conveyors, shipbuilding or terminals, but of every feature of transportation and its relation to business welfare.

We have, in this country, a great game known as "passing the buck." When our deficiencies are discovered and blame is to be fixed, it generally happens that everybody points his finger at someone else. The buck passes in its circle so swiftly that we become dizzy following it, and finally give up the chase. Whether the blame is fixed or not is immaterial, if remedies are made. The buck has been passed in connection with the mechanical equipment of our terminals; we have blamed our inadequate facilities on labor unions, politics, manufacturers, salesmen and lack of enterprise, but regardless of who or what is to blame, it is evident that action is now being taken to improve conditions, as a result of the severe jolt given us by the war with its tremendous drafts on our manufacturing and labor resources, its congested terminals and transportation difficulties. These war conditions did more than anything else to bring us to a conscious realization of our terminal deficiencies and that in the matter of the utilization of labor-saving, material-handling machinery, we had not kept pace with other countries.

We have now awakaned to our needs in this respect and have appropriated vast sums for the improvement of our harbors, for the construction of new piers and the improvement of old, for the building of terminal warehouses, and for the installation of equipment. Millions will be spent on these improvements—but, unfortunately, millions will also be wasted by incompetent technical advice and improper design of warehouses and handling equipment, unless some action is taken to overcome the lack of knowledge in this particular field of science and shortsightedness of local committees.

We, as a people, have not given much thought to matters connected with maritime trade—the average American looks on a port terminal merely as a lot of wharves and docks—a place where boats land their passengers and freight. But the wharves, piers and warehouses are only details in a general scheme. The complete port terminal system is only a unit in the great transportation machine: its combination of wharves, sheds, warehouses, railway tracks, streets, and all its facilities form a link for the transfer of commodities between land and water carriers. The terminal is in itself a mechanism in which each of its facilities is a detail unit. To be fully efficient, each of these units must be properly co-ordinated with the other units, the whole forming a well-balanced terminal system.

MARINE PILING SURVEY

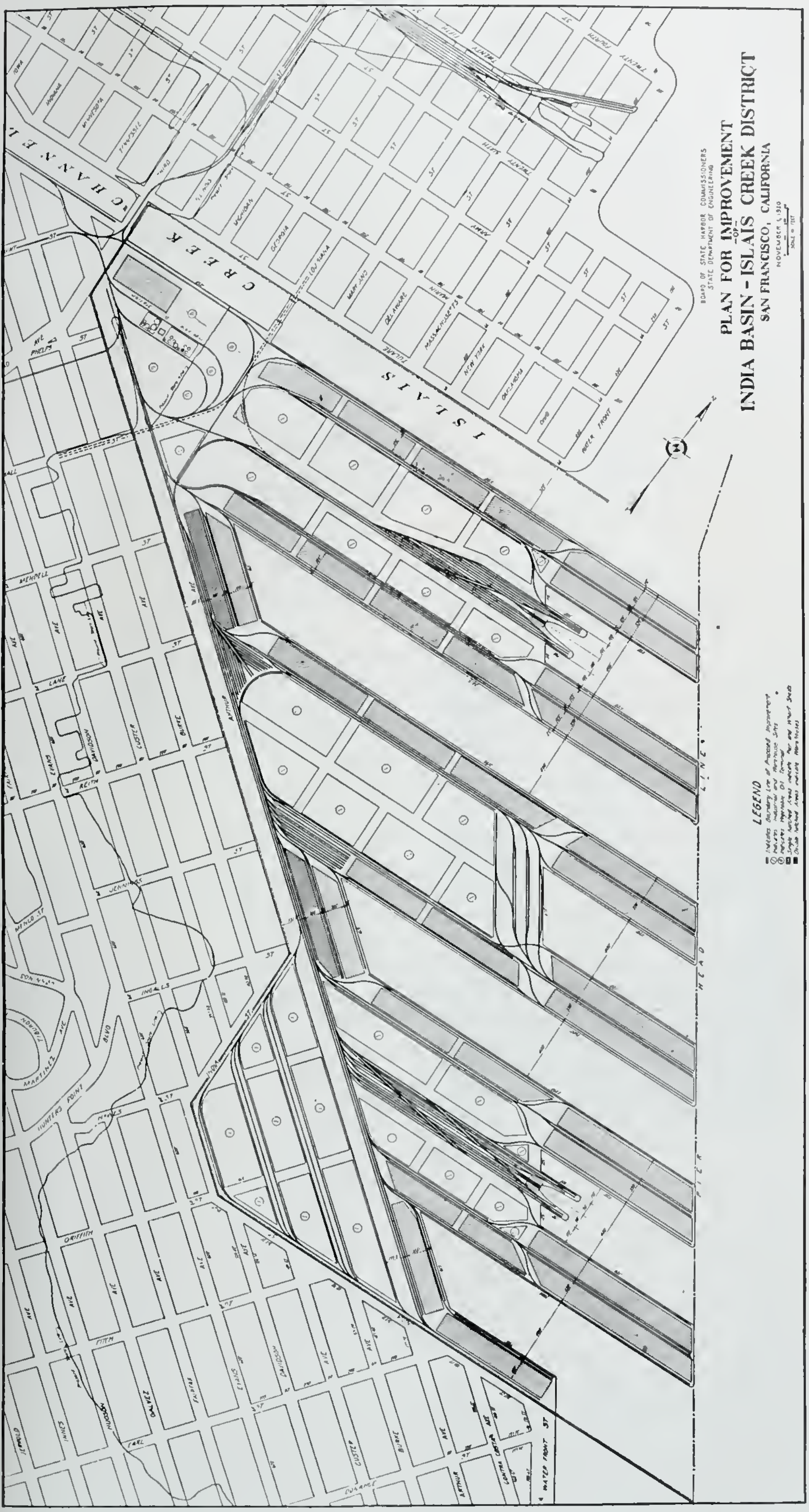
As has previously been announced in these columns during the past two years, a critical emergency has arisen in San Francisco Bay by the enormous increase in damage to waterfront structures from marine borers. This recent damage is most serious in the upper bay, from Mare Island Navy Yard up Carquinez Straits and the lower Sacramento River. A survey of the damage and an investigation looking to the best means of combating the marine borers have been undertaken by the Forest Products Laboratory of the United States Forest Service, in co-operation with the San Francisco Bay Marine Piling Committee of the American Wood Preservers' Association, under the chairmanship of Mr. F. D. Mattos, superintendent of creosoting plants for the Southern Pacific Company. This committee is composed of the engineering representatives of the State Board of Harbor Commissioners, the principal railroads, oil companies and shipping interests having waterfront structures in the bay, and who are financing the investigation, together with representatives of the Army, Navy, United States Engineer Corps, Immigration Commission and Lighthouse Board, and the University of California, the latter through Professor C. A. Kofoid, marine biologist, who is studying the biological aspects of the problem. The Forest Products Laboratory is represented by Mr. George M. Hunt, chief of the section of wood preservation, and Mr. T. G. Townsend, engineer in forest products, who are conducting the survey. The executive officer of the committee, to whom communications may be addressed, is Mr. C. L. Hill, chief of the Office of Forest Products, United States Forest Service, Ferry Building, San Francisco, California. Its fiscal agent is Mr. E. M. Blake, who is also secretary of the committee.

Marine borer attack upon waterfront structures has existed for a long time in San Francisco Bay, due chiefly to limnoria, and to one of the toredo family called xylotrya. From Mare Island up the Sacramento River, however, there has, until within the past three years, been little trouble from marine borers on account of the large volume of fresh water discharged into the bay by the river. A decrease of fresh water flow, caused by several past dry years, and the increasing diversion of irrigation water from the river, has apparently coincided with a new invasion of the **teredo navalis**, which is the species of ship worm that has caused such heavy damage to marine structures all over the world for centuries, but which has not previously been known in San Francisco Bay. This teredo has migrated in great numbers to the upper parts of the bay. There, by reason of the past immunity, were large quantities of untreated wooden piling, and the attacks of the teredo have been so rapid and severe that structures valued at many millions of dollars are already practically destroyed. Docks have been failing, and frequently dropping off into the bay, with accompanying menace to other structures, during the entire year past. The damage, which has been estimated by the committee at $25,000,000 up to the present time, bids fair to greatly exceed that sum in the near future.

This study will be the first unit of a nation-wide investigation under the auspices of the United States Forest Service and co-operating associations of wood preservers, lumbermen, railroads and many other industries having interests at stake, which will cover the entire coastal waters of the continental United States. Its ultimate object will be to find the best possible means of combating these attacks and to increase the effectiveness of the means now employed.

As complete a report as possible is to be prepared by the San Francisco Bay Marine Piling Committee on the findings to date.

PORT DEVELOPMENT PROJECTS ON THE PACIFIC COAST


BOARD OF STATE HARBOR COMMISSIONERS
STATE DEPARTMENT OF ENGINEERING
PLAN FOR IMPROVEMENT
-OF-
INDIA BASIN - ISLAIS CREEK DISTRICT
SAN FRANCISCO, CALIFORNIA
CHANNEL
CREEK
ISLAIS
PIER HEAD LINE
LEGEND

THIS issue of Pacific Marine Review is in the nature of a Pacific Coast ship operators' number, and we are therefore doubly glad to be able to announce in this department that almost universally the port authorities in Pacific Coast ports are looking forward to a period of great expansion in Pacific Ocean trade.

Elsewhere in this issue we publish an illustration showing the new Ballantyne pier at Vancouver, work on which has recently been commenced. This pier, which is to be furnished with the very latest designs in cargo handling machinery, is to cost when finished in the neighborhood of five million dollars. In addition to this work, the British Columbia port is also to be furnished with a fine new pier by the Canadian Pacific Railway, work on which is to commence in the spring.

At Seattle the regular progressive development of the harbor is being carried on by the port commissioners in the completion of the Smith Cove project, while it has been definitely stated that the Skinner & Eddy yards are to be taken over by private corporations and fitted up as first-class terminals.

Tacoma is pushing her new waterfront schemes in Commencement Bay, and even the great lumber port of Grays Harbor has caught the fever, and the port commissioners there are now actively engaged in working out the details of a construction program covering a five-year period. This program calls for the purchase of a suction dredge and the reclaiming thereby of forty acres for industrial sites. The second year's program would cover the dredging of channels opposite Cow Point and below Hoquiam, and the construction of a wharf 700 feet long by 85 feet wide and of a freight shed 500 feet by 114 feet with suitable roadway connections to Aberdeen and Hoquiam. The third year's program continues dredging operations in the channel and the filling of thirty acres additional port-owned property with construction of the necessary bulkheads and some extension to the dock. By the end of the fourth year it is expected that the minimum depth in the channel will be twenty-eight feet and that Grays Harbor will have a lumber dock for loading deep-water vessels second to none on the Pacific Coast.

Portland and Astoria are both actively engaged in the finishing of their great port projects and in the deepening and straightening of the channel in the Columbia River.

It is in San Francisco Bay, however, that the greatest activity in port develment is being manifested. The Board of State Harbor Commissioners controlling the waterfront of the city of San Francisco are now ready to begin work on their great warehouse on Channel Street, architect's drawing for which is shown elsewhere in this issue. In addition to this they have prepared new plans and are soliciting Federal dredging operations for the great projected terminal and industrial sites at Islais Creek.

The illustration herewith shows the plan of these terminals and is especially interesting in showing the trend of terminal design since the first tentative plan for this terminal was submitted to the State Harbor Board in 1917. The main piers in the present plan are double the length and width of those proposed in the first plan with much greater railroad facilities on the pier, while the solid fill inshore ends of the piers have ample space for industrial and storage warehouses with direct connection to deep-sea ships and transcontinental rail. In addition to the industrial sites provided for on the inshore end of each main pier, the reclamation work will make available eight blocks suitable for industrial development.

The piers shown on this plan will provide simultaneous berths for forty-nine steamships, each 500 feet in length and six steamships 300 feet in length. The sheds on the piers are planned so that ample width is provided for the accommodation of the cargo of each vessel in the space opposite its own berth. The area available for warehouse and industrial sites will amount to seventy-three acres, all served by railroad tracks and close to deep water. The solid fill piers as proposed have a width of 1060 feet and vary in length from 1600 to 3000 feet, with two reinforced concrete pile piers extending from the offshore end of each fill to the pierhead line, each of these extensions being 330 feet in width and 1100 feet in length.

The eastern side of San Francisco Bay also presents many projects of port development. The first unit of the Parr Terminal Company's project at the north side of the Southern Pacific Mole in what is known as the Key Route Basin has demonstrated the demand for east shore deep-water terminals and is kept very busy discharging and loading deep-water ships. Undoubtedly this unit will soon be followed by others.

Up the estuary we note the completion of the Standard Coal Company's storage yards and bunkering barges, which should prove of great benefit to shipping in the bay. The storage yards have a capacity of 100,000 tons and are served by a traveling electric gantry overhead with a capacity for loading 100 tons per hour either into the two barges or into ships' bunkers alongside the bulkhead. Each barge has a capacity of 100 tons per hour in its electrically operated bunkering tower, and a fleet of small tugs is available at all times for the towing of these barges to vessels in the stream.

Engineers and manufacturers engaged in the design and construction of cargo-handling machinery and of port facilities should be intensely interested in the present condition of waterfront structures in the upper arm of San Francisco Bay and in Carquinez Straits. It has been conservatively estimated that, due to the inroads of the teredo and other marine borers in the last few years, waterfront structures valued at over $25,000,000 are in imminent danger of collapse. A tremendous amount of work is under way or projected in the substitution of reinforced concrete bulkheads, creosoted piling, and other materials for the untreated piles which have given way under the onslaughts of the borers, and undoubtedly at the present time many owners of these waterfront structures would be open to suggestions for the improvement of their handling machinery through the opportunity for redesigning and realignment while their terminals are undergoing reconstruction.

If the activity on the Pacific Coast in the way of new port development work is any indication of the outlook for the future, foreign traders and ship operators in this part of the United States should feel very much encouraged.

BULK CARGO ELEVATOR

VERY recently there has been placed upon the market in the United States a well-designed, portable machine for the unloading of coal or other bulk material from the railroad cars to stock piles or from stock piles to cars, for the bunkering of ships, unloading of barges, or any other purpose where a self-contained portable mechanism can be advantageously used in place of hand labor. This machine is known as the DeMayo car unloader.

The DeMayo Engineering Corporation has for over fifteen years been designing and installing portable elevators and conveyors for the handling of bulk material. Their elevators have been used in New York harbor by such firms as the International Mercantile Marine for many years and have given eminent satisfaction. These machines also are now in use in various branches of the United States government services and by many of the most prominent coal companies and shipping companies on the Atlantic seaboard.

Coaling U. S. Navy Transport Kilpatrick at Cristobal with a Standard DeMayo conveyor

The elevators built by the DeMayo Engineering Corporation consist of a framework supporting the upper and lower bearings for the drum shafts of a bucket line elevator, which is impelled by gearing driven by a motor at the upper end of the framework. The buckets of the elevator discharge into a telescopic chute which in turn discharges either into the side ports or deck ports of a vessel's bunker spaces or onto the stock piles or into cars, as is necessary. The whole mechanism is arranged to be suspended by the top from either the derrick booms of a vessel or derrick booms on suitable structures ashore. The standard type, which has been in use for fifteen years, is built ordinarily in two sizes; one, 55 feet in height over the frame with a possible radius of 47 feet, measuring from the base of the frame to the point of discharge of the telescopic tube, driven by a 15-horsepower motor, the entire outfit having a weight of eight tons and a capacity of 100 to 125 tons of coal per hour. The other size has a capacity of 75 to 100 tons per hour, a weight of seven tons, and is driven by a 10-horsepower motor. These standard type machines in coaling vessels are used in connection with portable conveyors, also supplied by the DeMayo Engineering Corporation. These are usually an all-steel arrangement and self-contained, being driven by their own motors. These conveyors can be built in any length or style desired and may be made capable of discharging their load at a number of given points along the length. They are equipped with pivoted hinges so that they may be used either as all horizontal conveyors or may have some of their sections elevated to carry the material to any level desired. It has been found in New York harbor that by means of this combination between elevator and conveyor systems the bunker coal is delivered to vessels in approximately 50 per cent of the time and employing from one-quarter to one-third of the men required in bunkering by the hand-labor system.

The new machine, or car unloader type, carries out exactly the same idea as the standard type, but is smaller, lighter and much more practicable for many concerns where the volume of material handled would not warrant the installation of the heavier machine. This type is also made in two sizes. The first has a height of 25 feet, a discharge radius of 19 feet, a weight of 2½ tons, and is driven by a 5-horsepower motor, giving a capacity of 50 tons of coal per hour. The second size has a height of 20 feet, a discharge radius of 14 feet, a weight of 2 tons, the same capacity and motor horsepower as the former.

The operation of these elevators is entirely automatic, the only labor being that required to shift the framework and break down the coal or other material to the elevator. There are no chains, the bucket line consisting of solid steel plates with a steel bucket attachment to each alternate plate. This construction, in conjunction with the drums over which these hinged plate lines run, enables the elevator to dig into the pile of material automatically under its own weight. It is said that this machine has been of very great benefit to large coal dealers in fighting hot spots in their coal piles because it can so readily by its automatic digging excavate a cooling well clear to the bottom of the pile in a very short space of time, thus not only saving the coal in the pile for consumption, but, if promptly applied, saving also the coal in the hot spot.

A 250-TON SHIP CRANE FOR THE UNITED STATES NAVY

By A. F. CASE

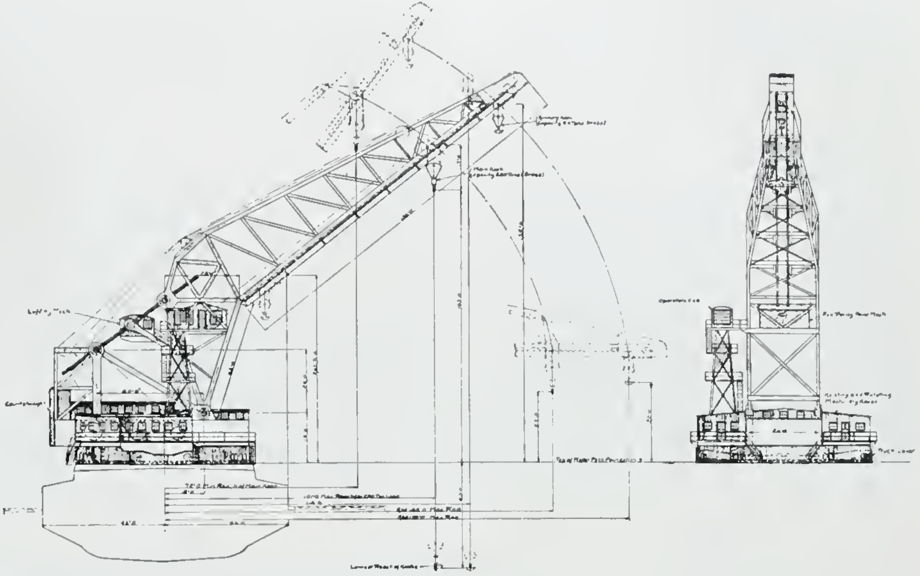
Engineer, Wellman-Seaver-Morgan Company

THE Navy has recently awarded a contract for the construction of a 250-ton revolving crane to be mounted on the hull of the United States battleship Kearsarge. The crane will be so constructed that the crane-ship will be seaworthy, as it is the intention to transport the ship, under its own power, with turrets and guns on board, to any port where the crane service is required. This will be the largest seagoing crane ever constructed.

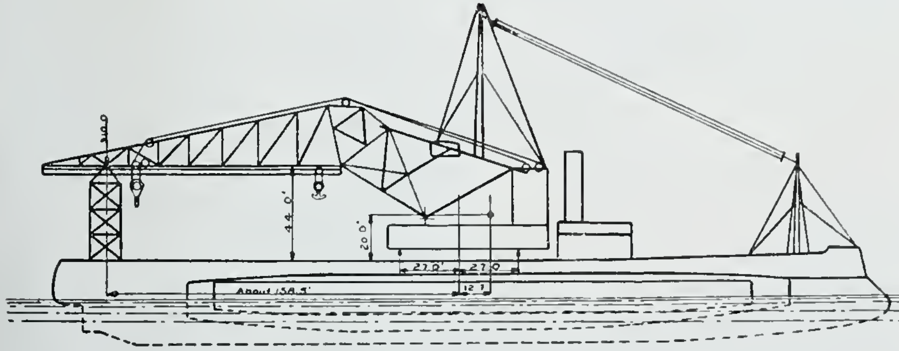
The construction will be under the direction of Rear Admiral D. W. Taylor, chief constructor of the Navy, Bureau of Construction and Repair. The crane proper will be designed, and erected on the Kearsarge at the League Island Navy yard, Philadelphia, by the Wellman-Seaver-Morgan Company of Cleveland, Ohio. All of the work of preparation of the hull to support the crane will be done by the Navy Department.

The battleship Kearsarge, with her sister ship Kentucky, was launched at Newport News, Virginia, on March 24, 1898, and was the first battleship to have superimposed turrets. The length overall is 375 feet, beam 72 feet, draft 23 feet 6 inches, displacement 11,520 tons. Her indicated horsepower was 11,900 and her trial speed was 16.82 knots per hour.

Preparatory to the mounting of the crane, the guns, turrets and armor will be removed, and a circular steel foundation, 60 feet in diameter, will be constructed on the deck. To this foundation the rails for the rotating structure will be secured, for the crane will be of the rotary, hinged jib type. Bulges will also be constructed along each side of the present hull of the Kearsarge to produce additional transverse stability, making a total beam of 92 feet.



End and side elevation of 250-ton Revolving Crane to be mounted on the U. S. B. S. Kearsarge



Crane in Transport Position

Diagrammatic sketch showing jib of crane in position for sea transport

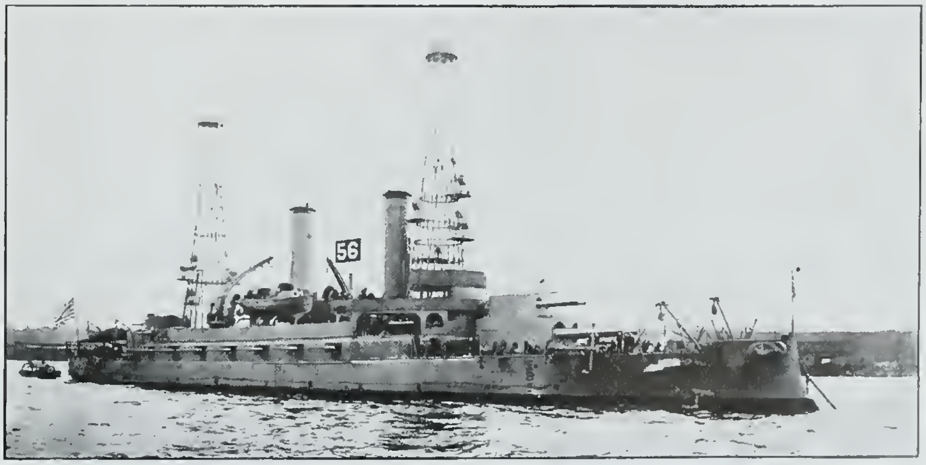
The crane proper will consist of a rotating platform to which the jib will be hinged. The jib will be an enormous structure, even in itself, for it is required to handle its maximum loads at far reaches and great heights. Two main hoist blocks, each having a capacity of 125 tons, will be suspended from the jib, side by side, from sheaves fixed in the structure. A 40-ton auxiliary block will be suspended from a trolley which travels lengthwise of the jib between the main hoists.

An equalizer, with a single hook, will be used to connect the main hoist blocks together when handling the maximum load of 250 tons.

The jib will be capable of luffing in a vertical plane about its hinge pins, this motion being obtained by two massive screws which operate nuts attached to the elbow of the jib and to a steel back frame built up at the back of the rotating platform. The range of these screws is sufficient so that the jib may be luffed to all working positions and also to a position approximately horizontal, when its outer end will rest in a cradle, provided at the after end of the ship, for this sea-going or transport position. After the jib has been lowered into the cradle, the entire rotating structure is locked by means of motor operated wedges, to prevent rotation. A special device will also be arranged so that the screws can be slacked off to allow the jib to rest securely in the cradle.

The rotating platform will rotate about a central pivot located within the circular foundation. A system of equalized trucks, attached to the platform, will travel on heavy rails attached to the foundation. There will be four rings of these rails, located in pairs, four feet apart and having a mean diameter of sixty feet.

Intermediate between the rails a bevel gear ring will be attached to the foundation, and, meshing with this gear, will be two bevel pinions which will be connected to separate driving motors on the rotating platform. These pinions will be diametrically opposite at each



U. S. B. S. Kearsarge

side of the platform so that deflections in the structure under load will not affect the mesh of the teeth.

All of the hoisting and rotating machinery will be carried on the rotating platform, ropes from the drums being led around deflecting sheaves in the back frame and thence to the hoist sheaves in the jib.

The various functions of the crane will be controlled from an operating tower located at the right side of the jib, on the rotating platform. From this station, high above the deck, the operator will hoist or lower the loads hanging on the hook blocks, move the auxiliary trolley in or out on the jib, luff the jib up or down, or rotate the entire crane. There is no manual labor connected with these operations. All of the motors are governed by automatic control and the operator is required only to turn the small handles of his master controllers to make the giant do his bidding.

The back of the rotating platform will be counter-weighted to compensate for the eccentricity of the extreme weights which the crane will handle. For this purpose it is proposed to use about 400 tons of the old armor plate removed from the ship. This will first be placed in position and then imbedded in concrete to secure it in place.

For the operation of the various functions of the crane, direct current at 220 volts will be supplied by a generating plant to be installed in the ship. Leads from this generator will pass through the center pin and terminate in contact rings from which the current will be collected by sliding contact shoes.

The general arrangement and principal dimensions of the crane are shown in the accompanying cut. Each of the main hoist blocks will handle a load of 125 tons at a radius of 101 feet and when connected by the equalizer, the maximum load of 250 tons at the same radius, has a vertical range from 40 feet below the deck to 103 feet above the deck. The minimum radius of the main hoist, with the jib in its highest position, will be 72 feet.

The auxiliary hoist will have a capacity of 40 tons, with a maximum reach of 174 feet horizontally. At a radius of 114 feet the vertical range will be from 40 feet below to 135 feet above the crane foundation. This hoist will operate at full load with the jib in any position.

It is interesting to note that the outer end of the jib, when in its highest position, is about 190 feet above the water, and with the jib in its lowest position the extreme end is 102 feet beyond the side of the ship.

The operating speeds of the different functions of the crane will be as follows:

Main hoist, full load	6 f.p.m.
Main hoist, no load	10 f.p.m.
Auxiliary hoist, full load	14 f.p.m.
Auxiliary hoist, no load	30 f.p.m.
Auxiliary trolley, jib up, full load	20 f.p.m.
Auxiliary trolley, jib up, no load	35 f.p.m.
Auxiliary trolley, jib down	50 f.p.m.
Rotating, full load, one revolution	12 min.
Luffing, extreme positions	20 min.

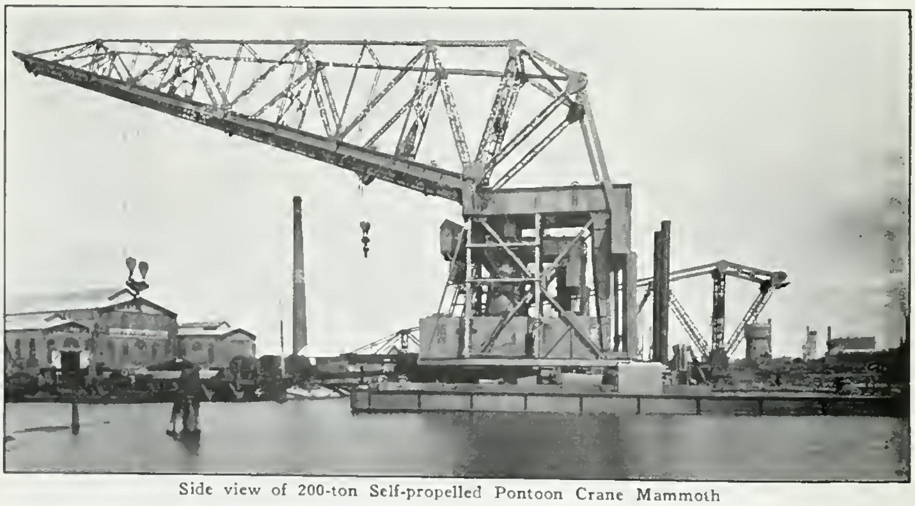
Identical motors will be used for all operations of the crane. They will be of enclosed mill type, series wound, and will have a rating of 110 horsepower for one-half hour. Eight of these motors, forming the power equipment of the crane, will be distributed; one to each of the main hoists, one to the auxiliary hoist, one to the auxiliary trolley, two to the rotating and two to the luffing mechanisms. An electrically operated disk brake will be applied to each motor, so arranged as to set when the current is cut off. Flexible couplings will be used to connect the motors to their pinions.

The motor with its flexible coupling, pinion, brake and bearings, is mounted on a cast bed plate to form a standard power unit, which will be identical for each of the mechanisms. The motor pinions and their gears will be of herringbone type, with teeth ground and hardened.

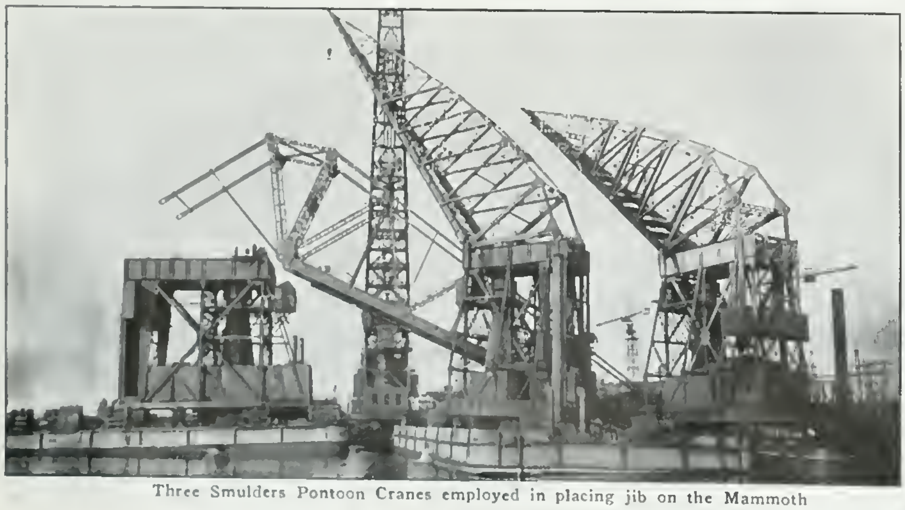
HUGE PONTOON CRANE

OUR three illustrations show the self-propelled 200-ton pontoon crane Mammoth, built by the Gusto Works of the A. F. Smulders Corporation, Scheidam, Holland, for the Mersey Docks and Harbor Board of Liverpool, England.

This crane was delivered and tested during September, 1920, and is giving eminent satisfaction. It will handle easily a weight of 200 tons to a height of 170 feet above the water line on a circle with a radius of 110 feet and will handle 150 tons to the same height on a circle of 143 feet radius. The pontoon is self-propelling.



Side view of 200-ton Self-propelled Pontoon Crane Mammoth



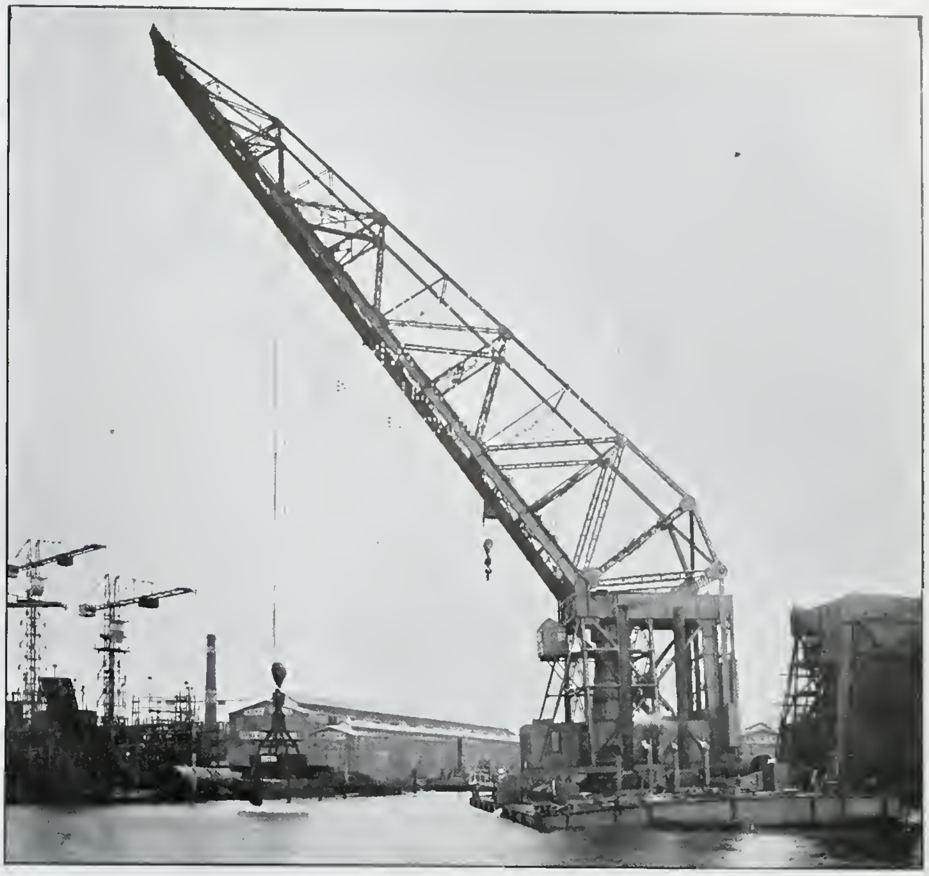
Three Smulders Pontoon Cranes employed in placing jib on the Mammoth

The crane rests on a tower about 66 feet high which is strongly secured to the structure of the pontoon. This tower is a truncated cone and carries the bearings for the framework of the crane which revolves upon it. The lower platform of the framework carries the winch room, which is 23 feet wide by 65 feet long. This room contains all of the motors for working the various motions of the crane. Ten electric motors are used, and they are all controlled by one man, the control being by the Ward-Leonard system. Electric current for driving these motors is supplied by dynamos driven by a set of triple expansion engines which are located in the pontoon, current being supplied to the winch room through slip rings and brushes on the outside of the upper end of the tower.

By means of a clutch the engines can be coupled to the propeller shafts and the pontoon driven at an average speed of 4.85 miles per hour. An auxiliary engine and dynamo provide electric light for the pontoon and crane.

The deck machinery consists of windlass and four capstans driven by steam engines. The steering engine is also driven by steam. Only three men are required for operating this crane, namely, the engine driver, deck hand, and crane driver. There are two sets of blocks and hooks for lifting 100 tons each, and two sets of blocks and hooks for 30 tons each. Each of the hooks can be lowered or hoisted independently or they can be coupled in pairs with a balance to lift 60 tons or 200 tons. The speed of hoisting on trial was five feet per minute for the 200 tons and eighteen feet per minute for the 60 tons. The total weight of the jib itself is about 280 tons. It is supported on two horizontal pins at the foot of the upper platform and by two links connected to the movable counterweight on the vertical worm shaft at the back of the winch room. This counterweight is moved by means of the worm shafts between vertical guides and serves to partly balance the weight of the jib. The entire crane was towed from Schiedam to Liverpool without dismounting the jib, which shows the seaworthiness of the structure.

The A. F. Smulders Corporation have under construction a number of these pontoon cranes for port authorities in various European ports, among others being one, the pontoon for which was recently launched and which is to be delivered in the near future to the port of Manchester, England.



The Mammoth with test load

NEW ASANO DOCKS

TWO new graving drydocks will be completed during the year 1921 at the yard of the Asano Shipbuilding Company, situated at Tsurumi, near Yokohama, says an announcement received in America from Japan. Both probably will be placed in operation during the last quarter of the year.

Their dimensions in feet will be as follows:

	No. 1	No. 2
Length	650	530
Breadth	85	65
Depth of water on sill	35	23

Largest on Tokyo Bay

No. 1 dock of the Asano yard will be the largest on Tokyo Bay open to merchant shipping, and will be longer than Nos. 1, 2, 3 and 4 of the Yokosuka yard, but will be surpassed by Yokosuka No. 5. Inasmuch as the naval docks cannot be used by merchant vessels, however, the new Asano dock will have first place, and will be the first having sufficient water over the sill for the largest trans-Pacific steamships in a loaded condition. Heretofore the greatest depth over the sill has been the 28-foot No. 1 dock, Yokohama Dock Company.

These new docks will be noteworthy additions to the facilities of Tokyo Bay and should assist greatly in obtaining for that section of Japan its proper share of repair work in competition with the Kobe and Nagasaki districts, which have the great Mitsubishi and Kawasaki yards and repair plants.

Surpasses Yokohama Docks

No. 1 dock of the Asano yard will be larger than any of the three of the Yokohama Dock Company, and No. 2 Asano will surpass the two smaller Yokohama docks. The dimensions of the three Yokohama docks are:

	No. 1	No. 2	No. 3
Length	625	380	480
Breadth	80	50	63
Depth of water on sill	28	26	21½

At the Uraga yard there are the following docks:

	Main Yd.	Br. Yd.
Length	500	459
Breadth	70	66
Depth of water on sill	27	25

A comparison of these tables shows that the larger of the two new Asano docks will surpass any private facility on Tokyo Bay, especially as regards depth of water on the sill, which is adequate for any merchant vessel now plying in trans-Pacific trade and for any vessel that is likely to be seen for several years, in view of the shallow water of most Eastern harbors. Tentative plans for the new Asano docks, as drawn last year, provided for No. 1 to be longer but to have less water over the sill; No. 2 has been made materially larger than as first planned.

Engine Works Building

Engine works also are under construction at the Asano yard; boiler works, equipped for constructing land and marine boilers of all sizes, both firetube and watertube, already are in operation; and the shipbuilding plant recently took over the Asano steel works, situated a few hundred yards' distant, and increased its capital to yen 50,000,000, or $25,000,000. This steel mill rolls ordinarily mild and high-tension steel plates up to 40 feet in length, 8 feet wide and 1½ inches thick.

For building vessels the Asano yard is well equipped, having ten concrete building berths, two of which are 625 feet long; six, 600 feet long; and two, 300 feet long, for the construction of naval and merchant vessels up to 30,000 tons. Fixed tower and floating cranes, besides smaller traveling and locomotive cranes, serve the yard.

Two for U. S. S. B.

The largest vessels constructed for the United States Shipping Board in Japan, the Eastern Merchant and Eastern Trader, both of approximately 13,000 tons deadweight, were built by the Asano yard. Such was the character of the work that the representatives of the Shipping Board in Japan were outspoken in their praise of the steamers, which were rated as among the best of the thirty ordered under the exchange agreement of steel for ships. These two vessels were of the standard Asano C type, a description of which is: twin - screw; shelter - deck; length, 445 feet; beam, 58 feet; draft, about 30 feet 4 inches; gross tonnage, about 8100; deadweight, about 12,900; sea speed, 11 knots. The B type, the other standard vessel built by the yard, is: single-screw; length, 400 feet; beam, 53 feet; draft, about 25 feet 9 inches; gross tonnage, about 5500; deadweight tonnage, about 8750; sea speed, 10½ knots.

Soichiro Asano, president of the Toyo Kisen Kaisha, is president of the Asano Shipbuilding Company. K. Kageyama is manager.

EUROPEAN MARINE DEVELOPMENTS

Special Correspondence of Pacific Marine Review

THE national coal strike, which fortunately ran its course in the brief period of less than three weeks, exercised a very malignant effect upon shipping. Besides the direct effect of the strike, there was the government order forbidding all export of coal while the strike lasted, and places like Newport, South Wales, felt this very badly. Things are getting right again, with the pits in full working order, but until the needs of home industries are fully met there will be idle shipping. Two days after the strike became effective there were fifty-one vessels, aggregating 103,000 tons, recorded as "lying up, repairing, bunkering, etc.," in the port of London. A week later the number of vessels so described had increased to eighty-two, of an aggregate tonnage of 141,000. This figure certainly suggests an abnormal condition, although it is asserted that a number of ships requiring overhaul have found in the strike period a convenient opportunity for the work.

Shipbuilding Revival

Optimists for British shipbuilding were very considerably bucked up when the Lloyd's shipbuilding figures for the quarter ended September 30 last were published. They show that during the last eighteen months—that is, since the close of the March quarter of 1919, tonnage under construction in the United Kingdom has increased from 2,524,845 to the present "record" total of 3,731,098, an increase of over 65 per cent. The great strides made during the late months by British shipyards towards regaining their old position as merchant shipbuilders is shown in the following table, which compares the tonnage of merchant shipbuilding in the world at the end of June, 1914, the last available return prior to the outbreak of war, with the tonnage building at the end of September:

	June, '14 Tons	Sept., '20 Tons
United Kingdom	1,722,124	3,731,098
Abroad	1,440,766	3,834,073

These returns do not include any war ship work, and it should be noted in regard to the total building abroad that complete totals are not yet available for Germany and therefore no figures are shown for that country.

As to the individual tonnage of the vessels building in the United Kingdom, the returns show a tendency towards increasing size. There are now building 229 vessels of 6000 tons and upwards as compared with 151 of similar size at the end of September, 1919. Vessels of 10,000 tons and upwards now building amount to sixty-four.

Rejuvenated Windjammers

One way of turning old sailing ships to profitable account has been hit on by a North of England firm of shipowners. Some time ago they purchased the 25-year-old steel barkentine Renfield, which has now been fitted with twin marine oil engines of the Vickers-Petters type, each of 220 horsepower. In addition to the daily service tanks, she carries about sixty tons of oil in the double bottom, and this is sufficient to enable her to make five round voyages from the Nortseast coast to North France ports, bunkering being necessary only once every four or five weeks. The owners estimate that in converting a sailing ship in this way they save 50 per cent of the cost of building a 2000-ton steamer, while they claim that the Renfield is in every way equal to a coasting steamer with the addition to her sail power; sails are used whenever the wind serves. The firm have another windjammer being fitted with oil engines, together with the paddle cable-laying steamer Lady Carmichael, built on the Clyde as far back as 1871. The latter will be driven by two Vickers-Petters engines of 152 b. h. p. each, giving her a sea speed of about 10½ knots loaded.

French State Shipowning

The liquidation of the fleet of merchant vessels owned by the French government is one result of the energetic campaign that has been carried out for many months past against the state working of mercantile ships. While the government had necessarily to take over a considerable number of vessels in order to ensure supplies of foodstuffs during the war, it was expected that on the termination of hostilities the state would hasten to dispose of its fleet, but to the surprise of many the merchant service was extended and developed, and there seemed a probability of the state engaging actively in the sea-borne traffic and embarking upon the construction of merchant vessels in the arsenals. Objections to the state ownership of a merchant fleet were based largely upon extravagance in management. As figures could not be kept secret, it soon became evident that the expenditure upon the merchant fleet was growing so rapidly, without a corresponding gain in money-earning capacity, that the enterprise, if continued long enough, could only end in disaster. Eventually, the under-secretary of state for the merchant marine secured authority from parliament to sell the fleet, consisting of not far short of a million tons of shipping. Unfortunately the most favorable time for the disposal of this shipping has been lost, and steps are now being taken to liquidate the fleet under the best conditions possible. Colliers, of which the state owns more than a million tons, are not included, and the coal-carrying trade will doubtless remain partly in the hands of the state till the situation becomes normal.

Sale of German Ships

One aspect of the sale of ex-German steamers which has not hitherto been touched upon, although it must have been all the time apparent, is that shipbuilders in this and neighboring countries have not viewed with equanimity the reinforcing of fleets by ex-German tonnage at a time when, from various causes, the tendency all over the world is to reduce the rate of ship production. High prices and difficulties of monetary exchange have arrested international trade, and thereby denied profitable employment to many thousands of tons of cargo space, with the result that in some cases the loss of laying up a ship would have been less than the loss incurred by running her. This particularly applies to liners; but if such ships are to be justified of their name, their owners must continue to run them. It is an open secret, declares a writer in the London Times, that while steamship passenger traffic was never so brisk as at present it was never so little profitable. Clearly the success of Lord Inchcape's undertaking must to some extent depend on the optimism of owners; and it says much for the vitality of the industry that, in face of existing conditions, so many of the ex-enemy steamers have found and are finding purchasers. Meantime the shipyards must perforce await the absorption of the reparation tonnage, and, what is a much more potent factor—a revival of British export trade before they can hope to compile a list of orders which will promise unabated activity when orders now on hand shall have been completed.

Cunarders' Experiment

The Cunard Line has just converted the Saxonia (14,000 tons) into a two-class ship, with the result that travelers can now book from London to New York for $114.60 instead of about $240, the average first-class rate (taking the exchange at four dollars to the pound sterling). A passage on the Imperator to New York is now $248; on the Caronia (20,000 tons) it is $207.60. But the Cunard Line has just put the Saxonia on the service from London to New York with passage fees which strike quite a new note in world travel. With the Caronia she forms the new fortnightly service from London to New York—the largest liners to sail from the Thames. The Saxonia represents a remarkably interesting experiment in world travel today. She has been entirely rebuilt inside. Instead of having first, second and third-class passengers, the first and second-class have now been merged into one, the "cabin" class. There is now a first and third-class only, the latter fare to New York being only $73.80, a remarkably low figure for such comfortable accommodation.

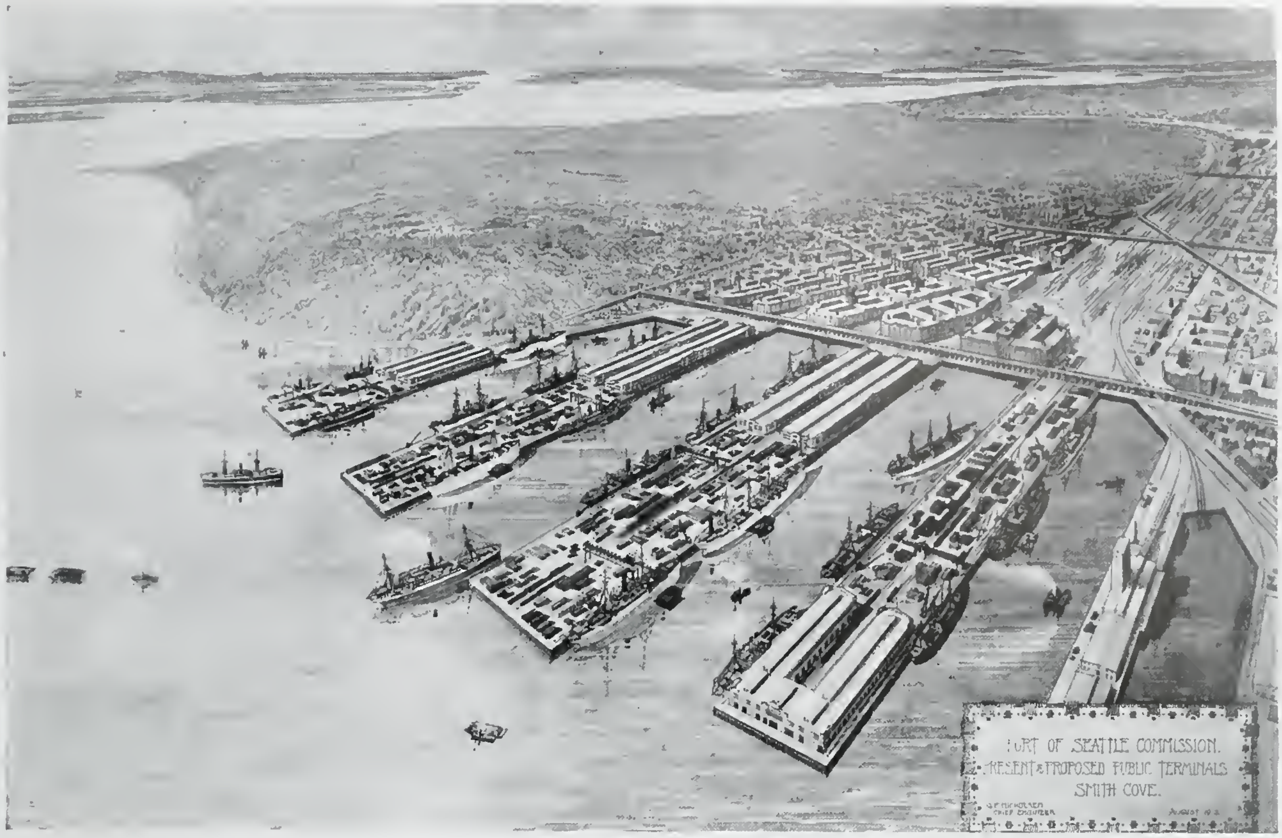
Passenger Accommodations

A comprehensive scheme has been carried out. The ship has been repainted, redecorated, refurnished, throughout; new public rooms have been built; the staterooms have been remodeled; the latest scientific ventilation and sanitary systems have been installed; the kitchens and bakery have been replanned and fitted with the most modern apparatus; and the engines, boilers and hull have been thoroughly overhauled. As only the two classes of passengers are carried, the accommodation available for each is unusually extensive and complete.

Four big public rooms are provided for the 500 cabin passengers—the smoking room, with its atmosphere of restfulness and relaxation; the white drawing room, with mahogany furniture and upholstered settees and chairs; the new lounge, one of the most popular rooms on modern Cunarders, with its oak-tiled floor; and the large new dining room, with the modern small tables to seat small parties of friends. The cabin staterooms are large and airy; those on "B" deck look out direct on to the promenade deck.

It is certain that the third-class passengers will be more than pleased with their quarters, the whole of which have been reconstructed. A series of large cabins, with comfortable spring beds, and up-to-date toilet arrangements, will appeal greatly. The new dining room and lounge are designed for quick service and comfort. For both classes of passengers there is ample deck space, open and covered.

NEW PIER AT SEATTLE


PORT OF SEATTLE COMMISSION.
PRESENT & PROPOSED PUBLIC TERMINALS
SMITH COVE.
CHIEF ENGINEER

Birdseye view of present and proposed terminal facilities at Smith's Cove, Seattle. Pier "B" is the second large pier from the right

THE Port of Seattle's new Smith's Cove Terminal Pier "B" is completed, and the fact that the Port of Seattle has made arrangements with two of the largest steamship companies on the Pacific Coact for the use of this terminal shows the need of such a facility.

This pier is 367 feet wide and 2580 feet long, only lacking 60 feet of being a half mile. It is the largest commercial pier in the world, even surpassing in square foot area the huge Chicago municipal pier, which is 3000 feet long.

This pier will have two transit sheds, 130 feet wide by 1000 feet long at the street end, the outer section of the pier being uncovered and given over for the handling of export freight. The north 500 feet of the east transit shed has been finished, and as the construction crew were leaving the work, the Horaisan Maru began discharging 10,000 tons of cargo, consisting of nitrates, sugar, etc., into the transit shed for transshipment. Construction has started on the north 500 feet of the west transit shed, which will be ready for operation about March 1, 1921.

One of the outstanding features in connection with the equipment of this pier is the amount of railroad trackage, there being approximately four and one-miles of trackage, consisting of two shipside tracks on outer sides of pier, together with four depressed tracks in the center, with numerous cross-overs in order to facilitate switching. It was decided to install this great amount of trackage since very satisfactory results have been obtained in the operation of the similar Smiths Cove Pier "A," which has three and one-half miles of railroad trackage.

The Port of Seattle have made satisfactory arrangements with the Pacific Steamship Company, the largest American steamship company on the Pacific Coast, and the Nippon Yusen Kaisha Steamship Company, the largest Japanese steamship company entering Puget Sound, for the use of Pier "B," the former being given preferential right for the use of the east side of the pier, while the latter has been given preferential right for the use of the west side of the pier. It is understood, of course, that when the ship berths and storage space are not used by either of these companies, the Port Commission will have the right to berth other ships and use storage space as required in order to place the terminal in maximum use.

Elaborate passenger accommodations and baggage inspection rooms are to be installed on the second floor at the street end of each shed for the accommodation of trans-Pacific passanger traffic. A large, commodious waiting room will be located on the water side of the second floor of each shed, this location being an ideal one from a fire hazard standpoint, besides giving the passengers easy access to the street. Just opposite and on the other side of the shed will be located the baggage inspection room, thus making it very convenient for the passengers.

Along the face of the pier, portable adjustable ramps will be provided, allowing the passengers to leave the ship and enter the second floor in close proximity to the waiting and baggage rooms on an easy grade and without crossing any railroad tracks on the same level. The portable ramps will be made adjustable for any stage of the tide and will be electrically operated, making their operation simple and economical. Overhead bridges will be installed connecting the second floor of transit sheds with the overhead Garfield Street viaduct, enabling passengers to reach the street on the same grade, avoiding congestion of railroad and vehicular traffic on the lower floor from the time they leave the ship until they reach the street car line, taxi cabs or waiting automobiles on West Garfield Street.

Since the Oriental passenger boats also carry a large amount of freight, Smiths Cove Pier "B" will be most suitable for this class of business, since the import cargoes can be discharged and stored in the shed at the same time the passengers are leaving. To expedite the handling of this freight in the shed, a great variety of light handling equipment will be furnished. After the ship has discharged her passengers and her import cargo, she can then be warped along the pier to the large open wharf to take on her export cargo. Again, on the open wharf, a great variety of heavy handling mechanical equipment will be provided to expedite the loading of these vessels.

SUPERHEATED STEAM

SINCE the great bulk of the world's merchant marine fleets is steam-driven, it naturally follows that any economies which may be effected in the use of steam on shipboard will be for a long time to come of great interest to the ship operator and the marine engineer. Among all of the various methods which have been used to produce greater economy possibly none has more far-reaching possibilities than the propert use of superheaters in connection with steam boilers.

The factors which govern the saving effected by superheating lie in the increased capacity of the boiler plant and the decreased consumption of steam by the prime mover. These factors have been attested by numerous tests in plants ashore and afloat. One such test was made very carefully on the steam yacht Idalia and recorded in the Journal of the American Society of Naval Engineers in November, 1909.

This yacht was powered with a 4-cylinder triple expansion engine of 500 normal indicated horsepower, steam being supplied by a Babcock & Wilcox boiler equipped with Babcock & Wilcox superheater. The superheating was carried through a series of tests arranged in four steps. The first was with no degrees superheat, or saturated steam, and showed a water consumption of 18.3 lbs. per i.h.p. The next step carried superheating to 57 degrees and showed a water consumption of 17 lbs. per i.h.p. The next step was at 88 degrees superheat with 15.8 lbs. of water per i.h.p., and so on up to 105 degrees superheat, where the water consumption was 15.5 or a saving of 15.3 per cent. Under higher superheats and with quadruple expansion engines the savings are still greater, and with large turbine installations mechanical engineers are giving much attention to the possibilities of great savings by the use of very high steam pressures and superheats running up as high as 600 degrees.

While superheating is almost as old as the use of steam and Watt himself worked assiduously to find a satisfactory method to utilize superheating, it has only been during the last twenty-five years that it has come very generally into use, and the present tendency in all steam engineering is to increase as much as practicable the degree of superheat. Practically all of the high powered locomotives throughout the world use high degrees of superheat, many of them using 700 degrees in the steam chest, while in French practice this is carried up to 800 degrees. When we consider that many of these locomotives have cylinders ranging up to twenty-nine inches in diameter and that they operate at piston speeds of 1500 feet per minute, some of them with indicated horse powers above 3000, we must acknowledge that the success of high degree superheat in this field gives ample ground for the adoption of the same sort of practice in marine work. As a matter of fact, a very great number of ships have been fitted with superheaters and are operating at superheats in excess of 200 degrees.

Many reliable superheating appartus have been developed both for stationary, railway and marine work. The Babcock & Wilcox superheater has already been mentioned in citing the tests on the Idalia. The Foster superheater and the Locomotive superheater are two others of the notable American forms. Several forms of superheaters also have been gotten out by British designers, such as the well known Yarrow and Thornycroft patterns.

In the early stages of superheater design the principal difficulties that the engineers labored with were in the lack of suitable materials for superheater construction or suitable designs for various engine parts. In using superheat, steam pipes, top valves and fittings should contain no copper or brass, and some government regulations also prohibit cast iron and malleable iron. Also, of course, in carrying superheated steam, steam pipes and flanges should be especially well insulated. Wherever the degree of superheat is sufficient to eliminate condensation in the cylinder the high pressure valves should be of the piston type with rings, as they will be found much more satisfactory in operation than slide valves even of the balanced type, and on the intermediate steam chest of triple and quadruple engines and the low pressure chest of compound engines, piston valves are desirable. Engine cylinders and cylinder liners for superheat work should be of the highest class close-grained cast iron as hard as that material can be worked.

In designing reciprocating engines for use with superheated steam it has come to be good practice in Europe to lower the cylinder ratio, which is accomplished by increasing the diameter of the high pressure cylinder in triple expansion and in quadruple engines by increasing the high and first interemdiate pressure cylinders. Of course, in converting a job to superheated steam it is not always possible to increase the diameter of the high pressure cylinder, and in such cases the same result may be obtained by increasing the cut off giving a greater volume of steam and thus in effect decreasing the cylinder ratio. The expansion curve of superheated steam falls more rapidly than that of saturated steam, and at the higher pressures in order to get equal power it is necessary to decrease the cylinder ratio. At 200 degrees superheat this increased volume of steam would be about 10 per cent. This, however, does not increase the weight of steam used per stroke since at this degree of superheat this greater volume would weigh 30 per cent less per unit of volume than would saturated steam, and there would still be a considerable margin of saving in steam economy in favor of the superheat.

There is still in the minds of many of the older marine engineers a prejudice against superheating, due to injudicious application of superheating apparatus without proper conversion of the prime mover or the connections between the prime mover and the boiler. The difficulties experienced by these injudicious installations are under two classes: Those experienced in starting up and those due to faulty lubrication.

Practically all superheater manufacturers recommend starting with saturated steam until the engines are well heated, and a mixing pipe with proper valve connections is always provided for this purpose. After the engines are well heated the mixing pipe valve is gradually closed and the temperature in the high pressure chest gradually raised. Any citizen who has had experience starting his flivver on a cold morning will appreciate this point.

Lubrication is the point most prominently brought forward by all those prejudiced against superheating practice. With ordinary saturated steam in reciprocating engines the moisture in the steam is depended upon for lubrication in the steam cylinders, and several cases are on record where injudicious application of superehat in reciprocating engines has caused scoring in the cylinders and various other troubles, and the superehating apparatus has been thrown out in consequence. With low superheat, which does little more than eliminate a part of the initial condensation, there is no need of oil lubrication in the cylinders. With moderate degrees of superheat, in fact, with superheat up to 100 degrees, there are many cases on record where operation has been carried out over long periods without internal oil lubrication, but it would seem a wise proposition to supply internal oil lubrication on all jobs where superheat was above 50 degrees. The quantity of oil needed is not very great. On a large number of boats using high degrees of superheat very favorable results have been otbained with .3 of a gallon of oil per thousand horsepower per twenty-four hours, and one case is known of a 2800 horsepower ship using 20.5 gallons of oil on a forty-two day voyage. This was with degrees of superheat ranging from 90 to 150. The use of oil in this way on marine jobs necessitates the installation of lubricating oil pumps and pipes and of filters. These, together with pyrometers and mixing pipes, are the only complications added to the plant in addition to the superheater itself.

A very decided economy may also be otbained on cargo vessels by arranging the auxiliary machinery for the use of superheated steam. Without such arrangement the ordinary deck winch, especially in cold weather, is using a very high proportion of hot water, and if sufficient superheat is maintained so that we can be assured of thoroughly dry steam reaching these winch engines, we will find that the percentage of economy gained in the auxiliary machinery will be far greater than that obtained in the main engines.

To sum up—the advantages to be gained by installing superheaters are: Greater fuel economy, greater water economy, reduced leakage, increased boiler capacity, and hence in a marine job, increased revenue cargo space.

Notable examples of high superheat in recent marine installations are new Cunard medium sized liners of the Scythia class, on which Scotch marine boilers are equipped with Locomotive type superheaters for 225 degrees superheat. The installation in America of turbo-electric drive in the ten cargo vessels of the Shipping Board and in the passenger liner Cuba is being attended by the introduction of high superheat in the boilers of these vessels.

WITH THE NAVAL ARCHITECTS

At the recent annual meeting of the Society of Naval Architects and Marine Engineers, ten very interesting papers were read and discussed. Eight of these papers were either summarized or published in full in the December issue of Pacific Marine Review. The other two are here summarized for the convenience of our readers.

NEW 20,000-TON TANKERS

By H. F. NORTON, ESQ.

THE vessels described in this paper are two twin-screw tank steamers 500 feet between perpendiculars, 75 feet beam, 43 feet 3 inches molded depth to shelter deck, and having a capacity of about 20,300 tons deadweight on a draft of 30 feet. These vessels have straight stems and elliptical sterns and are rigged with three pole masts. They are of the shelter deck type, having a complete steel shelter deck and an upper deck complete, except that it is omitted in the expansion trunk in the way of the oil tanks.

The propelling machinery, as usual, is located aft and consists of two triple expansion engines set side by side in the same engine room. These engines have a total indicated horsepower of 3800 at 200 pounds boiler pressure and have cylinders 23 inches, 39 inches and 68 inches in diameter with a 45-inch stroke. There are three single ended Scotch boilers placed side by side with their backs towards the engine rooms and oil-fired from the forward end. These boilers are 17 feet inside diameter by 12 feet long, and are among the largest Scotch boilers yet built in this country. There is also a cylindrical two-furnace donkey boiler. The main boilers are fitted for burning oil only and the donkey boiler for coal only. The power plant on these ships is not remarkable in any way, being about the usual power plant for a tanker of this size.

The unique features in these ships lie in the design of the structural work in the hull. The main body of the ship, which is practically the parallel middle body, is divided into nine compartments, each 34 feet 6 inches long. These compartments are divided by a central longitudinal bulkhead, making the cross-section of each tank 34 feet 6 inches fore and aft by 37 feet 6 inches athwartship, or practically square. There are no summer tanks, the wing spaces outboard of the expansion trunk between upper and shelter decks being used for pipe passage only.

The Gatewood system of longitudinal framing is used, the main framing consisting of two deep transverse webs between each pair of main transverse bulkheads. The longitudinals are worked continually through the transverse web frames, but are cut and bracketed at the main transverse bulkheads. The transverse frames are spaced 10 feet apart, leaving a 12-foot 3-inch spacing between the bulkhead and each transverse frame, this difference being compensated for by the brackets at the bulkheads. The bottom longitudinals, which are 18 inches by 4.1 inches by 51.6 pound channels, are spaced 33 inches between centers. This is, so far as the author knows, a "wider spacing than has been previously used on a longitudinally framed vessel." The side longitudinals gradually decrease from the size of those on the bottom to a 10-inch by 3.5-inch by 23.4-pound channel for the first longitudinal under the upper deck.

The central compartment is used for the cargo oil pump room, so that the entire length of the parallel middle body is absolutely symmetrical in its arrangement with respect to the amidship line and to each transverse bulkhead. This fact permits an unique arrangement of shell plating amidships. Each shell plate in the parallel middle body is made 34 feet 6 inches long between centers of butts, or exactly the length of the main cargo tanks. All the butts are arranged symmetrically with reference to the transverse bulkheads and the transverse webs, so that a number of plates amidships on each strake are exactly alike in every respect. The straight sheer and the identical dimensions of all of the main compartments result in a very symmetrical arrangement of the center line bulkhead plating and also of the deck plating, all of which makes for economy in construction.

A number of very interesting girder and webbing problems were worked out in the stiffening of the transverse and longitudinal bulkheads. These stiffening arrangements were made in such a way that every alternate cargo oil tank and the cargo oil pump room have perfectly smooth bulkheads, which greatly facilitates testing and retesting for bulkhead leakage. The omission of summer tanks alongside the expansion trunk makes for a clear shelter deck with very few hatches, adding greatly of course to the strength of the hull and permitting very economical distribution of steel.

Ample provision is made for electric lighting arrangements, cold storage rooms, steam heating system, interior communication and drainage, fire-room and deck service systems, steam steering gear, steam windlass and winches, and all of the necessary auxiliaries. Complete plans showing structural details and general arrangements accompany the paper.

RULES AND REGULATIONS FOR FREEBOARD

By DAVID ARNOTT, ESQ.

THE load line question has come very prominently before naval architects, marine engineers, shipowners and shipbuilders during the last three years in America. Strange to say, up to the time of the paper under discussion nothing had been contributed to the transactions of the Society of Naval Architects and Marine Engineers since the contribution by Mr. Lewis Nixon entitled "Regulations for Loading Vessels," which was read at the annual meeting in 1897. This paper attempts to give a brief history of load line legislation in other countries and to outline the development of various rules and regulations with regard to freeboard.

The usual definition of freeboard is the height of side of ship above the load water line at the middle of her length measured from the top of the deck at the side. This freeboard marks the limit of loading which is considered safe under all conditions of wind and weather. Freeboard rules and regulations are an endeavor to define this limit, but, as the author points out very graphically, a modern ship is a very complicated structure, supported on a very varying foundation, and the problem of fixing a safe load line does not "lend itself to simple mathematical treatment." Four considerations must be kept in view when determining proper freeboard. First: keeping the deck safe from damage to itself or to the crew through undue shipping of water. Second: provision of reserve or spare buoyancy. Freeboard as determined from the above two considerations is the minimum freeboard allowable for a vessel of given dimension, form and type. Third: sufficient structural strength at minimum freeboard. Fourth: increase of minimum freeboard to compensate for deficiency in structural strength.

In 1917 the United States Shipping Board issued instructions that load lines be marked on all vessels building or to be built for the Emergency Fleet Corporation, but prior to that time for many years marine underwriters and the American Bureau of Shipping had been emphasizing the importance of adhering to the general principles of safe freeboard, and the American Bureau of Shipping's old rules contain a table of freeboard allowances based on type of structure.

In the discussion on the paper by Mr. Lewis Nixon referred to above, it transpired that a bill to regulate freeboard, particularly for Lake vessels, had been introduced into Congress some years previously, but this bill was dropped when it was pointed out that the majority of the channels on the Great Lakes would not allow of vessels being loaded to their minimum freeboard, and freeboard was not considered so vital a question in the United States as in some other countries, owing to the limited draft of harbors and the extensive use in the coasting trade of hurricane deck vessels.

In 1874 builders and owners of the Great Lakes district held a council at Buffalo and after mature deliberation formulated rules for freeboard and drew up a set of construction rules for wooden vessels.

In Great Britain the first load line legislation was the Merchant Shipping Act of 1871, which provided that seagoing vessels must have draft marks at the stem and stern and that loaded draft should be recorded before leaving port. This law was especially useful on account of the reliable data gathered through its enforcement in relation to draft in connection with losses of ships at sea. Popular agitation led by Samuel Plimsoll forced the Merchant Shipping Act of 1873, providing for detention by the Board of Trade of overloaded and improperly laden vessels. The Merchant Shipping Act of 1875 required owners of foreign-going vessels to mark a circular disk on the sides at the maximum draft, record freeboard before clearing at the custom house, and insert this record in crew agreements. Act of 1876 made these requirements compulsory for all British vessels above 80 gross tons.

Position of load line under these rules was a matter of personal opinion with the owner. Board of Trade had power to detain ship considered overloaded, but there were no legally recognized freeboard rules. In 1875 an agreement was reached on certain fundamental principles concerning determination of freeboard, but no direct action was taken.

Lloyds about 1880 made approved load line on spar and awning deck vessels a condition of classification, and in 1882 published freeboard tables for general application. Board of Trade also issued freeboard tables for the guidance of surveyors. Load line committee of Board of Trade reported in 1885 general rules covering freeboard which "would prevent dangerous overloading without unduly interfering with trade." The rules were based on Lloyd's 1882 tables and the majority of ship owners voluntarily took steps to have conforming freeboards marked on their vessels.

The 1890 Merchant Shipping Act provided compulsory marking of all vessels according to these rules, and Lloyd's Register and the British Corporation were empowered by the Board of Trade to assign freeboards. Board of Trade regulations stipulated that a vessel must be maintained in good condition to hold freeboard certificate. Upon failure to comply with this ruling the Board of Trade notifies the collector of customs, who refuses clearance to the vessel.

The tables were extended in 1898 to include vessels of 50 feet molded depth, and freeboards for special types, such as turret deck and shelter deck vessels, were added.

In 1903 the German Marine Association published freeboard rules which differed appreciably from British regulations. These rules were modified to suit changes in the construction of vessels and contained tables of freeboards for full scantling steamers and sailers and also for awning deck vessels. The depth of freeboard used with these German tables is measured from the top of the deck to the center of the disk; in other words, summer freeboards instead of winter freeboards, as in the British regulations. This reduction in freeboard granted by the German tables was justified on account of improvements in structural methods and distribution of material. Vessels carrying wood in the holds and having deck cargo were allowed less freeboard.

Drastic alterations were made in the British tables, which had the effect of allowing considerable reduction in the freeboards of the majority of the vessels, representing an estimated increased carrying capacity for British shipping of at least 1,000,000 tons. Lloyd's awning deck rules now called for heavier topside scantlings.

In 1908 the Germans again changed their load line rules so as to bring them into line with the revised British requirements, and in 1910 further changes were made in the German rules. In 1913 a British load line committee was appointed to advise with the Board of Trade in preparation for an international conference. Owing to the outbreak of the war, this conference never met and committee's report was delayed until the end of 1915 and not published until 1916. This report is said to be a very masterly document.

The United States is not handicapped by precedent in the matter of freeboard or load line legislation, so that the American load line committee, of which Admiral Taylor is chairman, has a free hand in working out its rules and its work may be of the highest importance not only to the shipping of America but to that of the entire maritime world.

The present paper is illustrated and amplified by extracts from British merchant shipping acts and by a reprint of the House resolution establishing load lines for certain vessels and by various curves showing the trend of the various British and German and American attempts at load line regulation and their relations to each other.

USING THE WOODEN SHIPS

After serving as the only shipbuilding material for several thousand years, wood has suddenly become altogether unfit for that use. One need only read the daily newspapers' comment upon the wooden shipbuilding of the Emergency Fleet Corporation during the war to be convinced of that fact. All the vessels are "idle," they are "unseaworthy," most are dismissed curtly as being "rotting hulks."

How Hulls Are Used

Those facts having been established, nothing remains but to chronicle some of the performances of the wooden hulls built for the government principally in the yards of the Pacific Northwest. These hulls are doing service in many seas as barkentines, schooners, barges and steam schooners, and, newspaper jibes to the contrary notwithstanding, are functioning successfully. In the conversion and operation of these vessels Pacific Coast shipowners are doing some valuable pioneering for the United States government, which may yet discover that the wooden vessels are better ships than the public has been willing to believe.

Such runs as that of the Alicia Haviside, 129 days from Vancouver to Durban; of the Russel Haviside, 101 days from Puget Sound to Cape Town; and the Anne Comyn, 52 days from San Francisco to Sydney, demonstrate what can be done with Ferris hulls rigged as six-masted barkentines. These vessels are owned and operated by the Pacific Freighters Company, San Francisco.

A Magnificent Vessel

Another more recent voyage is that of the six-masted schooner Oregon Fir, owned by Grant Smith & Company, Portland, Oregon, concerning which her master, Captain W. I. Eyres, writes:

"Arrived at Port Philip Head on October 10, 76 days from Astoria, and docked at Melbourne the following day. After reaching a point out distant from Sydney some 300 miles, could have made that port in 55 days, but, owing to meeting equinoxial gales, subsequent course was slow into Melbourne.

"The Oregon Fir is a magnificent vessel. I have tried her out in every possible way in which a vessel may be tried, and she has more than realized my expectations. She will carry all the sail that you can get on her and is a splendid weatherly ship, sailing within nine points.

220 Miles in One Day

"I have never known a ship in over 50 years of experience that will do as well in light winds as she will. I have made 220 nautical miles with her in 24 hours, and at present she is a full 10-knot ship. During the passage over and during strong squalls, she made 11 knots an hour. No matter how hard it blows, so long as she can carry the main jib, she will nip to windward and make good course without leeway.

This ship is a splendid asset and will be so for the next 25 years. She is strong and staunch.

"My crew turned out splendidly, and every one has now become efficient sailors. I would not wish for better men. They are a clean, respectable and ambitious crew.

Surpasses All Schooners

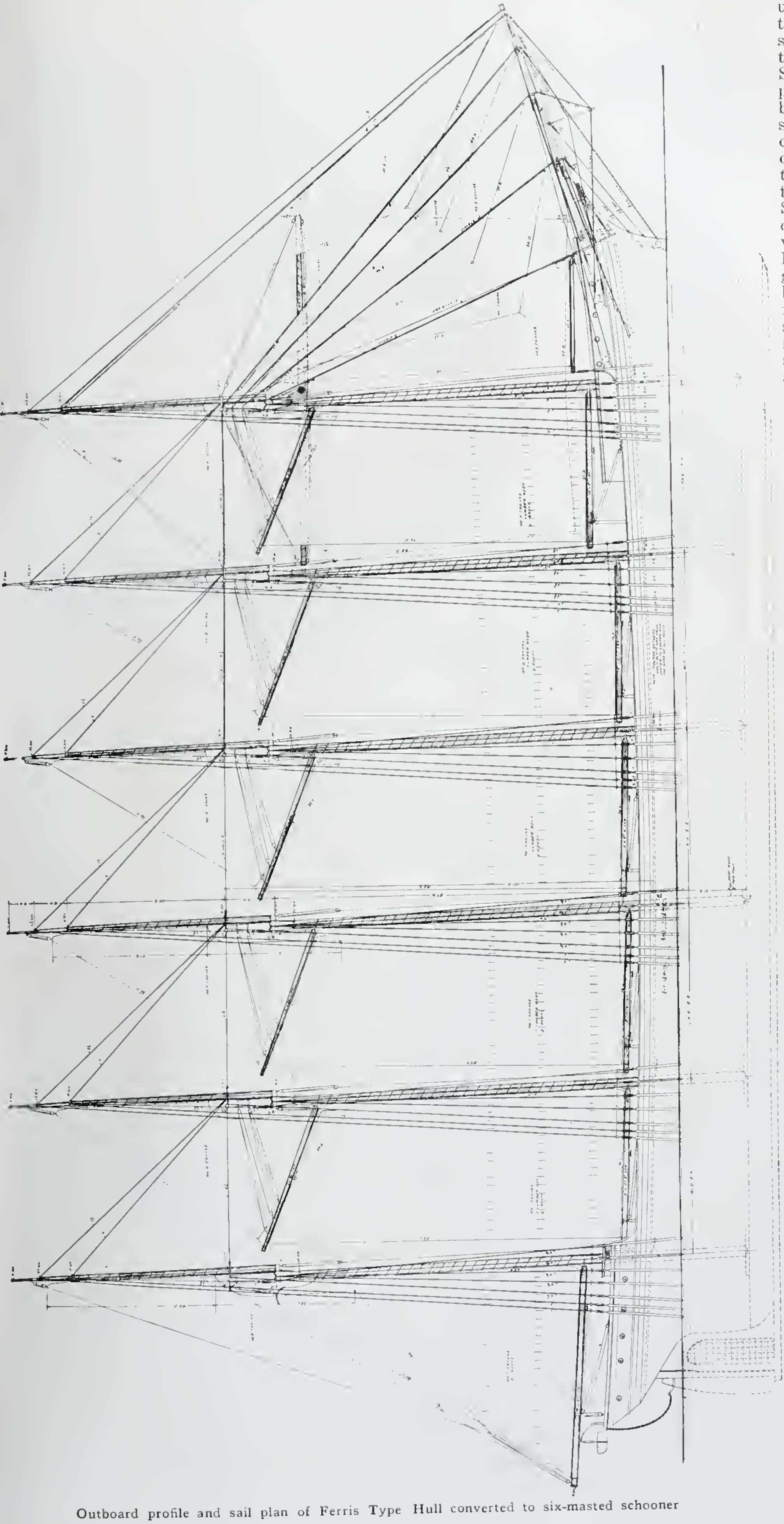
"I have beat the ship to windward 50 miles in 24 hours—that is, dead-beat. She beat from Cape Schank to Port Philip, 17 miles, with a full run of ebb tides against her, in six hours. There is not a schooner on the Pacific Coast today that can even approximate this. She did this with full courses, stay foresail, jib and outer jib, and strong northeast gale."

A new vessel, rigged as a six-masted schooner, is the Fort Laramie, built by Kruse & Banks, North Bend, and bought by W. S. Scammell & Company, San Francisco. The "general unfitness" of wood for shipbuilding is proved clearly enough by the Fort Laramie, which failed to make a cupful of water while loading for her first voyage. She was rigged with the usual sails and four jibs, a staysail and squaresail by the Haviside Company, which rigged the three barkentines of the Pacific Freighters Company named above; the sail work of the Fort Laramie was done by Ottison & Olsen, San Francisco, and the iron work by Tway. She has two Murray steam winches, and a 16-horsepower Union gasoline engine for hoisting sail, washing decks, pumping, etc., In her arrangements the vessel is admirable, having such features as tiled cabins and rooms for each two men. There is no forecastle whatever. The Fort Laramie will carry about 2,000,000 feet of lumber.

Steam Schooner Forest King

Still other uses to which the wooden hull can be put are as barges and steam schooners. The first barge was the Griffson, owned by James Griffiths & Sons, Seattle. An interesting steam schooner is the Forest King, owned by the Grays Harbor Motorship Corporation. Following the ideas of shipping men that the steam schooner type of ship was the craft desired for lumber carrying and all-around cargo work, the owners changed the Shipping Board plans for cabins and built the vessel on the regular steam schooner plan. The machinery was placed in the stern of the vessel, and big cargo hatches were arranged so that her owners say that she can stow away nearly 300,000 feet more of lumber cargo than the Ferris ship. In all the Forest King can carry around 1,500,000 feet of lumber. Her machinery is all the standard power plant put out for the Ferris type vessels, the engine being of 1400 horsepower. She will use 105 barrels a day at an average loaded speed of a little better than nine knots an hour. The steamer is well fitted out for the comfort of her crew.

Testifying before the Walsh committee, Commander A. B. Clements, exec-



Outboard profile and sail plan of Ferris Type Hull converted to six-masted schooner

utive aide to Admiral Benson, said that there were approximately 200 wooden ships that were unsalable because of their inability to cope with steel vessels. Some of the 200 had not been completed, he continued, and engines and boilers ordered for them could not be sold. Nevertheless, the long and successful use of the wooden sailing vessel on the Pacific, in such diverse trades as transporting lumber to Australia and the South Seas and bringing to the States much of the Alaska salmon pack demonstrate that there is a field for the wooden ship, and the voyages of the Pacific Freighters' vessels and the Oregon Pine prove that the Ferris hulls can be rigged as barkentines and schooners for offshore routes. The conversion of some hulls into barges opens another field. In the employment of some as steam schooners, finally, both the hull and machinery can be used.

So much for the use that has been made of wooden ships as sailing vessels and steam schooners. In addition, there is the possibility of their use as motorships, either with direct Diesel engine drive, with or without combination with sails, or by Diesel electric drive.

There is ample demonstration of the feasibility of operating wooden motorships in Pacific Ocean trade. Among the wooden Diesel engine ships built and powered at and operated from Pacific Coast ports might be mentioned the Libby Main, 240 feet long, with a gross tonnage of 1811, powered with two Dow Diesel engines built by the Dow Pump & Diesel Engine Company; the James Timpson, 2016 gross tons, powered with two Winton Diesel engines; and the motorships Balcatta, Babinda, Benowa, and Boobyalla, all of approximately 3100 tons gross and 268 feet long, powered with McIntosh & Seymour Diesel engines; and the other four wooden motorships, the Coolcha, Cethana, Culburra, and Challamba, 262 feet long, of 2300 tons gross, likewise powered with McIntosh & Seymours.

All of these vessels have been making consistent time on their regular voyages under all kinds of sea conditions and with an economy of operation which cannot be even approached by any steamer of similar capacity. There is no doubt that by the use of one or more of the methods outlined many of the wooden ships now tied up on the Atlantic and Pacific Coasts will be put into operation.

NEW ATLAS ENGINE

THE Atlas Imperial Engine Company has been very busy up to the present time, principally with export orders, and has been shipping a great many 125 H. P. engines and 175 H. P. engines, as well as a great many smaller ones.

The company reports a good outlook for future business and have developed a new solid injection engine suitable for the fishing industry, tow boats, freighters, etc. These engines have proven a very high efficiency. The cost of fuel in these new engines is about one-quarter (¼) of that of a distillate engine of the same power. These engines are being built in sizes from 50 H. P. up to 200 H. P. and use medium low compression. Starting is done with compressed air. No high pressure air compressors are used. The smaller sizes of engines will be equipped with reverse gear, larger ones will be direct reversible.

EASTHAMPTON RADIO STATION

THE wonderful achievements in recent years in radio engineering warrant the belief that we are now entering what might be called the radio age. Telephone conversations half way around the world, the navigation of ships, the direction of the movement of airplanes from a central station, the communication with submerged submarines, all by means of radio, presage wonderful achievements yet to come.

Alive to the practical needs of marine transportation, the Cutting and Washington Radio Corporation has just opened up a new commercial radio coastal station at Easthampton, Long Island.

The location of this station was the first important consideration for the company's engineers and Easthampton was decided upon only after most careful study of the necessities of ships entering and leaving New York. It was found that with the great number of vessels coming into and leaving the harbor that great difficulty was experienced in handling the radio traffic and it seemed advisable to locate a station at a point sufficiently distant from New York to avoid the interference and at the same time near enough to arrange all details of docking, transmitting of commercial messages and allowing ample time for making up of abstracts and other details of accounting.

Direct telephone and telegraph wires to New York, together with a selected corps of experienced operators, insure accurate and speedy transmission of all messages sent through this station, the call letters of which are WSA.

Easthampton is one of the fashionable summer resorts located on the south shore of Long Island. It is 103 miles from New York and is one of the earliest settlements on Long Island in that section noted in the early days for its whaling interests.

The location of the radio station is on one of the highest knolls in the town, about one mile from the shore. It occupies a plot of ground some six acres in extent. The two galvanized steel towers are 300 feet apart and are 165 feet high, surmounted with wooden masts, which bring the total height of the antenna to 175 feet above the heavy concrete foundations.

The latest developments in antenna and counterpoise are used, the antenna being of the cage type so efficient on battleships during the war; the counterpoise is a series of wires radiating from one corner of the radio building and practically covering six acres.

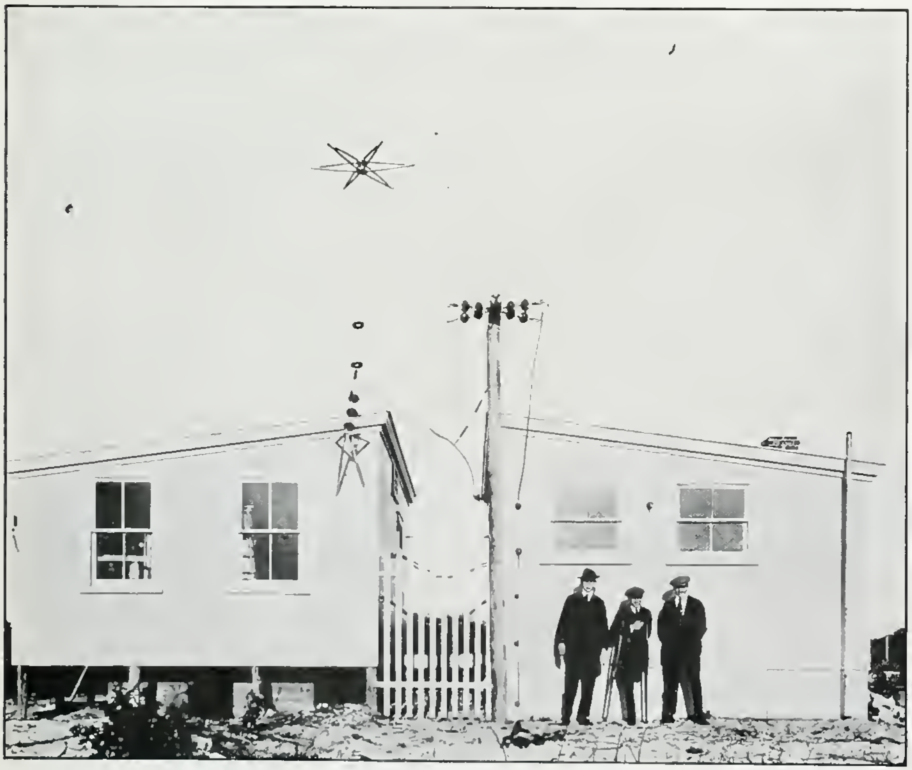
The power supply is obtained from the local electric light company and is brought to the station in a conduit 1200 feet long. Twenty-two hundred volts alternating current is stepped down to 220 volts, from which a motor generator unit produces the 110 volts' direct current used in the operation of the radio set. One of the well-known Delco Light units in conjunction with a storage battery is used as an auxiliary to provide against breakdown.

The radio "shack" is equipped with hot water heating, shower and toilet facilities, rest room for operators off duty and complete office equipment for handling the clerical work necessary at the station.

The station is said to be the most complete and thoroughly equipped station of its kind in the country and will no doubt, for some time to come, occupy a leading position among commercial coastal radio stations.

Many novel and ingenious devices were designed especially for this plant and we hope at a later date to publish a technical description for the benefit of our readers. The photographs herewith will illustrate the station and distinctly show the high quality of the work on which no expense was spared to make the station a model of its kind.

General view of Easthampton Radio Station showing Aerial Towers and Shacks



View of the shacks at the Easthampton Radio Station showing Aerial Terminal and the Counterpoise Wires radiating from pole at corner of shack

FUEL OIL SITUATION

THE acuteness of the fuel oil situation on the Pacific Coast is forcefully evidenced by the recent announcement of the conversion of the C. P. R. steamers, plying between Puget Sound and Alaska, from oil burners back to coal burners.

Relief from the appalling increases in the cost of fuel oil is given by the C. P. R. as the reason for this drastic decision.

For months past, steamship operators on the Pacific have been confronted with this problem of meeting the stupendous increases in the price of oil, and there has been an insistent, ominous, almost beseeching, cry for "Fuel oil! Cheaper fuel oil." Oil which a few years ago cost the operators but 60 cents per barrel today costs them $1.85 per barrel, an increase of over 200 per cent, and tentative quotations for the year 1921 indicate further increases.

What this represents in dollars and cents is better realized when it is considered that one coastwise steamship company uses over a million and a quarter barrels of oil per year, which at the tentative prices quoted for 1921 will mean an increase in annual operating expenses amounting to nearly $2,000,000. This amount, while the largest, represents the increase in but one item of steamship operation which the operators are endeavoring to meet from their limited and restricted sources of revenue.

NEW INTERCOASTAL SERVICE

An eighteen-day service between New York and Philadelphia and San Francisco was opened by the Luckenbach Steamship Company with the sailing of the steamer Julia Luckenbach from New York early in December. Between New York or Philadelphia and Los Angeles the steaming time will be only sixteen days, including the passage of the Panama Canal; and the time between New York or Philadelphia and San Francisco could be cut to seventeen days if Los Angeles were omitted. The Julia Luckenbach will be followed by other vessels of the same class, the names of which will be announced later. A schedule such as this is made possible by the Julia Luckenbach's unusual sea speed of fifteen knots, which is seldom met in a freight vessel.

Railroad Service Surpassed

The Luckenbach Line was an important factor in the intercoastal service prior to the war, when it had one of the few fleets of consequence under the American flag, but the service was disrupted by the war and was not resumed until conditions had become more nearly normal this year.

So far as time is concerned the Luckenbach steamships will make deliveries on the Pacific much more promptly than do the railroads. Freight originating in New York can be delivered in San Francisco several days quicker than is possible by the transcontinental lines, and even goods from interior points, which may lie for a few days in New York, will be received in San Francisco in approximately the same time as would be required by the railroads. These statements apply to carload goods only. In transporting less than carload lots, which meet with delay in being unloaded and reloaded in crossing the continent, the railroads require much more time than they do for carloads, and for this reason the new Luckenbach service will be far superior to that of the railroads in handling smaller shipments.

Thirteen 15-Knot Vessels

The Julia Luckenbach is a vessel of 12,250 tons deadweight. Eleven of the new Luckenbach fleet are of this size and two are of 15,000 tons each. All of the thirteen have a sea speed of fifteen knots except the Walter A. Luckenbach, built by the Seattle Construction & Drydock Company, which has a speed of sixteen. Many passenger vessels of the world are unable to compete with the Luckenbach freighters in speed. Possessing a fleet such as this, the Luckenbach Line has been able to do what few if any other freight companies of the world have done—that is, to compete with passenger liners in carrying mails, as the vessels of the New York-Rotterdam Line are doing now.

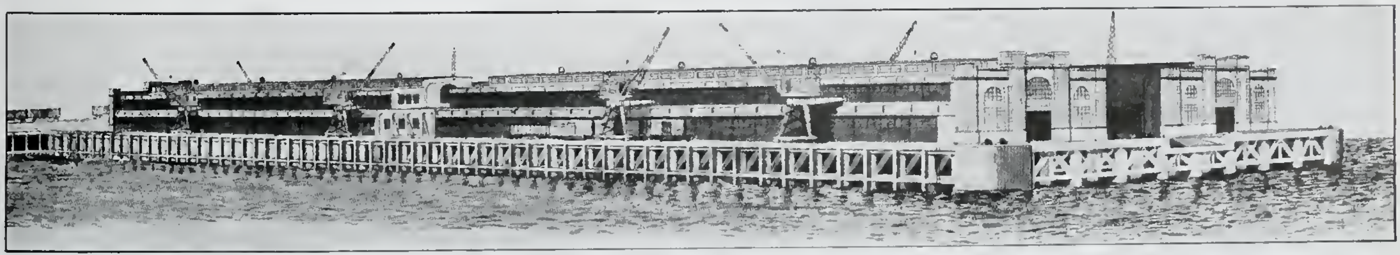
Mr. and Mrs. A. P. Hammond at the launch of the Mary Luckenbach. Mr. Hammond is Pacific Coast Manager of the Luckenbach Steamship Company.

Sailings approximately every ten days are being maintained by the Luckenbach intercoastal service, with one sailing a week in prospect. In addition to the intercoastal service, the Luckenbach vessels are operating in the New York-Hamburg, New York-Rotterdam and Philedelphia-Rotterdam trades. The Julia Luckenbach had been in the New York-Rotterdam service, in which she transported United States mails, after being turned back by the government. She was the third of the new fleet, having been preceded by the Edgar and Edward; was built at Fore River in 1917 and was placed in the New York-Australian trade a short time before the United States declared war upon Germany. During the war she was used as a trooper. She is a vessel of 8151 tons gross, 6141 net; 436-6 feet long, 57-2 broad and 37-6 deep; is an oil-burner; has a cruiser stern, and is driven by General Electric geared turbines.

New Tanker Delivered

The nineteenth vessel of the Luckenbach Line, the tanker Mary Luckenbach, was delivered by the Southwestern Shipbuilding Company in December, after having been launched November 1. The Mary Luckenbach had her trial at Los Angeles and was taken to San Francisco for drydocking, after which she loaded a cargo of gasoline for Seattle. She is transverse-framed; 410-5½ between perpendiculars; 54 broad; has a loaded draft of 23-11, a loaded speed of 10¾ knots and deadweight of 8450 tons; and is driven by triple-expansion engines of 2800 indicated horse power. The Mary Luckenbach was laid down by the Southwestern Shipbuilding Company for its own account and was sold while under construction to the Luckenbach company. At the time of the sale she was the only vessel in the world available for prompt delivery and answering the requirements of the purchasers, one of which was complete American registry.

Launch of the Mary Luckenbach at the yard of the Southwestern Shipbuilding Company, Wilmington, California



The new Ballantyne Pier at Vancouver, British Columbia. Note the semi-portal electric gantries along the water side, the reinforced concrete construction, and the arrangement of warehouses with double depressed trackage in the center of pier between parallel lines of warehouses. This pier has a length of 1200 feet, is 341 feet wide, with a floor area in the freight sheds of 394,500 square feet, and railroad trackage 8000 feet in length. It was designed and built under the supervision of the Vancouver Harbor Commissioners and their consulting engineer, A. D. Swan, M. I. C. E.

A NEW FAST MOTOR BOAT

TRIALS have recently been held of a new fast express cruiser, the Winifred, built by the N. J. Blanchard Boat Company on Lake Union, Seattle, for Gilbert Skinner of the Seattle Yacht Club. On trial this boat made a little better than thirty-five miles an hour. She was designed by L. E. Geary of Seattle and, as shown in the illustration she is of the V-bottom type with flaring bow and transom stern.

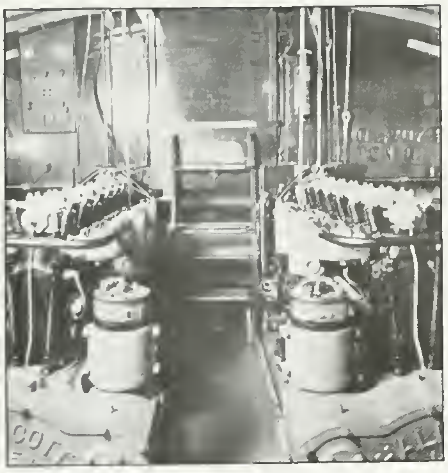
The boat has a length of 43 feet, a beam of 10 feet, and a draft of 2½ feet. Crew's quarters, which contain two transom berths with backs that hinge upward to form uper berths, providing accommodations for four men, are arranged in the forecastle and entered from the engine room, which is immediately aft of the forecastle.

The power plant in this engine room consists of two twin 200 H. P. Hall-Scott 6-cylinder motors, as shown in the illustration. The engine room is so arranged that full head room is obtained all around the two motors. The space below the engine room floor is used for fuel tanks, of which there are three, one holding 60 gallons and the other two 110 gallons each.

Above the after end of the engine roo mis the bridge, which is housed in forward but open aft, and contains the control station for engines and steering, with all necessary instruments. At the after side of the bridge a companion ladder leads down into the forward compartment of the main cabin space, which houses on the port side refrigerator space and lavatory and on the starboard side galley and pantry.

Aft of this space is the main cabin, a very roomy compartment with sleeping accommodations for four people, the upper berth being hinged to form the back of a transom seat. Aft of the cabin is a roomy cockpit with a permanent canopy for protection from rain or sunshine and a fine wide transom seat across the stern. A fresh water tank with a capacity of 80 gallons is housed under the cockpit floor.

The weight of the two 200 H. P. Hall-Scott engines on the Winifred is 1560 pounds, including all accessories. For general cruising the economical speed of these engines is 1000 revolutions per minute with a maneuvering speed range of 350 to 1700 revolutions per minute, so that the Winifred may be handily used for fish trawling at eight or ten miles per hour and in a very few moments be up to her maximum speed of thirty-five miles per hour.


Engine room of the Winifred showing two 200 h. p. Hall-Scott Marine Motors. This installation is equipped with electric starter and may be controlled entirely from the pilot house.

To most marine engineers this weight for 400 H. P. will seem quite small, and it is interesting in this connection to compare the weight of these Hall-Scott marine engines with the aviation type. Two aviation engines of the same horse power with electrically welded steel cylinders will weigh but 525 pounds.

The Hall-Scott engines for marine work are becoming deservedly popular, as is evidenced by a number of notable installations, including the following: 35-foot speed boat Comanche powered with two 200 H. P. Hall-Scott motors for Henry Ford; the Myrne III, a 50-foot express cruiser with mahogany hull powered with one 200 H. P. motor for service on Lake Tahoe for Mr. Norman DeVaux; the Grayhound, owned by Edsell Ford,, a 58-foot cruiser with a pair of 200 H. P. Hall-Scott motors; and the Miss Snip, a 60-foot 11-ton express cruiser owned by Jim Talbot of the Southwestern Shipbuilding Company, equipped with two 200 H. P. Hall-Scott motors.

Gilbert Skinner's new Express Cruiser Winifred snapped on the starboard bow while making twenty-nine knots per hour

RENEWING THE ANNIE JOHNSON

A COMPLETE revolution in methods of ship repairs has been wrought as a result of the vastly increased building and repair facilities installed at San Francisco during the past few years, according to the officials of the United Engineering Company, which has just finished a "near" reconstruction of the ancient but staunch motorship, Annie Johnson, of the Matson Navigation Company's fleet. Although the vessel has not been shifted to a drydock or shipbuilding plant and has remained moored to the bulkhead at Pier 46, a job has been done that would under former conditions tax the facilities of one of the old-time plants for a matter of about four months.

The United Engineering Company finished the work in thirty-five working days. It was a considerable job. The main deck, bulwarks, old wooden masts and houses were razed and all have been replaced. The sticks are now of steel. The cabins have been greatly improved, and, in short, the vessel looks and is a renewed craft. The 320 horsepower Bolinder semi-Diesel, which had not been in use for some months, was completely overhauled, being fitted with new cylinders and other parts so that when the ship goes on the run between San Francisco and Hawaii again she is expected to perform better than ever, and the Matson Company will have practically a new ship.

The term "new craft" is correct, because the Annie Johnson was built in England in 1872 as an all-iron sailing vessel and was converted to a motorship four years ago. Time and again corroded iron shell plates have been replaced with steel and the ship is now a steel vessel rather than iron.

The Matson officials were in a hurry and the United Engineering Company undertook to do the work as quickly as was desired. The repair job on the Annie Johnson, like that of building a new promenade deck on the China Mail Company's steamer Nanking, was made possible by shifting a portable shipbuilding plant to the pier. The version of the officials of the United Engineering Company is "that instead of sending the ship to the plant, the plant now comes to the ship."

Marine Insurance

DEVELOPMENTS IN MARINE INSURANCE

By Charles F. Howell

PERHAPS the most important circumstance in marine insurance during the past month has been the attempt to secure to American companies writing this class of insurance approximately the same underwriting conditions as apply to the great foreign companies. To accomplish this, it has been obvious to both marine underwriters and to those members of the government at Washington who have been anxiously watching the development in this country of a world spread in marine insurance, that it will be necessary to secure uniformity of regulation on the part of the different states and a leveling of those barriers that so vitally prevent the progress of the companies. The marine insurance syndicates have proved to be the first great step in the right direction; but grave intimations have recently been made by government officials to the effect that unless still further progress is made and the interests of American merchants can be properly taken care of as regards world trade that the government will be obliged to enter the marine insurance business itself.

Consequently the very greatest interest was taken in the meeting of the Multiple Line Committee of the National Convention of Insurance Commissioners which was held at the Hotel Astor, New York City, on the third instant. If marine companies are to operate under the working conditions of their great foreign rivals they will have to have the privilege of writing multiple lines; that is to say, all other kinds of insurance, except life. The idea is that when a large insurant seeks a varied coverage he should be able to get everything he wants "in the same shop." The meeting was attended by fifty or sixty prominent casualty underwriters, and also by government representatives and marine insurance leaders. The government was represented by Congressman Edmunds, who was seconded by Professor S. S. Huebner and Mr. Dean of the Shipping Board.

Professor Huebner presented the marine insurance attitude of the government, pointing out that it had now become a case of private insurance or government ownership, and that it was a matter of vital necessity for our government to have in this country such marine insurance facilities as will protect our trade secrets as well as important details of our ships and shipping. He pointed out the urgent need for the insurance commissioners to press upon their respective legislatures the necessity for according our marine underwriters the two vital factors of multiple line coverage and a world-wide spread. The need for the former lies in the advantage it would bring of reducing overhead expense, and also of obtaining more clients; the latter is necessary in order to secure greater stability, because unprofitable countries are apt to be counterbalanced by profitable ones. He intimated that it still remains a question as to whether or not the new marine syndicates may be thrown out of those twenty-four states that have anti-trust laws. A model bill has been drawn up for application in the District of Columbia, and this was urged upon the committee as a standard to follow in revising the marine insurance laws of the several states. It allows for the writing of multiple lines to a total of eleven classes, and that the original capital and surplus must be increased by 50 per cent for each additional kind written.

This proposition was enthusiastically supported by representatives of such leading marine insurance companies as the Continental group and the Insurance Company of North America. It was as strenuously opposed by practically all of the leading casualty and surety companies, whose objection was based on a selfish alarm lest their particular fields of underwriting should be invaded by the marine men. It was urged that such a wholesale change in our laws might destroy the insurance system of this country that has taken a half century to build up, and that the surety and casualty companies would be driven into marine insurance and probably ruined. The casualty men urged, as a substitute for the multiple line proposition, that the marine companies organize subsidiary companies to take care of their needs. The question of different reserves on different hazards was also gone into. Another substitute suggested was a general company, under Federal charter, for international trade only.

The committee took the matter under advisement and will later on report their conclusions to the national body of insurance commissioners.

Marine Auto Rates Increased

Notice has been sent out by marine insurance men of New York to the effect that there will be a radical increase in marine rates covering shipments of motor cars against all risks from the time they are placed on freight cars at the factory until delivery at their foreign destination. A number of informal conferences preceded this action, at which it was decided that such an increase was necessary on account of heavy claims on automobile accounts. Practically the entire New York market has subscribed to the agreement. There has been considerable competition for the rich volume of automobile premiums, and a consequent depression of rates; this, in connection with a disproportionately high loss ratio under the all-risk form of cover, has led to a rate advance of nearly 100 per cent. Automobiles are usually packed in crates and carried to the seaboard on flat cars; this form of packing does not keep out rain water, and as a result there is a steady stream of claims for damage from rust. Freight congestion, strikes, etc., have delayed the arrival of cars at wharves for shipment, and these have been held in the freight yards and seriously damaged by rain. Then again, there is damage from mildew to leather parts in steamer holds, and innumerable claims arise under the all-risk cover on account of theft, pilferage, and breakage. It is said that the automobile manufacturing companies are in agreement with the conclusions reached by marine underwriters, and will not seek to depress rates to the former low level, which would force some of the largest offices to abandon auto marine coverage. New rates at and from interior points of shipment via New York, Philadelphia and Boston, direct to various principal world ports are given as follows:

	First Class Liners	Approved Stmrs.
At and from interior points of shipment via N. Y., Phila. and Boston direct to U. K. ports not north of London on the East Coast and Continental ports between Havre and Bordeaux	.50	.62½
U. K. ports north of London on the East Coast	.55	.67½
Continent of Europe ports between Antwerp and Amsterdam, both inclusive	.55	.67½
Hamburg	.60	.72½
European Atlantic ports south of Bordeaux excluding Spain and Portugal	.65	.77½
Spanish Mediterranean ports	.85	.97½
Italian Mediterranean ports not east of Sicily	1.25	1.37½
Adriatic ports	1.37½	1.50
Constantinople	2.50	2.62½
Black Sea ports	3.00	3.12½
Baltic ports	1.00	1.12½
Russian Baltic ports	1.50	1.62½
Havana	2.50	2.62½
Porto Rico ports	.62½	.75
Rio de Janeiro	.75	.87½
Buenos Aires	1.00	1.12½
Vladivostok via Panama	1.50	1.62½

"Approved steamers — Iron or steel steamers and iron or steel motorships

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

(excluding all auxiliary vessels) not over 15 years old and not less than 2000 tons net register—Class 100 A1 British Lloyds, or equivalent. Excluding vessels built on the Great Lakes or for Great Lakes service, also excluding vessels of Greek or Spanish ownership or register.

"Deduct ¼ per cent for cars fixed at and shipped from the port of shipment.

"Standard Clause: Against all risks of transportation and navigation including the risks of breakage, fresh water, theft and/or pilferage, excluding such risks as are excluded by the F. C. & S. and the Strikers' clauses. In case of loss or damage to any part of a machine consisting when complete for sale or use of several parts, the insurer shall only be liable for the insured value of the part lost or damaged. No claim to be paid unless amounting to $25."

Voyage of the Poznan

One of the most unusual experiences in marine insurance was supplied recently when the steamer Poznan returned to New York from Havana still carrying her entire outward cargo of 8000 tons after a delay at the Cuban port of about five weeks. The value of this cargo is approximately $2,000,000. The Acme Operating Company, which operates the Poznan, states that the steamer sailed from New York for Havana, tied up to a Havana wharf for five weeks, and only returned without having broken bulk on account of the effect of the Cuban moratorium. The shippers are, of course, highly indignant and have held several meetings for discussions of their rights against the steamship company. A still more important question, but one which they do not appear to have considered, is the condition of their insurance. As there are other vessels at Havana which may be obliged to return without discharging their outward cargoes, some consideration of the insurance phases of the question may be of interest. That the Poznan tied up at a Havana wharf does not constitute an arrival under a marine insurance policy. Did any subsequent action or event terminate the insurance? The refusal by the consignees to accept delivery of the cargo would unquestionably be such an act, but according to the company's explanation there was no such refusal. The question of abandonment of the voyage enters, and tends to the conclusion that the underwriters were not at risk on the return trip. Neither is it believed that the assured would be protected under a deviation and change of voyage clause, for a deviation is a turning aside from the customary course of pursuing the insured venture and does not involve a change of destination; while a change of voyage is the substituting of a new destination and would appear to be distinct from the case where the vessel returns to the loading port without completing a voyage of any kind.

Cuban Conditions

Marine underwriters are being given credit for having exercised a strong, helpful influence in clarifying the muddled situation at Havana arising out of the freight congestion there. It is said that when the Havana merchants boycotted certain wharf property and restricted possible delivery of goods on ships in the harbor, a meeting of marine underwriters was promptly held and word allowed to leak out that the attitude of marine insurers was that the position taken by Havana merchants automatically ended marine insurance contracts. Within twenty-four hours the boycott was called off and was never reinstated. The warehouse to warehouse clause, as also the risk of craft from the steamer, have been the cause of considerable misunderstanding. Underwriters are of opinion that the voyages were completed when the deliveries were refused and that their liabilities ceased, additional premium being proper for the subsequent risk of merchandise held on lighters. In Havana harbor lighters and other craft have been, in effect, utilized as warehouses. Cuba finds now that she will have to consume what is within her ports before more merchandise will be supplied. Those best informed insist that it is the part of wisdom for American exporters to refuse to sell to Cuba until her present stocks on hand are consumed.

Binder Representations Valid

By a decision of the United States Circuit Court of Appeals, in the case of the Snare & Triest Company versus the St. Paul Fire & Marine Insurance Company, any representations made orally by brokers or written on applications in soliciting marine coverage are valid and legal even though they are not contained afterwards in the actual policy of insurance. It is likely that this case will set a precedent, as marine writers have heretofore considered that substantial compliance with representations was necessary only when they had been incorporated in the policy. There have been fewer than a half dozen cases touching on this point in the whole history of litigation in this country.

Marine Agents Not "Factors"

An insurance agency in charge of the entire insurance business of a large transportation company is not a factor, according to a recent decision of the Appellate Division of the New York Supreme Court. A foreign factor, as understood in marine matters, is a person in charge of the cargo to dispose of it and convert it into money or exchange it for other property. He has nothing to do with the boat, and his duties commence when the port of destination is reached and the property turned over to him by the master of the vessel. It was further held that the plaintiff's claim that "by the custom of the marine trade the defendant was acting in a fiduciary capacity," could not be sustained.

Proposed Bill of Lading

Recent hearings before the Interstate Commerce Commission at which changes were considered in the present form of standard bills of lading, have greatly interested marine underwriters in view of the serious effect the proposed changes would have upon the liability of ship owners and upon general average settlements. Representatives of the carriers objected especially to the introduction of a clause which attempted to define the extent of a shipowner's liability in event of a loss; stating that "the carrier shall not be liable for damage, delay or default from any cause whatever, except where the negligence of the carrier is the approximate cause of the injury complained of." Shipowners prefer the general exemption clauses contained in the Harter act. The carriers approved of an amendment to the section dealing with the calculation and payment of general average. Thus the rules of the port of New York become applicable for the settlement of disputes not covered by the York-Antwerp rules of 1890 in whatever port a case is being adjusted. Uniformity was the main point sought by this proposal.

Concrete Construction Tested

The sinking of the concrete steamer Cape Fear with the attendant loss of seventeen of her crew recalls the discussion that raged among marine underwriters a year or so ago, when the California product, the Faith, challenged universal attention as to the advisability of concrete ship construction. The American Bureau of Shipping accorded concrete steamers an experimental class. Concrete ship builders claimed that vessels could be constructed of concrete at a much lower cost than of any other material and that these vessels would be stronger. Despite the success of the

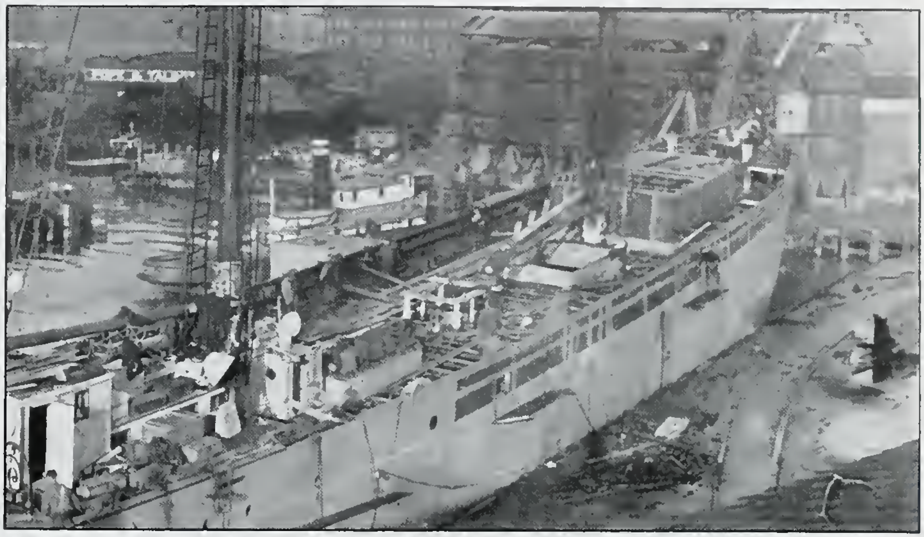
INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING

F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

Faith in off-shore trade, concrete vessels have not proved economic successes due to the fact that their weight prohibited the loading of sufficient cargo to make them profitable in the overseas' carrying trade. Builders at one time contemplated a reduction of the thickness of the hulls so as to decrease the weight and make possible the carriage of larger cargoes, but underwriters objected to this, being fearful lest a thinning of the hull, coupled with the porosity of the cement, might allow the water to reach the steel re-inforcement and by rusting it seriously weaken the hull. Again, the vibration of the vessels' engines produced cracks in the hulls. There has long been much conjecture as to what the effect of a collision on a concrete steamer would be; and, consequently, the smashing up of the Cape Fear, with the complete crumbling of her hull, appears to justify grave apprehension along this line. The conclusion seems to be inevitable that this collision has abundantly demonstrated the manifold advantages of steel over concrete in vessel construction.

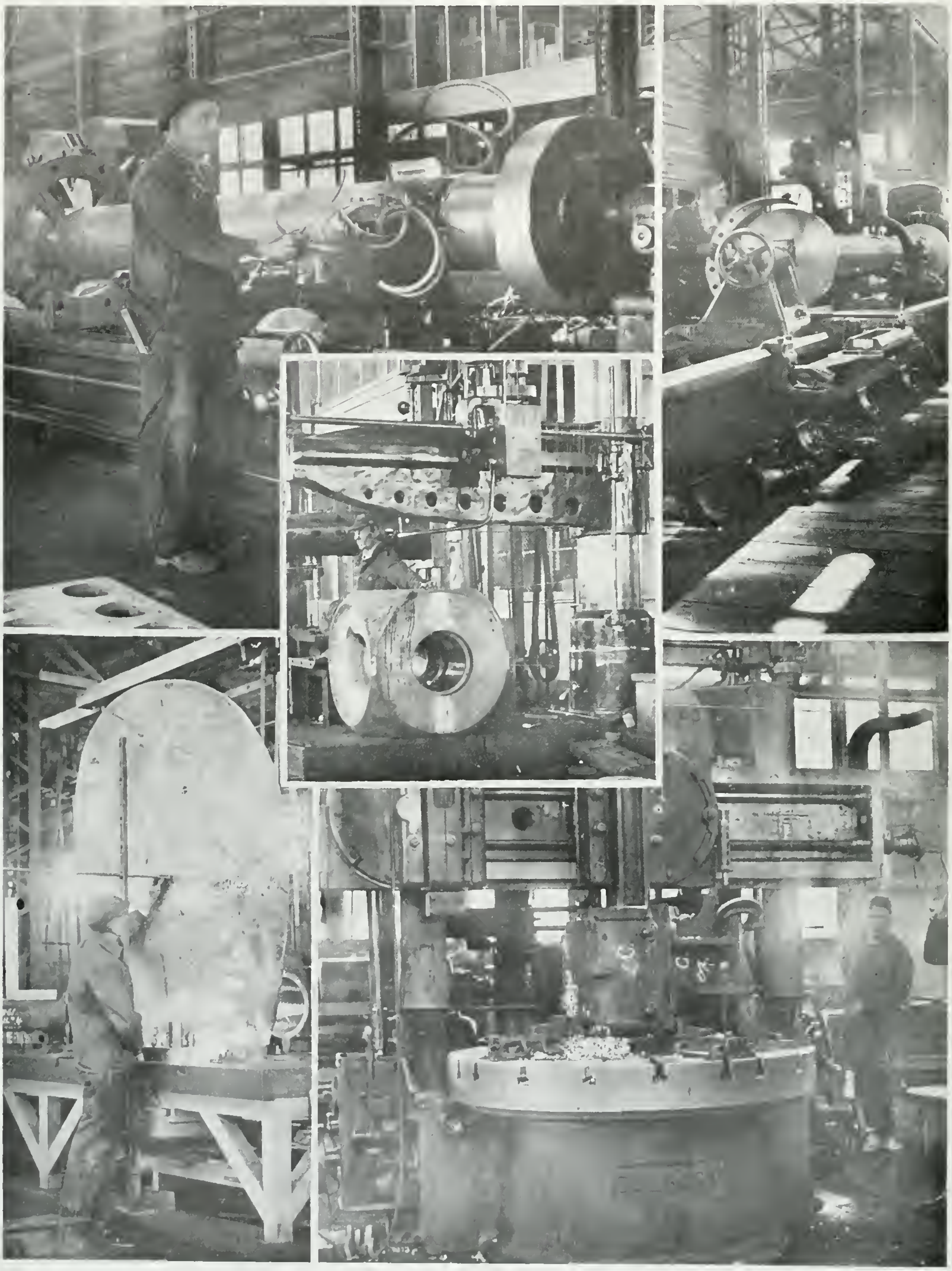


View looking down on the Matson Navigation Company's auxiliary motorship Annie Johnson, undergoing repairs by the United Engineering Company. As described in the article on Page 40, the United Engineering Company practically moved their shop to the job and finished the work in record time.

Unique view of New York's downtown section by night, lighted by the big Sperry searchlight, Brooklyn. The camera at head of Brooklyn bridge, Brooklyn side; searchlight at head of Manhattan bridge, Brooklyn side. Searchlight focused on each building for a few minutes. Camera exposure one-half hour.

—Photo copyrighted by Sperry Gyroscope Company.

SOME TOOLS IN THE UNION CONSTRUCTION COMPANY'S SHOP



Upper left—Forty-two inch by thirty-eight foot American geared head lathe roughing out line shafting. Depth of cut $1\frac{1}{4}$ inches with $\frac{3}{8}$ inch feed at 70 feet per minute. Upper right—Testing with micrometer gauge the finish cut on flange of tailshaft. 36-inch by 48-foot Pond lathe Center—One of the heavy radials drilling stud holes in propeller hub. Lower left—Gauging the pitch of a propeller blade mounted on face plate. Lower right—Sixty-inch Colburn vertical boring mill with two swiveling heads, four ten-inch special face plate jaws, and constant speed motor drive.

PACIFIC MACHINERY

MAKING A TWIST DRILL LIVE UP TO ITS REPUTATION

By H. Wills
The Standard Tool Company, Cleveland, Ohio

WHEN considering the almost human mechanical appliance employed in the making of standard types of twist drills and the precautions taken in the various operations from the laboratory test of the steel bars to the final inspection, it is a pretty safe conjecture that if the drill gives trouble some of the conditions surrounding its use are not right.

Twist drills will stand more strain in proportion to their size than almost any other tool and a very large percentage of drill troubles could be eliminated with proper attention given to grinding the points.

The form of the drill point controls the rate of production, accuracy of the hole, frequency of necessary grinding, and the very life of the drill.

If the illustrations and instructions of this article are followed religiously a uniform and satisfactory result will follow to an extent hardly appreciated by the average user of the twist drills.

In order to simplify the instructions contained herein, we recommend by all means that every user of twist drills be supplied with the "Standard Twist Drill Grinding Gauge Chart and Scale," illustrated herewith.

Twist drills must be properly ground and run at a suitable speed and feed in order to do their work efficiently and with the aid of this handy tool any skilled workman can attain these best results insuring a considerable increase in his drilling production.

This handy tool combines a gauge ground to an angle of 118 degrees and an accurate four-inch scale graduated in thirty-seconds and sixty-fourths on one side and sixteenths on the other. This gauge gives the proper angle and length of lip to the drills when they are being ground.

Measuring the length and angle of the cutting lip on twist drill with a standard grinding gauge.

On it also is a table of speeds and feeds for drilling steel and cast iron. Opposite each one-eighth inch mark is a number showing the proper speed at which to run a drill of corresponding diameter.

Both cutting lips must be inclined at the same angle with the axis of the drill and must be of equal length. The point angle of fifty-nine degrees has been universally adopted as best suited for average conditions. (Figure 1.)

The drill point must have the proper clearance or contour of surface back of the cutting edges and this clearance must be identical on both sides. Approximately a twelve-degree clearance angle (Figure 2) combined with the center angle of 130 degrees, which will give a constantly increasing clearance towards the center (Figure 3), has proven best for average conditions.

Incorrectly Ground Drill Points

If both lips are not ground at the same angle with the axis (Figure 4), one lip will fail to counteract the tendency of the other to spring away from the cut; consequently, one lip will do more work than the other, which will result in its becoming dull more rapidly than if both lips were cutting equally, and it will be subjected to an abnormal torsional strain.

When the cutting lips of a drill have the same point angle, but are of different lengths (Figure 5), the point of the drill will be "off center," or eccentric. As a result the hole will be oversize to an extent equal to double the amount of this eccentricity.

If the drill point is ground both with lips at different angles and of different lengths (Figure 6), there will be a combination of the undesirable results described.

Figure 7 shows a side and end view of a drill with the proper angle of point (59 degrees) and the proper angle of clearance at the periphery (12 degrees), but with insufficient clearance at the point or center.

Figure 8 shows a drill with insufficient clearance both at the periphery and at the center. The line A-B-C is at an angle of 12 degrees, but there is no clearance immediately back of the cutting edges (B-C) and the excess of clearance at the heel (A-B) is of no benefit.

Figure 9 shows what is liable to happen to a drill ground with insufficient clearance, or with any of the improper conditions previously described, especially if an attempt is made to obtain maximum production.

Figure 10 shows a drill with a clearance angle of about 12 degrees, but it

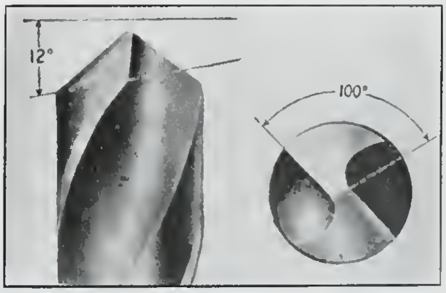
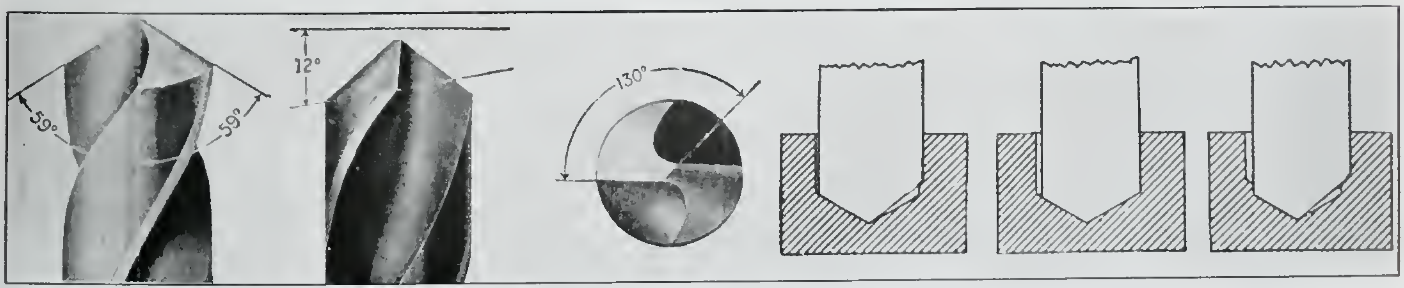
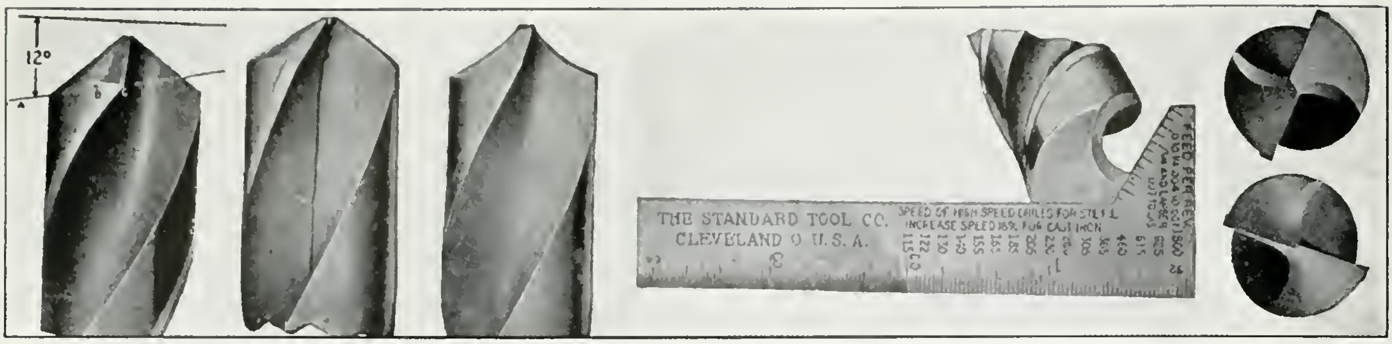


Figure 7



Left to right—Figures 1 to 6 inclusive


12°
THE STANDARD TOOL CO.
CLEVELAND O U.S.A.
SPEED OF HIGH SPEED DRILLS FOR STEEL
INCREASE SPEED 15% FOR CAST IRON
FEED PER REV.

Left to right—Figures 8 to 11 inclusive and at extreme right Figure 12 above and 13 below

does not have the proper contour back of the cutting edges. This manner of grinding leaves the cutting edges thin and weak, causing them to crumble away under heavy feeds.

The gauge can also be used to approximate the center angle. Although the included angle of the gauge is only 118 degrees, a center angle of 130 degrees is recommended. The use of this gauge in this manner enables a very close estimate to be made, as shown in Figure 11.

Most twist drills are made with a gradual increase in the thickness of the web or center of the drill toward the shank. As the drill becomes shorter and the web thicker, greater force is required to drive it. To overcome this, it is good practice to thin the web by grinding away the excess thickness, reducing it to its original dimensions. This grinding must not extend too far up the flute of the drill and care must be exercised that the cutting lips are not injured, and that the same amount is ground out of each groove. Figure 12 shows a drill with the web properly thinned. In Figure 13 the grinding is excessive, leaving the web entirely too thin and liable to crumble. When this happens a split drill is practically inevitable.

Twist drills are made with a slight taper from point to shank, so that the largest diameter is always across the corners of the cutting lips. This prevents the drills from binding in the work, when they are sharp. If the outer corners are allowed to become badly worn, the drills will bind and cannot perform satisfactorily. Whenever the outer corners of the cutting lips show wear, the drills should be reground and ever particle of worn surface removed, or the drill will continue to bind and very quickly be damaged beyond repair.

TABLE FOR SPEEDS AND FEEDS

FOR CARBON STEEL DRILLS

Diameter of Drill	Feed per Revolution	Mild Steel	Tool Steel	Cast Iron	Brass and Bronze	Drop Forging
		Cutting Speed, Feet per Minute				
		60 ft.	30 ft.	70 ft	150 ft	30 ft.
		REVOLUTIONS PER MINUTE				
1/16	003	3667	1833	4278	9168	1833
3/32	0035	2750	1375	3208	6875	1375
1/8	004	1833	917	2139	4584	917
5/32	0045	1527	764	1782	3820	764
3/16	005	1222	611	1426	3056	611
7/32	0055	1069	534	1248	2674	534
1/4	006	917	458	1070	2292	458
9/32	0065	825	412	963	2062	412
5/16	.007	733	367	856	1833	367
11/32	0075	672	336	784	1680	336
3/8	.008	611	306	713	1528	306
13/32	0085	567	284	662	1410	284
7/16	009	524	262	611	1310	262
15/32	0095	491	245	573	1228	245
1/2	010	458	229	535	1146	229
9/16	0105	412	206	481	1031	206
5/8	.011	367	183	428	917	183
11/16	.0115	336	168	392	840	168
3/4	012	306	153	357	764	153
13/16	0125	284	142	331	709	142
7/8	013	262	131	306	655	131
15/16	0135	245	123	286	614	123
1	014	229	115	267	573	115
1 1/8	.015	204	102	238	509	102
1 1/4	.016	183	92	214	458	92
1 3/8	016	167	83	194	417	83
1 1/2	016	153	76	178	382	76
1 5/8	016	141	70	165	353	70
1 3/4	016	131	65	153	327	65
1 7/8	016	122	61	143	306	61
2	016	115	57	154	287	57

TABLE OF SPEEDS AND FEEDS

FOR HIGH SPEED DRILLS

Diameter of Drill	Feed per Revolution	Mild Steel	Tool Steel	Cast Iron	Brass and Bronze	Drop Forging
		Cutting Speed, Feet per Minute				
		120 ft	60 ft	140 ft.	300 ft.	60 ft.
		REVOLUTIONS PER MINUTE				
1/16	003	7334	3666	8566	18336	3666
3/32	0035	5500	2750	6417	13750	2750
1/8	004	3666	1834	4278	9168	1834
5/32	0045	3055	1528	3565	7640	1528
3/16	005	2444	1222	2852	6112	1222
7/32	0055	2139	1069	2496	5348	1069
1/4	.006	1834	916	2140	4584	916
9/32	0065	1650	825	1926	4125	825
5/16	007	1466	734	1712	3666	734
11/32	0075	1344	673	1569	3361	673
3/8	008	1222	612	1426	3056	612
13/32	0085	1135	568	1324	2838	568
7/16	009	1048	524	1222	2620	524
15/32	0095	982	491	1146	2456	491
1/2	010	916	458	1070	2292	458
9/16	0105	825	412	963	2063	412
5/8	011	734	366	856	1834	366
11/16	0115	673	336	785	1681	336
3/4	012	612	306	714	1528	306
13/16	0125	568	284	663	1419	284
7/8	.013	521	262	612	1310	262
15/16	.0135	491	246	573	1228	246
1	014	458	230	534	1146	230
1 1/8	015	408	204	476	1018	204
1 1/4	.016	366	184	428	916	184
1 3/8	016	334	166	388	834	166
1 1/2	.016	306	152	356	764	152
1 5/8	.016	282	140	330	706	140
1 3/4	016	262	130	306	654	130
1 7/8	016	244	122	286	612	122
2	.016	230	114	268	574	114

In grinding high speed drills, care should be taken not to overheat them, and when heated they should never be plunged into cold water. Doing so is likely to cause small surface cracks which reduce the efficiency of the drill and may result in serious damage to it. Forcing the grinding on a wet grinder may also bring about the same condition.

If the suggestions for grinding drill points contained herein are followed and drills are run at the proper speeds and feeds, satisfactory results are practically assured.

It is, however, hardly possible to do this grinding as accurately by hand as by using a good twist drill grinding machine, of which there are several on the market, and we earnestly recommend their use.

Broken or damaged tangs of drills are generally the result of an imperfect fit of the drill shank in its socket, which may be caused by a "worn out socket," "dirt or chips accumulating in the socket," or "bruises on the shank of the drill." In either case the driving power of the taper is reduced or destroyed, resulting in an abnormal strain being put upon the tang.

A drill of either carbon or high speed steel that can be filed is not necessarily too soft for service; in fact, if drills were tempered so that a good file would make no impression, they would be entirely too hard for general use. If you have any doubt regarding the temper, try the drills in actual service.

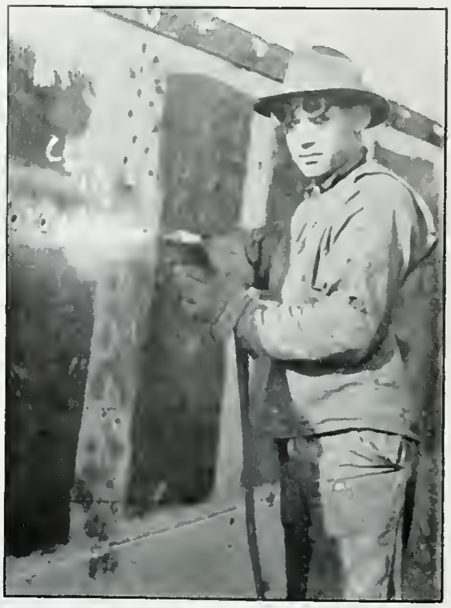
Speeds and Feeds

There are so many conditions affecting drilling operations that it is extremely difficult to establish "hard and fast" rules for speeds and feeds.

The tables given below can be safely followed when drilling in commercial materials. Exprience will enable the operator to determine what changes, if any, can be made from them.

Assuming the drill is properly ground, when the corners of the cutting lips wear away rapidly, it is an indication that the speed is too great. If the cutting edges roughen or break out in minute particles it indicates that the feed is too great.

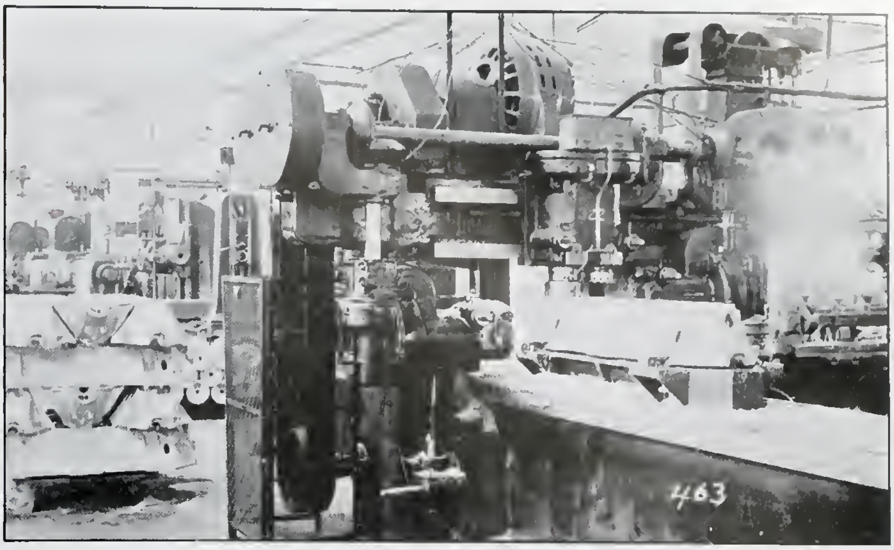
A word of caution will not be amiss regarding the use of very small drills. It is seldom that these are run at more than a fraction of the speed necessary to obtain the best results, and excessive breakage is inevitable. These are delicate tools; be sure they run true and that the cutting edges are kept sharp. A fine grade emery stone is best suited for this purpose.



United Engineering Company Oxyacetylene Torch operator at work on the renewing of the Matson Navigation Company's auxiliary motorship Annie Johnson. See page 40.

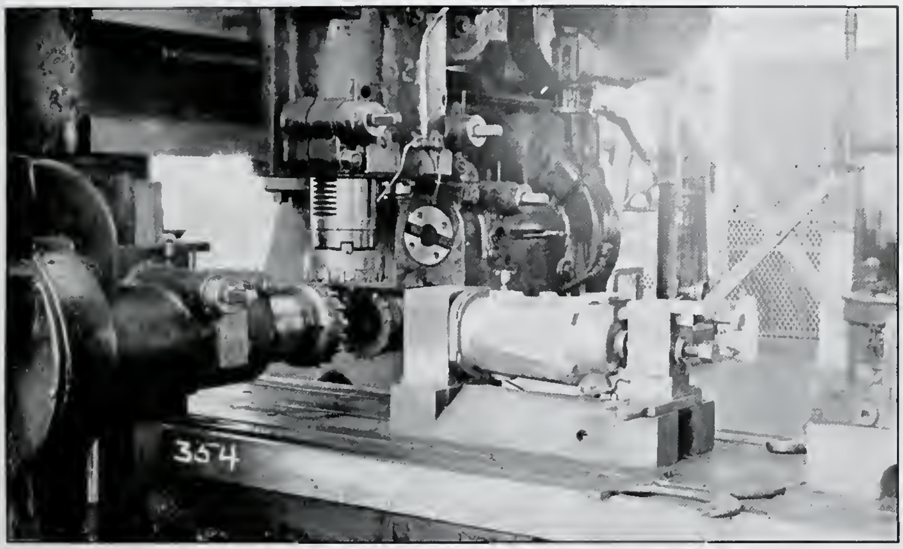
SOME HALL-SCOTT TOOLS

THE illustrations on this page show a few of the machining operations which are carried out at the works of the Hall-Scott Motor Car Company, West Berkeley.



Multiple Spindle Ingersoll Miller machining upper crankcase of Hall-Scott marine motor. Note the individual motor drive and the massiveness of castings and shafting on this machine

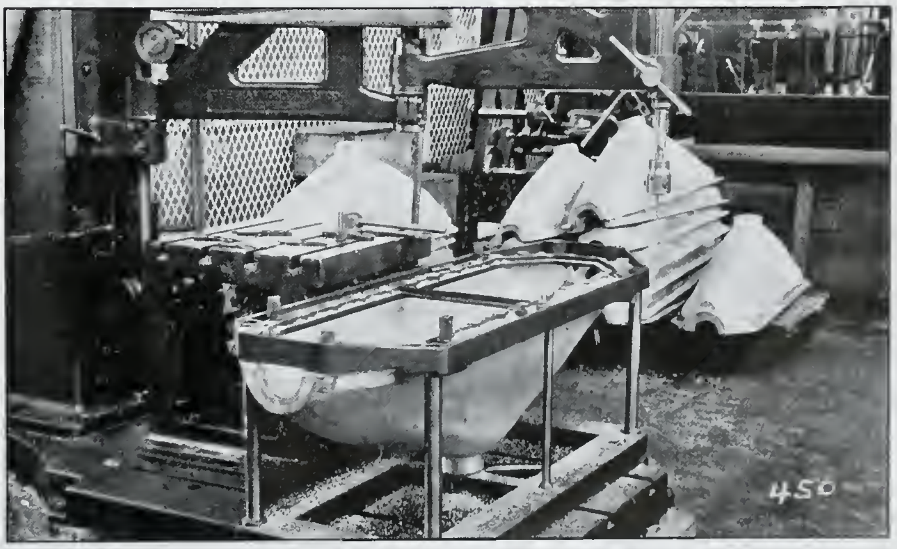
Of chief interest to those interested in manufacturing methods is the multiple spindle Ingersoll milling machine which is shown in several machining operations on the frames and cylinders of Hall-Scott marine motors. This machine gives an opportunity for the use of six milling cutters simultaneously on the top and sides of jigged parts, and for ordinary work within the limits of the machine it is possible to have the cutters working almost continuously, thereby insuring very rapid production. The machine is of very heavy rigid construction, as will be noted from the large diameter of the spindles, depth of bedplate casting, and size of transmission shafting as shown in the pictures. It is driven by its own individual motor and all of the movements are very readily controlled by the operator through conveniently located levers easily accessible from the operating position.



Closeup of the Spindle Heads and Milling Cutters on the Ingersoll Miller arranged for machining cylinders of Hall-Scott marine motors.

W. W. Padden's racing boat Hurricane, a thirty-five foot Hacker Model V-bottom displacement boat powered with two Hall-Scott L. M. Type six-Cylinder motors. Picture taken during the racing at Balboa, September 20, 1920.

Another interesting machine much used in this plant for light work is the Hammond type B radial drilling and tapping machine. This machine with its hinged radial arm and all-belt drive with adjustable tensions has been found extremely useful in jig work for small holes in thin metal. For tapping this machine is provided with a very simple friction reversing clutch so that a slight pressure on a horizontal lever on the spindle head instantly reverses the spindle and backs out the tap at 50 per cent greater speed than the forward drive. The double-hinged radial arm allows very quick and accurate placement of the drill spindle. The all-belt drive with adjustable tension makes the drill capable of adjustment so as to be very sensitive, thus preventing a great percentage of the breakage and wastage of small drills and taps.



Hammond Type B Radial Drilling and Tapping Machine at work on aluminum lower crankcase of Hall-Scott motor

CUTTING CAST IRON

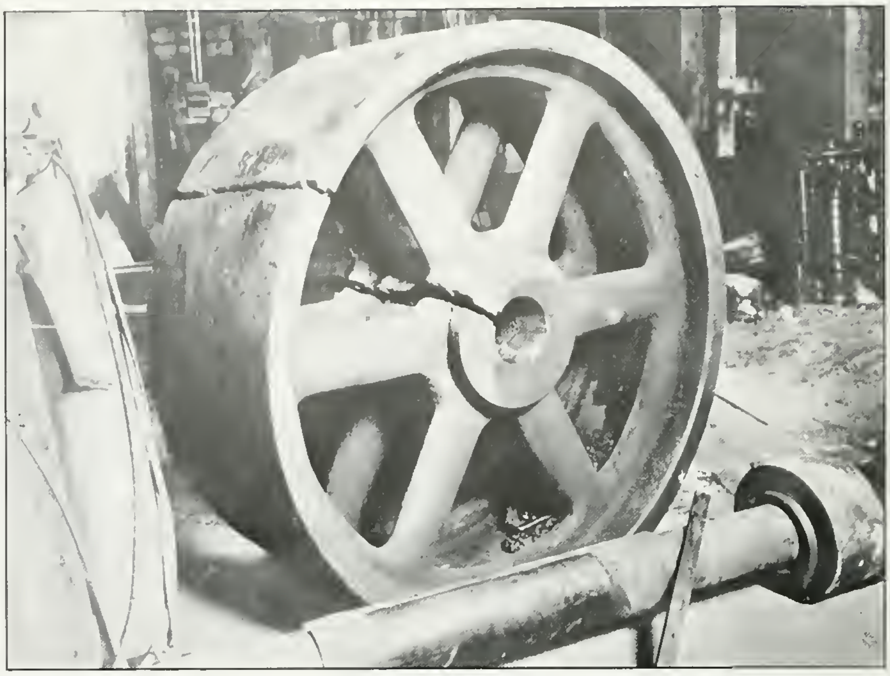
THE Oxweld-Acetylene Company of Newark, New Jersey, through its press service department, offers some very pertinent suggestions to those who are interested in the cutting of cast iron with oxy-acetylene torches. It has demonstrated conclusively that generally surface cutting blowpipes of the injector type require no special attachments for cast iron cutting. The Oxweld blowpipe was not originally designed with a view to cutting cast iron, but after exhaustive experiments a method of operating the torch was developed which can easily be mastered by the average operator and which is entirely successful in cutting the hardest cast iron.

Four outstanding differences are cited between cutting cast iron and cutting steel. First, it is necessary to use heating flames having excessive acetylene. Second, it is necessary to hold the blowpipe nozzle farther away from the metal than in the case of steel. Third, it is necessary to preheat for a longer period. Fourth, it is necessary to continually oscillate the nozzle in order to maintain the cut.

It is said that a good operator bearing these four differences well in mind can make a cut in cast iron, if the material is of good quality, which will have an appearance about equal to that of a fair cut in steel, but that the time required for cutting a given section of cast iron is about twice that required for cutting a similar section of steel, thus making the cost considerably higher in the cast of cast iron.

In cutting cast iron a dark layer will be found extending down from the top surface about 1 inch to 1½ inches. Below that layer the material will be bright, having an appearance about the same as steel.

Be sure that the forward and backward, or the semi-circular, movement of the nozzle allows the blowpipe to cut almost perpendicularly through the dark layer. The lag must not start until below that section. Particular attention must be paid to this condition.


Large cast iron flywheel cut with oxyacetylene flame for removal of steel shaft

If cut is lost, move nozzle back along one edge of the kerf about ½ inch and describe semi-circles lapping that edge and that point where the cut stopped. If the cut is not readily resumed, carry the semi-circles over to include both edges of the cut and the point where the cut stopped.

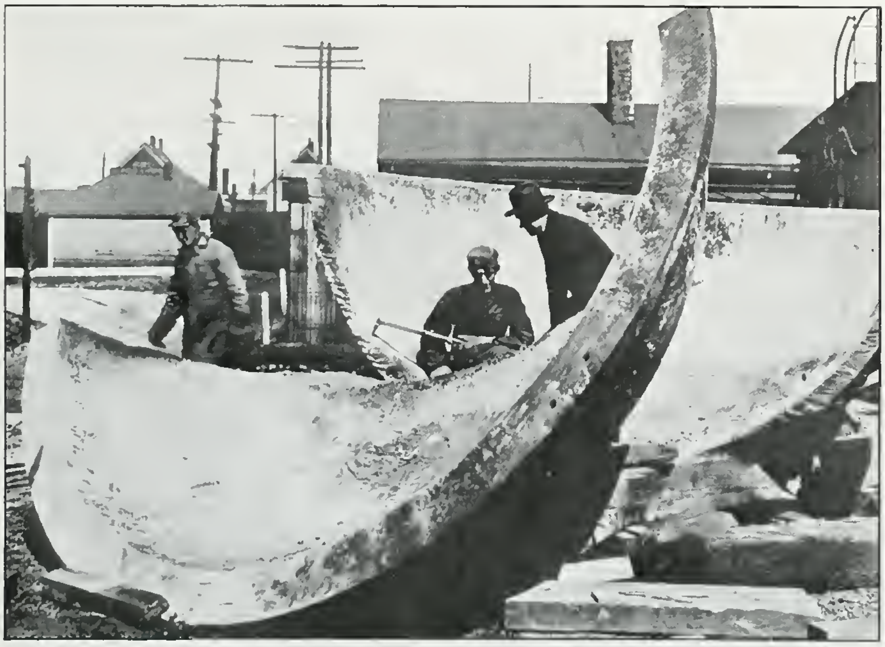
Always wear heavy asbestos gloves and suitable clothing to protect the body, face and head, because cast iron cutting is a very much hotter operation than steel cutting.

Always make sure of ample protection from the heat before starting, so that it will not be necessary to stop the cutting operation to take shelter or provide further protection.

Cast Iron Cutting Chart

Nozzle	Metal Thickness Inches	Oxygen Pressure lb. sq. in.	Excess Acetylene
No. 3	½	45	1 to 1½
	¾	50	
	1	55	
	1¼	60	
	1½	65	
	1¾	70	
	2	75	
No. 4	3	85	1 to 2
	4	95	
	5	105	
	6	115	
	8	125	
	10	155	
	12	175	

(The chart given above, published in March issue of Oxwelding, shows about the same gas values recently published by other investigators in the cast iron cutting field.)


Cast iron melting pot twelve feet in diameter with a flange one foot wide across the top and thickness of between three and four inches cut in half in two hours and thirty-five minutes with an oxyacetylene flame.

NEW AIRCO FACTORY

THE Air Reduction Sales Company has just completed the construction of a four-story addition to its apparatus plant in Jersey City, New Jersey. This to provide for the increased production of the Airco "A" welding and "D" cutting torches, to meet the rapidly increasing demand for this apparatus.

The extension has been built in accord with the principles of modern factory construction. It is of brick, with reinforced concrete floors. Careful attention has been paid to securing maximum lighting, and in every other way the comfort and safety of employes have been considered.

The expansion of Airco's facilities for quantity production places it in the position of being one of the largest manufacturers of welding and cutting apparatus in the country.

WITH THE EXPORTERS AND IMPORTERS

Rates and Freights

EVIDENCE accumulates to prove that the railroad rate increases of August 26 will be a factor of the first importance in building up the intercoastal trade of the United States. Each week brings some new development either in domestic or foreign trade. Announcement has been made by the Pacific Coast North Atlantic Eastbound Conference of import commodity rates on shipments originating in Japan, China and the Philippines, following upon the publication of similar tariffs for commodities from Australasia, which were printed in Pacific Marine Review for December. So far as domestic commerce is concerned an increasing tendency is apparent to turn from the railroads to the intercoastal steamships, not alone because of the lower steamer rates but because quicker deliveries actually are being made by water, and, with the new Luckenbach schedule of eighteen days between New York or Philadelphia and San Francisco in effect, the intercoastal service, already good, will be improved greatly. On the score of rates the lumber and fruit producers of the Pacific Coast have found in the intercoastal services their primary hope of being able to market their goods on the Atlantic in competition with sections favored by lower rail tariffs. A lack of refrigerator ships handicaps the fruit growers, but there is hope that the lack may be met soon.

Refrigerator Service Planned

Harris Livermore, president of the United American Lines, operating the American-Hawaiian Steamship Company, is giving consideration to a plan of installing refrigerating equipment in some of the vessels of the fleet, with a view of eventually placing wholly refrigerated vessels in the intercoastal trade. Impetus was given to suggestions looking toward use of refrigerator ships by a conference held in San Francisco December 20, which was called by G. B. Daniels, state market director, at the direction of Governor Stephens. At this meeting F. A. Hooper, general freight agent of Williams, Dimond & Company, agents of the United American Lines, conferred with the representatives of growers and shippers regarding the freight that would be offering should the American-Hawaiian place refrigerated vessels in the intercoastal service. Data were assembled and sent to New York for Mr. Livermore's consideration.

$21,000,000 Increased Cost

A table was prepared by the conference showing the increased freight cost due to the railroad rate increases of August 26, based on the 1919 shipments of California products. On a minimum carload basis, that is, if each car carried only 40,000 pounds, the total tonnage moved out of the state was 2,434,683, which under the old railroad rates cost $65,688,600, but under the new would cost $86,461,100, the increase being no less than $20,775,700. The shipments of 1920 are expected to exceed those of 119 by 20 or 25 per cent. On the basis of $21,000,000, Mr. Hooper, in order to have a basis of discussion, suggested rates that would make possible a saving of $8,000,000.

The table in question shows the following deadweight tonnages of California products shipped from the state in 1919; beans, dry, 172,908; fruit, citrus, 637,509; fruit, deciduius 244,951; fruit, dried, 195,810; apples, 62,295; nuts, 31,000; vegetables, green, 140,340; vegetables, potatoes, beets, etc., 282,975; melons and cantaloupes, 120,000; grapes, 280,865; olives, 12,000; raisins, 254,030. Not all these products could be classed as refrigerated goods, of course, but the quantities are sufficiently large to supply cargo for a fleet of impossible size. If the average refrigerator ship carried 9000 measurement tons of cargo, one sailing a day scarcely would avail to move the total of California alone, without Oregon and Washington being considered. But the only plan would be to move a portion of the tonnage, sufcient, however, to relieve the railroads.

Distributed Movement Necessary

One important aspect of the problem is the fact that the crop movement manifests a pronounced peak, so that the economical operation of a fleet of refrigerated vessels would demand the distribution of the shipments throughout the year. Careful consideration was given to this point. No guarantee of freight, however, was asked by the American-Hawaiian, inasmuch as the company was persuaded that business offered in sufficient quantities, provided that other problems could be settled satisfactorily.

A permanent organization, known as the California Producers' and Shippers' Transportation Association, was formed by the conference, and a decision was made to strive for reductions in railroad rates; to demand that reductions be made on a varying scale as circumstances required; and to assist in harmonizing elements affecting transportation costs.

Due to the increases in railroad rates, the situation of some growers of the Pacific Coast has become critical, in that they find their margin of profit wiped out. To remedy this condition the growers' conference was called.

Intercoastal Import Tariffs

Tariffs 3, 4 and 5 of the Pacific Coast North Atlantic Eastbound Conference were published during December. These name intercoastal import commodity rates on goods originating in China, Japan and the Philippines and moving to the Atlantic via a Pacific port, and are designed to make it possible for the trans-Pacific steamship lines to compete with the direct Atlantic-Orient companies. The three tariffs follow:

Tariff No. 3, Pacific Coast North Atlantic Eastbound Conference, direct commodity rates from Pacific Coast ports, San Pedro-Puget Sound range, on shipments originating at Moji, Yokohama, Nagasaki and Kobe, to United States North Atlantic ports; first figure is item number, then follows commodity and then rate in cents a hundred pounds, any quantity:

70, beans exclusive of cocoa, vanilla and tonka beans), lentils, peas, dry, in bags, 70.

95, camphor, crude, in packages; camphor, refined, hermetically sealed cans; camphor, oil, red and white in cases, 175.

316, peanuts, unshelled, 130.

317, peanuts, shelled, 100.

325, oils, liquid, or solidified (crude or refined); oil residium, viz.: bean, China wood, cocoanut, cottonseed, fish, nut, palm kernel, rape seed, seed, silk worm, soya bean; oil residium, soapstock or foots, 75.

390, seed, viz.: in packages, alfalfa, beet, canary, clover, fescue, flax, grass, fog, hemp, millet, rape, sesame, sorghum, sunflower, 110.

395, shells, in the rough, viz.:, in bags, abalone, clam, mussel, oyster, pearl, snail, 85.

410, skins and hides, viz.:, badger, buffalo, cat, dog, fox, kangaroo, kolinsky, marmot, mink, opossum, pahmih, rabbit, racoon, squirrel; tails, fox; tails, weasel; wallaby, weasel, wombat, 200.

415, skins (dry) and hides (dry); rugs and mats, viz.:, cattle, deer, goat, hair seal, horse, sheep, sheep slats, 140.

455, tea, in packages, 110.

486, wax, vegetable, 85.

495, wool, in bales, compressed, 100.

1000, general cargo, 40 a cubic foot; $16 W or M.

Tariff No. 4, on shipments originating at Shanghai and Hongkong:

70, beans (exclusive of cocoa, vanilla and tonka beans), lentils, peas, dry, in bags, 70.

75, bean cake, 60.

95, camphor, crude, in packages; camphor, refined, in hermetically sealed cans; camphor oil, red and white, in cases, 150.

155, eggs, in packages; eggs, dried; eggs, shelled (egg albumen, white or yolks, or white and yolks together); frozen, in metal cans; yolks, dried eggs; albumen, dried eggs, 90.

170, feathers, in natural state, compressed in bales, viz.:, chicken, duck, goose, turkey, 120.

175, firecrackers, in packages, 50.

315, nuts, edible, as follows: peanuts (shelled), in packages, 60.

317, peanuts (unshelled), in packages, 130.

325, oils, liquid, or solidified (crude or refined), oil residium, in packages, viz.: bean, China wood, cocoanut, cottonseed, fish, nut, palm kernel, rape seed, seed, silkworm, soya bean; oil residium, soakstock or foots, 75.

326, oil, essential, 80.

386, ramie, in bales, 100.

390, seed, viz.:, in packages, alfalfa, beet, canary, clover, fescue, flax, grass, fogseed, millet, rape, sesame, sorghum, sunflower, 110.

391, hemp seed, in packages, 80.

410, skins and hides, viz.:, in bales, badger, buffalo, cat, dog, fox, kangaroo, kolinsky, marmot, mink, opossum, pahmih, rabbit, racoon, squirrel; tails, fox; tails, weasel; wallaby, weasel, wombat, 200.

415, skins (dry) and hides (dry), rugs and mats, viz.: cattle, deer, goat, hair seal, horse, sheep, sheep slats, 120.

420, spices, condiments dry or preserved, in packages: areca nuts, betel cassia, chillies, cinnamon, cloves, ginger, dry or preserved, mace, nutmegs, pepper, turmeric, 75.

455, tea in packages, 110.

470, tin, block, pig, bar, slab, 40.

495, wool and mohair, in grease, in bales, compressed, 100.

500, wool and mohair, scoured, in bales compressed, 120.

600, general cargo, $10 W or M.

Tariff No. 5, on shipments originating at ports of the Philippine Islands:

135, copra, in packages, copra cake, copra meal, 60.

175, fibre, viz.:, in pressed bales, flax, jute, straw, hemp, raw jute, sisal, rice straw, towflax, spinner's waste flax, 75.

230, gums, in packages, including copal, damar, kowrie, shellac, east india, manila, pontiac, bird lime, cutch, catechu, gambier, japonica or terra japonica, gelotong, 62½.

255, kapok, in bales, 62½.

295, lumber, hardwood (except cocoa barrels, ebony, lignum-vitae, rosewood), 70.

310, nuts, edible, viz.:, in packages, pelinuts, 75.

325, oils, liquid or solidified (crude or refined) and oil residuum, viz.:, in packages, bean, China wood, cocoanut, cottonseed, fish, nut, palm kernel, rape seed, seed, silkworm, soya bean; oil residuum, soapstock or foots, 75.

395, shells, in the rough, in bags, viz.: abalone, clam, mussel, oyster, pearl, snail, 85.

400, general cargo, $15 W or M.

Effect of New Tariffs

Statements showing rates on various commodities from China, Japan and the Philippines to New York and Pacific Coast ports have been prepared by the Pacific Coast North Atlantic Eastbound Conference. Intercoastal rates on many commodities already were in existence and in some cases were sufficiently low to make competition possible; several rates are unchanged. Only those rates that have been reduced or that are quoted for the first time are given below. All figures except lumber are for tons of 2000 pounds. The last column, "Present Rail and Water Rate," lists rates on goods moving by rail to New Orleans or Galveston and thence to New York by steamship. The table follows:

Commodity	Meas. cu. ft.	Rate to N. Y.	Rate to Pacific Coast	Differential	Old Intercoastal Rate	New Intercoastal Rate	Import Rail Rate	Present Rail and Water Rate
SHANGHAI								
Feathers	95	$68.87	$41.51	$27.36	$40	$24.00	$50.00	$50.00
Hides, dry	120	63.00	36.50	26.50	28	24.00	43.30	40.00
Skins	120	63.00	36.50	26.50	50	40.00	53.30	53.30
Egg Albumen and Yolk	51	37.67	19.12	18.55	36	18.00	53.30	46.00
Peanuts, shelled	.....	27.00	15.00	12.00	26	12.00	40.00	35.00
General Cargo	W or M	25.00	17.50	7.50	....	10.00	....	....
HONGKONG								
Peanuts, shelled	......	30.00	15.00	15.00	26	12.00	40.00	35.00
Tin, block	......	19.00	15.00	4.00	12	8.00	20.00	15.00
Firecrackers	85	61.62	42.50	19.12	80	20.00	....	....
Feathers, baled	95	68.40	41.56	26.84	40	24.00	50.00	50.00
Ginger, preserved	88	31.00	38.50	....	22	15.00	33.30	33.30
Oil Essentials	42	32.55	28.85	3.70	80	16.00	....	....
Skins	120	63.00	75.00	....	50	40.00	40.00	40.00
General Cargo	W or M	25.00	17.50	7.50	....	10.00	....	....
PHILIPPINES								
Kapok	130	34.00	21.25	12.75	30	12.50	41.70	41.70
Lumber	......	30.00 M feet	17.50 M feet	12.50 M feet	25 M feet	14.00W	21.30W	....
Pelinuts	......	30.00	15.00	15.00	26	15.00	46.70	....
Gums	......	25.00	12.50	12.50	18	12.50	26.70	20.00
General Cargo	W or M	30.00	15.00	15.00	....	15.00	....	....
JAPAN								
Hides, high value	120	84.00	19.00	65.00	50	40.00	53.30	53.30
Peanuts, shelled	......	38.00	11.00	27.00	26	20.00	40.00	35.00
General Cargo	W or M	25.00	9.00	16.00	....	16.00	....	....
Camphor	90	78.75	16.00	62.75	....	35.00	40.00	34.00

A specific instance of quicker delivery and lower rates by water is cited by a Pacific Coast shipbuilding company, which in common with most Pacific Coast yards, found itself severely handicapped by inability to get steel promptly. The best rail deliveries have been between twenty-five and thirty days, some shipments required as long as six weeks, Pittsburgh to San Francisco, and others two months, Buffalo to San Francisco. As opposed to this the new Luckenbach service should be at least as good as the railroads' best, and far superior to the railroads' worst, which has been very bad indeed; and, moreover, the steamship charges are appreciably less than those of the transcontinental lines. Prior to August 26 the railroad rate on plates, Pittsburgh to San Francisco, was $1, minimum of 80,000 pounds, and $1.25 for less; from Chicago, 90 cents and $1. Shapes were $1.25, either city, any amount. The railroad rate increases were 33 1/3 per cent, so that shapes and plates of less than 80,000 pounds now carry a rate of $1.66 2/3 Pittsburgh to San Francisco. This compares with a rate, Pittsburgh to New York, of 38 cents; plus 75 cents for shapes and 70 cents for plates, intercoastal steamship service; plus 15 cents for insurance, handling in San Francisco, etc., the totals being $1.23 and $1.28. Philadelphia and Baltimore are 5 cents cheaper than New York.

Railroads May Adjust

No decided action has been taken by the Eastern railroad lines to adjust import and export rates in order to place the Pacific on a basis of equality with the Atlantic, so that the reductions continue to be effective only to Chicago. A vigorous sentiment prevails in some quarters against any reduction in the East, because it is held that territory naturally is tributary to New York and other Atlantic ports. Such an argument fails to take into consideration the normal westbound movement of empty cars, to which Admiral Benson referred in his addresses defending Section 28 of the Merchant Marine Act, but of course Atlantic shipping operators and exporters are not interested primarily in filling those trains.

The railroads are interested, however, and there are reports that the Eastern and Western lines may hold a meeting in Chicago about the first of the year at which something may be done. A changed attitude is clearly discernible on the part of some of the roads. Much delay followed the increases of August 26 before any reductions were made and even then the action of the Western rail lines was not promptly unanimous, independent action having been taken by the Great Northern, Northern Pacific, Western Pacific, which was followed within a few days by such roads as the Southern Pacific and Santa Fe. But some of the lines are discovering that the import and export business meant more than they had realized; domestic freight is not so plentiful as it was a few months ago. No gift of prophecy is necessary in order to foresee that all the roads may be begging within a year or so for freight that they are indifferent to now. By that time the position of the intercoastal steamship lines should be greatly strengthened.

New Steel Rate Useless

A new export rate on steel from Birmingham has been announced by the Transcontinental Freight Bureau of 71 cents a hundred as against the old rate of 80 cents. At first the reduction appeared to be of benefit, but that belief changed when the export rate to New Orleans of $2.50 a ton was considered, the total rail and water rate via New Orleans being $20.35 as compared with $25.45 a ton via a Pacific Coast port—a differential in favor of New Orleans of $5.10.

The Los Angeles Chamber of Commerce, which has been vigorously attempting to obtain reductions in import and export rates and a consequent restoration of the parity between the Atlantic and Pacific, has urged that Pacific Coast interests meet in conference to discuss plans of action. Although individual business men had been alive to the seriousness of the situation, the chambers of commerce generally have appeared apathetic.

Should the meeting of railroad officials be held, Pacific Coast steamship operators will have data to submit. Tables have been prepared showing the situation of the Pacific in competing with the Atlantic for cargo destined to the Far East.

Auto Differentials Favor East

The first of the statements gives comparisons of through charges on passenger automobiles of various makes and models from the cities of manufacture in the United States to Manila, Hongkong, Shanghai, Yokohama, Kobe, Nagasaki and Moji via the Atlantic and Pacific. Of all cars the touring Ford probably is the most common, and certainly it appears to be the most popular in the Far East, so that figures for that model may be cited as illustrating the situation of the Pacific Coast. All rates are reduced to tons of 2000 pounds:

Ford touring car, 124 cubic feet to 2000 pounds.

From Detroit via New York: Rail rate to New York, $27.20; ocean rate from New York, $62; through rate via New York, $89.20.

From Detroit via Pacific port: Rail rate to Pacific Coast, $86.70; ocean rate from Pacific Coast, $31; through rate via Pacific Coast, $117.70.

Differential in favor of New York for 2000 pounds, $28.50; differential in favor of New York for 40 cubic feet, $7.12; Pacific rate necessary to meet New York competition, 40 cubic feet, $2.88.

That amount, $2.88, is little enough for carrying a measurement ton of freight to Shanghai or Hongkong. As a matter of fact, the differential in favor of New York is prohibitively great.

The rates for 40 cubic feet necessary to meet New York competition are given for other cars: Studebaker, Special 6, $4.94; Light 6, $4.25. Essex, touring, $4.57. Ford runabout, $3.38; sedan, $6.50. Scripps-Booth, touring, $4.50. Dodge, touring, $11; roadster, $11.87; sedan, $29.12. Chevrolet, 490 touring, $5.05; roadster, $5.11; sedan, $8.98. Chevrolet, F. B., touring, $5.67; roadster, $6.17; sedan, $10.95. Buick, touring, $5.33; roadster, $5.30; sedan, $9.49 and $9.36. Velie, touring, $24.90; sedan, $36.40.

New Orleans After Business

New Orleans also is bidding for the business since the increases of railroad rates August 26. The Pacific Ocean rate necessary to meet New Orleans competition in the case of the Ford touring is $2.55, even less than the $2.88 necessary to compete with New York. Figures on other cars are: Studebaker, Special 6, $4.62; Light 6, $3.93. Essex, touring, $4.24. Ford, runabout, $3.05; sedan, $6.18. Scripps-Booth, touring, $4.18. Dodge, touring, $10.67; roadster, $14.05; sedan, $28.80. Chevrolet, 490 touring, $5.05; roadster, $5.11; sedan, $8.98. Chevrolet, F. B., touring, $5.67; roadster, $6.16; sedan, $10.95. Buick, touring, $5.33; roadster, $5.30; sedan, $9.48 and $9.36. Velie, touring, $24.90; sedan, $36.40.

In the cases of the Dodge, all models; Chevrolet, F. B. sedan, and Velie, moving via either New York or New Orleans, the differentials favor the Pacific Coast, which accounts for the high rate given as necessary to compete with New York. In all other cases the differentials favor New York and New Orleans, as may be deduced from the low rates that Pacific lines must fix if they are to attract any business.

Rate War Remote

Possibility of a rate war in the trans-Pacific trade was made still more remote by a general meeting of the Pacific Westbound Conference held in Seattle the last of November. That Mitsui & Company had agreed to rejoin the conference and that the Blue Funnel would maintain conference rates was stated in these columns last month. Both these decisions were reiterated at the general meeting, and other action tended to draw the lines closer together.

Prevent Misunderstandings

Of primary importance was the decision of the Blue Funnel and the Dollar Line of Canada to have representatives attend the meetings of the Pacific Westbound Conference. Although neither of these lines is a member of the conference, inasmuch as they wish to be at liberty to move as they see fit, the willingness of both to participate in conference meetings indicates that they seek amicable settlements of differences. As a result of attending the meetings, both lines will be kept well informed of the decisions of the conference lines and misunderstandings will be less likely to arise.

After Mitsui & Company had been formally readmitted to the conferences, representatives of the Blue Funnel reiterated that the line would abide by conference rates and would assist members in meeting competition from outside lines. Similar statements were made by Melville Dollar. Amity having been restored, the conference made another move of importance, permission being given to the southern section to make its own rates on petroleum and petroleum products, in which the northern group is not directly interested; and permission was granted the northern section in turn to make its own rates on wood, wood pulp, coal, lumber and lumber products.

Changes in Rates

A new rate of $6.50 was made for coal originating in Ogden and eastward, with a view to attracting shipments from Utah. The rate on Vancouver coal remains $10. Old newspapers will move at $12 a ton weight, the cubic measurement not exceeding 50 feet to the ton, as against the former rate of $12 a ton measurement. This in effect is a reduction. Other rate reductions were: flour, from $10 to $7; cement, $10 to $9; lumber, $17.50 to $15.

Representatives of southern lines who attended the meeting were: Daulton Mann, Pacific Mail; A. S. Darrow, T. K. K.; Mr. Dodd, Java-Pacific; W. K. Sempe, China Mail; M. J. Mayfield, agent of the Pacific Westbound Conference; W. M. Minor, traffic manager, and C. O. Burgin, conference secretary, Shipping Board, San Francisco district. The northern lines represented were: Struthers & Dixon, Frank Waterhouse & Company, the Pacific Steamship Company, Canadian Pacific, N. Y. K., O. S. K. and Mitsui, in addition to Dollar and the Blue Funnel.

Rubber Rate Cut

C. O. Burgin, secretary of the United States Shipping Board conferences, San Francisco, has submitted figures to the foreign trade department of the San Francisco Chamber of Commerce, showing that it is now much cheaper to ship rubber from Singapore to Akron, Ohio, via San Francisco than via New York.

Cable advices just received state that the rubber rate from Singapore to Pacific Coast ports has been reduced from $17.50 for forty cubic feet to $12.50 for the same space in order to equalize at Akron the movement of this commodity from the Orient through New York. This reduction places San Francisco in a most favorable position to obtain the import movement of rubber.

A comparison of through charges on rubber from Singapore to Akron based on 52½ cubic feet for 2000 pounds of rubber follows:

New York—Ocean rate for forty cubic feet, $26.40; rail rate, New York to Akron, 2000 pounds, $10.50; through charge, $45.15 for 2000 pounds.

San Francisco—Ocean rate for forty cubic feet, $12.50; rail rate, San Francisco to Akron, 2000 pounds, $26.65; through charge, $43.05 for 2000 pounds.

This shows a difference in favor of San Francisco of $2.10 a ton. Prior to this reduction in Pacific ocean rates the movement of rubber through this port had been very small, but with this saving to be made by shippers, Mr. Burgin states that a considerable tonnage should begin to arrive at San Francisco for rubber manufacturing concerns in the East.

Appeal to Shippers

In a letter addressed to commercial organizations throughout the country, Admiral W. S. Benson, chairman of the Shipping Board, says that American cargoes must be carried in American vessels if the country's merchant marine is to succeed. Admiral Benson's letter follows:

"It is imperative that the attention of the American people, and especially of the business interests of the country, should be called at once to certain conditions today confronting the American merchant marine, their causes, and the necessity of concerted action in meeting them. Owing in great part to the competition brought into the world's shipping situation by the building of the American merchant marine, ocean freight rates have been tremendously reduced. This situation has been accentuated by a simultaneous falling off in international trade, due to many conditions unnecessary to discuss here. This situation has developed until freight rates on many routes have dropped to an unprofitable level.

Must Carry American Cargo

"These traffic conditions have evolved to a point where it is imperative that American cargo be carried in American bottoms if our American merchant marine is to succeed. Two things must transpire: the volume of freight on profitable routes must be increased to meet the losses from competition on the unprofitable routes; American cargo must be kept out of foreign bottoms in order to prevent them from conducting ruinous competition.

"We are inviting your attention, therefore, to the figures set forth in the attached table covering the movements of cargo carried by American and foreign vessels for the week ending November 6, the last available statistics, through Pacific ports, of which your port is one, so that you may judge for yourselves this situation. Based upon this showing we would ask you to inaugurate a campaign among the shippers of your city to patronize American-owned tonnage. We would also ask you to communicate with public bodies in cities contributing tonnage for shipment through your port, to the same end. And in making this appeal for American-owned shipping, may I suggest to your organization, and through you to representative bodies of other cities:

"1. That the low ocean freight rates enjoyed today by them are primarily due to the American merchant marine;

Fleet Our Protection

"2. That if it were not for the American merchant fleet the foreigners would today be operating in combinations to control the ocean freight rates of the world to place them at such figures as they should see fit;

"3. That if the American fleet did not exist today, foreign-owned tonnage would be used as a subsidiary to foreign-manufactured goods; and American goods would enjoy the markets of the world after merchants and manufacturers of foreign countries had been given opportunity to supply the world's needs;

"4. That if the American merchant marine did not exist there would not be sufficient shipping to handle the world's trade in normal times, and consequently the products of foreign countries owning the shipping would undoubtedly be preferred as cargo to the products of the United States; and

"5. That patronage given to foreign ships means the transfer of capital from this country and the creation of a second foreign debt such as existed before the late war, and at the same time the rendering unprofitable of a great investment made in shipping by the American people.

"When you have investigated the statistics presented herewith, together with the five points I have set forth above, I believe you will join with me in doing everything within your power as an organization to meet the critical situation now confronting American shipping."

Pacific Cargo Movements

The table covering movements of cargo through Pacific Coast ports for the week ending November 6 follows:

	Vessels Number		Vessels Per Cent		With Cargo Per Cent		With Ballast Per Cent		For Bunkers Per Cent		In Transit Per Cent	
	Am.	For.	Am.	For.	Am.	For.	Am.	For.	Am.	For.	Am.	For.
Entrances....	40	26	60	40	75	90	25	10	0	0	0	0
Clearances .	36	30	55	45	78	74	8	10	0	3	14	13

	Cargo Reported Tons		Cargo Reported Per Cent.		Missing Cargo Reports		Cargo Reported Number of Vessels and Av. Cargo per Vessel American		Foreign	
	Am.	For.	Am.	For.	Am.	For.				
Entrances..	37,017	15,526	79	30	3	10	27	1371	13	1194
Clearances	41,156	21,737	65	35	6	12	22	1871	10	2174

Freight Report

December 13, 1920.

Our last circular was dated November 16, since which time freights have steadily decreased in value.

The Pacific Grain Company had chartered steamer D. A. D. G. No. 76, prior to arrival from Portland to U. K. Continent, at $20 per ton on wheat. This boat, however, missed her cancelling date and the charter was cancelled, although the Pacific Grain Company again chartered her at a reduction of $2 per ton.

Kerr, Gifford & Company chartered steamer Hermion from Portland to U. K. Continent at 120/-, followed by Strauss & Company taking the Dutch steamer Elbergen, with the option of loading barley at San Francisco at the same rate of freight. The Shipping Board then met these reductions by chartering two steamers on the basis of $18 per ton, one the Quillyark to Kerr, Gifford & Company from Portland to Italy or U. K. Continent, freight prepaid, and the steamer Haxtum to Park & Ashburn.

The Dutch steamer Arakan was chartered a few days later by Kerr, Gifford at 95/-, and M. H. Houser chartered Mt. Berwin to Italy at $15 per ton. Later the fine motorboat Theodore Roosevelt was closed by Pacific Grain Company for February loading to U. K. Continent, Bordeaux to Hamburg, at 87/6, option Mediterranean not east of West Coast of Italy at 92/6, wheat and/or flour from Portland or Puget Sound.

Kerr, Gifford & Company last week arranged space from Portland or Puget to a United Kingdom port, for about 5000 tons, per Dodwell liner Eurydamas at 90/-. From San Francisco, Balfour, Guthrie & Company chartered French sailer Noemi with barley to U. K., Havre, Antwerp or Dunkirk at 135/-, an advance of 5/- on the one taken previously by them. This rate, of course, is reduced in that they get a full 6¼ per cent commission on the freight.

Some business has been done by shippers on barley by regular liners. About the middle of November a Shipping Board steamer gave space at $22 per ton, and foreign liners have since accepted 90/- per ton a direct port in the United Kingdom.

Lumber freights have also weakened in line with grain freights. Christenson, Hanify & Weatherwax chartered Dutch steamer Kelbergen to load ties from the North to one port in United Kingdom at $35 United States gold, and later the Shipping Board made up their minds to accept the same price for two of their steamers, and other foreign steamers have since tried to get $35 without success.

The steamer Windber has been chartered for lumber from the North to Santo Domingo at $32.50 by Santo Domingo charterers.

Schooner C. S. Holmes was chartered by W. L. Comyn & Company at $30 from the North to Callao.

We have heard of no charters lately for lumber to Australia nor to Africa.

The H. R. MacMillan Export Company, Ltd., have chartered one of the Canadian government steamers for ties to Calcutta or Bombay, at a reported rate of about $41.50 Canadian.

In miscellaneous charters we record the charters of the sailers Olympic and Mindanao with coal from Newcastle, N. S. W., to a Peruvian port at 100/-. The steamer Tancred is reported chartered on private terms, for coal from Australia to the Mediterranean, the charter having been arranged by Balfour, Guthrie & Company.

The motorboat Theodore Roosevelt, previously mentioned as chartered for wheat and/or flour from the North to Europe, has accepted $10 per ton for a part cargo of nitrate, 2500 tons, to Honolulu.

London advises the charter of a Norwegian tanker, 9900 deadweight, at $6 for five years, delivery and re-delivery United Kingdom, and also the fact that freights in Australia have weakened for wheat, thence to the United Kingdom, steel sailers having been chartered as low as 80/-.

The only sales reported have been those of the auxiliary sailer Kirketind at $153,000, bought by parties up North. The Inter-Island Steam Navigation Company of Honolulu has purchased City of Topeka at $120,000 for its inter-island trade, and the Campagnie Du Boleo is reported to have bought the tanker Argyle from the Union Oil Company at a price of about $400,000.

We regret to say that the outlook for freights is not good, owing to the decreased buying power all over the world, but we must be hopeful and wait for a change for the better.

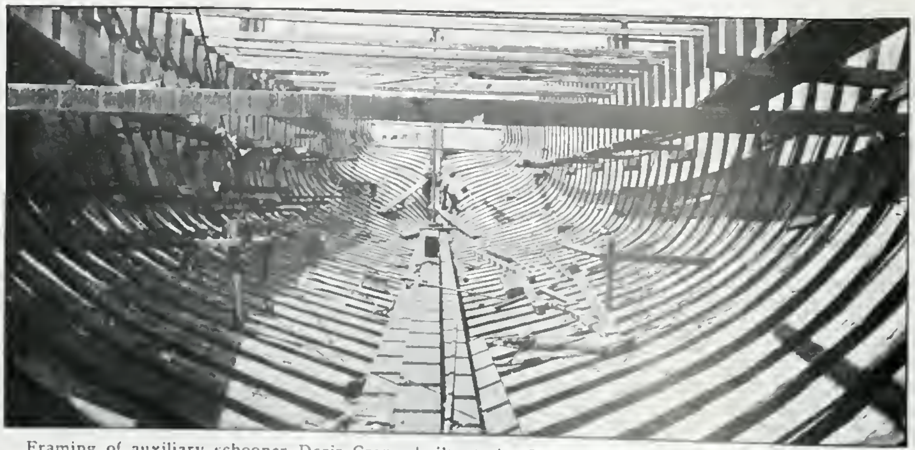
PAGE BROTHERS, Brokers.

Oil Production Grows

That the oil industry is putting forth every effort to meet the petroleum shortage on the Pacific Coast is fully demonstrated in the figures of October crude-oil production, says the Standard Oil Bulletin of November. The October production of 9,458,152 barrels is the largest production ever recorded in California for a month, and is an increase of approximately 1,000,000 barrels over the production of January of this year.

In 1914, during the days of "gusher" wells in the Midway Field, California produced 103,623,695 barrels of crude oil, the state's record output. Many observers believed that production had reached its peak and that it would thereafter decline, this being the history of the oil fields of other states. How little one may see into the future of the industry is well shown from the fact that the production in 1920 will unquestionably exceed the banner year of 1914. The indications are that the output for both November and December will exceed that of October and that the total production for 1920 will be greater than that of 1914 by at least two millions of barrels.

Consumption of California crude oil in October was more than 10,000,000 barrels, and in excess of production by approximately 20,000 barrels per day. While this consumption is probably above normal, it constitutes a record consumption. It appears nevertheless quite possible that the present pace of production and development may overcome the deficiency in production.



Framing of auxiliary schooner Doris Crane, built at the Stone yard, Oakland, for Fanning Island

FULL SPEED AHEAD

Pacific Shipbuilding Work

On December 1, according to returns compiled by Pacific Marine Review, 75 steel merchant vessels of an aggregate deadweight tonnage of 751,640 were under construction or contract in American and Canadian Pacific Coast yards, as compared with 83 vessels of 822,740 tons November 1. Deliveries of American yards in November were: 3 of 30,600 tons for the Shipping Board, all freighters; 4 tankers of 32,400 tons for private account; the status of freighters for private account and of tankers for foreign account remains unchanged. One delivery, of an 8100-ton freighter for the Canadian government, was made by a Canadian yard.

No new contracts have been announced, except that the Todd Drydock & Construction Corporation, Tacoma, is reported to have received a contract for a Navy transport, 484 feet long, 64 broad, of a speed of 16 knots, oil-burning, turbine-engined.

A tabulated statement of Pacific Coast shipbuilding December 1 follows:

American Yards:	Number Vessels	Aggregate Deadweight
Freighters for U.S.S.B.	16	150,300
Tankers for U.S.S.B.	7	*67,800
Tankers, private acct.	31	348,160
Freighters, private acct.	3	34,500
Tankers, private account (foreign)	9	82,280
Total	66	683,040

*includes a 7500-ton concrete tanker.

Canadian:		
Freighters for Govt.	7	59,200
Freighters, private acct.	2	9,400
Total	9	68,600

Construction of freighters for the Shipping Board is being ended by some companies. The Long Beach Shipbuilding Company delivered its last vessel, the 8800-ton West Kebar, in December; Moore Shipbuilding Company delivered its last freighter, the 9400-ton Narcissus, but still is building tankers for the Board; Bethlehem expected to deliver the 11,800-ton Hanley the last of December, leaving that company's two plants of Potrero and Alameda engaged on tankers exclusively, naval work excepted; Hanlon delivered the 5350-ton Medon in December and has one sister, the Memnon, left; only Los Angeles and Pacific Coast have any extensive freighter construction for the Shipping Board ahead of them.

On November 1, 1920, private American shipyards were building or under contract to build for private shipowners 334 steel vessels of 1,206,486 gross tons, compared with 330 vessels of 1,236,327 gross tons on October 1, 1920. These figures do not include government ships or ships building or contracted for by the United States Shipping Board. Ships built in the United States and officially numbered by the Bureau of Navigation, Department of Commerce, during the month of November aggregated 119 of 213,966 gross tons. Of these, 35 of 181,355 gross tons were seagoing steel steamers, 11 of 18,690 gross tons were seagoing wooden steamers, 1 concrete seagoing steamer of 6144 gross tons, and the remainder were small non-seagoing vessels. During the 12 months ended November 30, 1920, the output of ships in the United States was 1845 of 2,977,886 gross tons, compared with 2367 of 4,247,436 gross tons during the 12 months ended November 30, 1919.

Shipbuilding

B. C. MARINE ENGINEERS & SHIPBUILDERS, LTD., VANCOUVER, B. C.

No report.

BETHLEHEM SHIPBUILDING CORP'N, LTD.

Potrero Works

Purchasing Agent: O. W. Street

Hanley, hull 5276, freighter for USSB; keel laid June 26/19; launching Oct./20; delivery Dec. 30/20, estimated; 440 LBP; 56 beam; 28-6 loaded draft; 10½ loaded speed; 11,800 DWT; rec. eng., 2600 IHP; three Scotch boilers, 15x11-9.

Hammac, hull 5274, tanker for USSB; keel Nov. 30/20; launch Apr. 1/21, estimated; delivery June 15/21, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2600 IHP; three Scotch marine boilers, 15x11-9.

Alameda Works

Hambro, hull 5272, tanker for USSB; keel laying Sept. 8/20; launching Jan. 15/21, estimated; delivery Apr. 15/21, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15 x 11-9.

Hamer, hull 5273, tanker for USSB; keel laying Nov. 1/20; launching Feb. 15/21, estimated; dim., etc., same as Hambro.

Crampton Anderson, hull 5303, tanker for Pan Amer. Pet. Co.; keel laid June 11/20; launching Nov. 30/20; delivery Dec. 30/20, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15x11-9.

W. S. Miller, hull 5305, tanker for Stand. Oil Co. of Cal.; keel laid Apr. 26/20; launching Oct. 28/20; delivery Dec. 23/20; dim., etc., same as Crampton Anderson.

E. R. Kingsbury, hull 5306, tanker for Stand. Oil Co. of Cal.; keel laid July 2/20; launching Jan. 15/21, estimated delivery Mar. 20/21, estimated; 440 LBP; 58 beam; 28 loaded draft; 11 loaded speed; 11,600 DWT; rec. engines, 3200 IHP; three Scotch boilers, 15-6 x 12-1.

Yorba Linda, hull 5307, tanker for Gen. Pet. Co.; keel laid May 17/20; launching Nov. 22/20; delivery Jan. 20/21, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15x11-9.

Frank G. Drum, hull 5308, tanker for Ass'd Oil Co.; keel laid Nov. 5/20; launching Feb. 15/21, estimated; delivery Apr. 1/21, estimated; sister to Yorba Linda.

No name, hull 5311, tanker for Standard Oil of Calif.; keel laid Jan. 5/21, estimated; launching May 5/21, estimated; delivery Aug. 15/21, estimated; 500 LBP; 68 beam; 25-11 loaded draft; 11 loaded speed; 15,000 DWT; rec. engines, 4000 IHP; three Scotch marine boilers, 16-4 x 12-9.

No name, hull 5312, tanker for Standard Oil of Calif.; keel laid Jan. 15/21, estimated; launching June 1/21, estimated; delivery Sept. 1/21, estimated; sister to hull 5311.

No name, hull 5313, tanker for Standard Oil of Calif.; keel laid Feb. 1/21, estimated; launching June 15/21, estimated; delivery Sept. 15/21, estimated; sister to hull 5311.

BETHLEHEM SHIPBUILDING CORPORATION

Potrero Works

Naval Work

Destroyers for U. S. Navy; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1308 tons; turbine engines, 27,000 IHP; four Yarrows boilers, as follows: Zeilin, hull 313, keel laying Feb. 20/19; launching May 28/19; Yarborough, hull 314, keel laying Feb. 27/19, launching June 20/19; La Vallette, hull 315, keel laying Apr. 14/19, launching July 15/19; Sloat, hull 316, keel laying Jan. 18/19, launching May 14/19; Wood, hull 317, keel laying Jan. 23/19, launching May 28/19; Shirk, hull 318, keel laying Feb. 13/19, launching June 20/19; Kidder, hull 319, keel laying May 15/19, launching July 10/19; Selfridge, hull 320, keel laying Apr. 28/19, launching July 25/19; Marcus, hull 321, keel laying May 20/19, launching Aug. 22/19; Mervine, hull 322, keel laying Apr. 28/19, launching Aug. 11/19; Chase, hull 323, keel laying May 5/19, launching Sept. 2/19; Robert Smith, hull 324, keel laying May 13/19, launching Sept. 19/19; Mullany, hull 325, keel laying June 3/19, launching July 9/20; Coghlan, hull 326, keel laying June 25/19 launching June 16/20; Preston, hull 327, keel laying July 18/19, launching Aug. 7/20; Lamson, hull 328, keel laying Aug. 13/19, launching Sept. 1/20; Hull, hull 330, keel laying Sept. 13/20; MacDonough, hull 331, keel laying May 24/20; Farenholt, hull 332, keel laying Sept. 13/20; Sumner, hull 333, keel laying Aug. 27/19; no name, hull 334, keel laying Sept. 15/20; no name, hull 335, keel laying Sept. 15/20.

Submarines for U. S. Navy: S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145; S-41, hull 146.

RALPH J. CHANDLER COMPANY, WILMINGTON

Purchasing Agent: G. R. Crofut.

Building sixth and last section floating drydock for Los Angeles Shipbuilding & Drydock Company.

CHOLBERG SHIPYARD, VANCOUVER, B. C.

Purchasing Agent: W. Meed.

S. F. Tolmie, hull 4, four-masted barkentine for Victoria (B. C.) Shipowners, Ltd.; keel laying May 1/20; launching Dec. 15/20, estimated; delivery Jan. 15/21, estimated; 250 OA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel, shaft logs fitted for auxiliary but no machinery installed.

Sir Henry Drayton, hull 5, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying May 15/20; launching Jan. 15/21, estimated; delivery Feb. 15/21, estimated; sister to S. F. Tolmie.

No name, hull 6, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying June 4/20; launching Feb. 25/21, estimated; delivery Mar. 25/21, estimated; sister to S. F. Tolmie.

No name, hull 7, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying Dec. 20/20, estimated; launching Apr. 30/21, estimated; delivery May 30/21, estimated; sister to S. F. Tolmie.

J. COUGHLAN & SONS, LTD., VANCOUVER, BRITISH COLUMBIA

Purchasing Agent: J. Joseph.

City of Victoria, hull 19, steel freighter for own account; keel laying Aug./20; launching Oct./20; delivery Dec./20; 410 5½ LBP; 54 beam; 24-2 loaded draft; 11½ loaded speed; 8800 DWT; TE engines, 3000 IHP; three Scotch boilers, 15-6x11-6.

Canadian Transporter, hull 20, steel freighter for Canadian government; keel laying Jan./21, estimated; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; triple expansion engine, 3000 IHP; three Scotch boilers, 15-6 x 11-6.

Canadian Freighter, hull 21, steel freighter for Canadian government; keel laying Jan./21, estimated; dim., etc., same as Canadian Transporter.

CROWLEY LAUNCH & TUGBOAT COMPANY, SAN FRANCISCO EAST OAKLAND

Purchasing Agent: John L. Crowley.

Four launches, 36 LBP; one equipped with 30 HP Frisco Standard engine; one, 25 HP Acme; one, 20 HP Acme; one, 25 HP Frisco Standard.

HANLON DRYDOCK & SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: C. H. Brown.

Medon, hull 87, freighter for USSB; delivery Dec. /20; 305 LBP; 46 beam; 22-5 loaded draft; 10½ loaded speed; 5350 DWT; 1800 IHP engines.

Memnon, hull 88, freighter for USSB; launching Sept. 28/20; delivery Jan. 15/21, estimated; dim., etc., same as Medon.

HARBOR MARINE COMPANY, VICTORIA

Purchasing Agent: B. L. Robertson

Canadian Winner, steel freighter for Canadian government merchant marine; keel July 4/19 launch June 29/20; 400 LBP; 52 beam; 25-2 loaded draft; 11½ loaded speed; 8100 DWT; TE eng., 3000 IHP; three Scotch boilers, 15-6 x 11-6; two deck, poop, bridge, forecastle; delivered Nov. 27.

Canadian Traveller, steel freighter for Canadian government merchant marine; keel Aug. 9/19; launch Sept. 29/20; sister to Canadian Winner.

Car ferry for Canadian Pacific; Dec./20 launching, estimated.

LONG BEACH SHIPBUILDING COMPANY, LONG BEACH

West Kebar, hull 136, for USSB; launching Oct. /20; 410-5 LBP; 54 beam; 24-2 loaded draft; 10½ loaded speed; 8800 DWT; triple expansion engines, 2800 IHP; three Scotch boilers, 14-9; del. Dec./20.

Edythe, hull 142, motor yacht for J. F. Craig; 105-3 LBP; 21 beam; 8-10 loaded draft; 12 loaded speed; New London engines, 360 BHP.

LOS ANGELES SHIPBUILDING & DRYDOCK COMPANY, SAN PEDRO

Purchasing Agent: L. R. McFie.

West Honaker, hull 28, steel cargo for USSB; keel laid Mar. 21/20; launching Sept. 25/20; delivery Dec./20; 410 LBP; 54 beam; 24-2 loaded draft; 10½ loaded speed; 8800 DWT; TE eng., 3500 IHP; three WT boilers.

West Cusseta, hull 29, steel cargo for USSB; keel laid Apr. 19/20; launching Nov. 10/20; 410 LBP; 54 beam; 24-2 loaded draft; 10½ loaded speed; 8800 DWT; TE eng., 3500 IHP; three WT boilers.

West O'Rowa, hull 30, steel cargo for USSB; keel laid June 14/20; dim., etc., same as West Cusseta.

West Lewark, hull 31, steel cargo for USSB; keel laid July 30/20; 430 LBP; 54 beam; 2802 loaded draft; 10½ loaded speed; 11,000 DWT; TE engines, 3500 IHP; three Scotch single end, 15-9.

West Faralon, hull 32, steel cargo for USSB; keel laying Sept. 27/20; dim., etc., same as West Lewark.

West Greylock, hull 33, steel cargo for USSB; keel laying Nov. 10/20; dim., etc., same as West Lewark.

West Prospect, steel cargo for USSB; keel laying Dec. 20, est.; dim., etc., same as West Lewark.

West Chopaka, steel cargo for USSB; keel laying Feb. 21, est.; dim., etc., same as West Lewark.

G. F. MATTHEWS, PORTLAND

Quinault, hull 1, steam schr. for Hart-Wood Lumber Co.; launch Nov. 10/20, delivery Jan. 1/21, est.; 210 LBP; 43 beam; 20 loaded draft; 9 loaded speed; 1500 DWT; triple-expansion engines; 650 IHP; Babcock & Wilcox WT boilers.

Undaunted, hull 2, 5-mast schr. for Hart-Wood Lumber Co.; launch Jan. 15/21, est.; delivery Feb. 15/21 est.; 264 LBP; 46 beam; 24 loaded draft; 3800 DWT.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: M. G. Waites.

Narcissus, hull 2238, freighter for USSB; keel laid Dec. 31/19; launching Aug. 28/20; delivery Dec. 20; 402-6 LBP; 53 beam; 26 loaded draft; 9400 DWT; Parson comp. eng.; three Scotch boilers, 15-2x11.

West Bohemian, hull 2826, tanker for USSB; 425 LBP; 57 beam; 26 loaded draft; 10,000 DWT; rec. eng.; three Scotch boilers, 15-2x11; keel Oct. 23/20.

West Tustem, hull 2863, tanker for USSB; sister to West Bohemian; keel Nov. 24/20.

West Lubrico, hull 2864, tanker for USSB; sister to West Bohemian.

Manulani, hull 158, freighter for Matson Nav. Co.; keel laid Aug. 5/20; 480 LBP; 62 beam; 30 loaded draft; 14,000 DWT; Parson engines; five Scotch marine boilers, 15-6 x 12-3½.

Manukai, hull 159, freighter for Matson Nav. Co.; keel laid Aug. 17/20; dim., etc., same as hull 158.

S. C. T. Dodd, hull 160, tanker for Stand. Oil Co. of N. J.; keel laid April 27/20; launching Oct./20; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec. engines; three Scotch marine boilers, 15-2x12; sold to Standard Oil of Calif.; del. Dec./20.

M. F. Elliott, hull 161, tanker for Stand. Oil Co. of N. J.; keel laid July 2/20; dim., etc., same as S. C. T. Dodd; launching Nov. 13; delivery Jan./21, estimated.

Tho. H. Wheeler, hull 162, tanker for Stand. Oil Co. of N. J.; keel laid July 28/20; dim., etc., same as S. C. T. Dodd; launch Dec. 5/20.

No name, hull 163, tanker for Stand. Oil Co. of Calif.; keel laying Oct. 20; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engines.

Gargoyle, hull 164, tanker for Vacuum Oil Co.; keel laid Sept. 13/20; 425 LBP; 57 beam; 2603 loaded draft; 10,100 DWT; rec. engines; three Scotch marine boilers, 15-2 x 12.

Tamihua, hull 165, tanker for S. P.-Atlantic S. S. Co.; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; rec. engines; three Scotch boilers, 15-9 x 12.

No name, hull 166, tanker for Vacuum Oil Co.; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec engines; three Scotch marine boilers, 15-2x12; keel Dec. 9/20.

NAVY YARD, PUGET SOUND

Nitro, ammunition carrier for government; keel laying Mar. 19/19; launching Dec. 16/19; 460 LBP; 61 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp.; turbine engines, 5300 IHP; four Babcock & Wilcox WT boilers; del. Mar. 15/21, est.

Medusa, repair ship for government; keel laying Jan. 2/20; 460 LBP; 75 beam; about 19 loaded draft; 17-5 loaded speed; turbine engine, 7000 IHP; two watertube express type boilers; 10,000 tons disp.; del. Aug. 31/21, est.

Holland, submarine tender for government; date for keel laying not set; 460 LBP; 61 beam; about 20 loaded draft; 16 K. loaded speed; turbine engine, 7000 IHP; two watertube express type boilers; 10,000 tons disp.

NAVY YARD, MARE ISLAND

California, battleship for U. S. Navy; keel laying Oct. 25/16; launching Nov. 20/19; 600 LBP; 97-3½ beam; 30-3 loaded draft; 21 loaded speed; 32,300 displacement; turbo-electric engines, 26,800 SHP; eight Bu's express boilers, 50,984 sq. ft.; docked in Hunters Point drydock Nov. 30-Dec. 8 for cleaning and painting.

Montana, battleship for U. S. Navy; keel laying Sept. 1/20; 660 LBP; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 displacement; turbo-electric engines, 60,000 SHP; twelve Bu's express boilers, 74,040 sq. ft.

Zane, destroyer for U. S. Navy; keel laying Jan. 15/19; launching Aug. 12/19; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 displacement; geared turbine engine; 26,000 SHP; four Normand boilers, 27,000 sq. ft.

Wasmuth, destroyer for U. S. Navy; keel laying Aug. 12/19; launching Sept. 15/20; dim., etc., same as Zane.

Trever, destroyer for U. S. Navy; keel laying Aug. 12/19; launching Sept. 15/20; dim., etc., same as Zane.

Perry, destroyer for U. S. Navy; keel laying Sept. 15/20; dim., etc., same as Zane.

Decatur, destroyer for U. S. Navy; keel laying Sept. 15/20; dim., etc., same as Zane.

NORTHWEST BRIDGE & IRON COMPANY, PORTLAND

Purchasing Agent: W. C. Smith

Seven 12,000-ton oil tankers for Swiftsure Oil Trans. Co. (France & Canada S. S. Co.); deliveries from Feb. to Aug./21, estimated; 465-7 LBP; 60 beam; 26-3 loaded draft; 10½ loaded speed; TE engines, 3150 IHP; three Scotch boilers, 15-5½ x 11-9.

Tanker, launched Dec. 15/20.

PACIFIC COAST SHIPBUILDING COMPANY, BAY POINT

Purchasing Agent: J. A. Smiley

Cuprum, hull 947, steel cargo for USSB; keel laying May 7/19; launching Feb. 18/20; 402-6 LBP; 53 beam; 26-6 loaded draft; 9400 DWT; 2800 IHP engines; three Scotch marine boilers, 11x15-6; del. Nov. 15/20.

Namasket, hull 948, steel cargo for USSB; keel laying June 18/19; launching Aug. 2/20; dim., etc., same as Cuprum; del. Jan. 21, est.

Meanticut, hull 949, steel cargo for USSB; keel laying July 18/19; dim., etc., same as Cuprum; del. Mar. 21, est.; launch Dec. 22/20.

Nashaba, hull 950, steel cargo for USSB; keel laying Aug. 25/19; dim., etc., same as Cuprum; del. June 21, est.

Midway, hull 12, steel tanker for Associated Oil Co.; keel laying Mar. 17/20; 200 LBP; 38 beam; 15-6 loaded draft; 10,000 bbls.; rec. engine, 520 IHP; Scotch marine boilers, 12-6x10-10; delivery Dec. 8/20.

PRINCE RUPERT SHIPBUILDING & DRYDOCK COMPANY, PRINCE RUPERT

Two 8800-ton steel freighters for Canadian government merchant marine.

JAMES ROBERTSON SHIPYARD, ALAMEDA

Purchasing Agent: James Robertson

No name, hull 102, side-wheel ferryboat for Richmond-San Rafael Ferry Co.; keel Nov. 15/20; 190 LBP; 34 beam; 17 loaded draft; 10 loaded speed; digaonal cross comp. eng., 500 IHP; two marine dry back boilers, 9 x 17.

ST. HELENS SHIPBUILDING COMPANY ST. HELENS

Purchasing Agent: A. F. Barnett

No name, hull 52, fuel barge for Swift & Co.; keel laying Sept. 1/20; 130 LBP; 34 beam; 7 loaded draft.

No name, hull 53, fuel barge for Swift & Co.; keel laying Sept. 1/20; dim., etc., same as hull 52.

SAN FRANCISCO SHIPBUILDING COMPANY, OAKLAND

Peralta, hull 1662, tanker for USSB; keel laid Oct. 10/18; launching Oct. 26/20; delivery Jan. 15/21, est.; 420 LBP; 56 beam; 26 loaded draft; 10½ loaded speed; 7500 DWT; rec. engines, 2800 IHP; three watertube boilers, 21,000 sq. ft.

SEACRAFT CORPORATION OF CALIFORNIA WILMINGTON

Purchasing Agent: C. D. Callahan.

Recently took over yard of Marine Equipment Co.; overhauling equipment preparatory to construction of pleasure craft.

SOUTHWESTERN SHIPBUILDING COMPANY, EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

No name, hull 23, Isherwood tanker for Union Oil Co.; keel laying Dec./20; delivery July/21, estimated; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engines, 2800 IHP; three Scotch boilers, 14x12.

No name, hull 24, Isherwood tanker for Anglo-Saxon Pet. Co.; keel laying Nov./20; delivery Mar./21, estimated; 412 LBP; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engines, 2800 IHP; three Scotch boilers, 15-6 x 11-7.

No name, hull 25, Isherwood tanker for Anglo-Saxon Petroleum Co.; keel laying Dec./20; delivery Apr./21, estimated; dim., etc., same as hull 24.

No name, hull 26, Isherwood tanker for Anglo-Saxon Petroleum Co.; keel laying Dec./20; delivery May/21, estimated; dim., etc., same as hull 24.

Mary Luckenbach, hull 19, transverse tanker for Luckenbach Co.; keel laid Feb. 24/20; launching Nov. 1/20; delivery Dec./20; 410-5½ LBP; 54 beam; 23-11 loaded draft; 10¾ loaded speed; 8450 DWT; TE engines, 2800 IHP; three Scotch boilers, 14-9 x 11.

Montebello, hull 21, Isherwood tanker for Union Oil Co.; keel laid Apr. 20/20; launching Dec./20, estimated; delivery Jan./21, estimated; 440 LBP; 58 beam; 29-2 loaded draft; 11 loaded speed; 12,000 DWT; OE engines, 3300 IHP; three Scotch boilers, 15-6 x 12-1.

La Placentia, hull 22, Isherwood tanker for Union Oil Co.; keel laid May 20/20; launching Jan./21, estimated; delivery Feb./21, estimated; dim., etc., same as Montebello.

G. M. STANDIFER CONSTRUCTION CORPORATION, VANCOUVER, WASH.

John Worthington, hull 16, shelterdeck oil-tanker for Standard Oil Co. of N. J.; 11,740 DWT; VOM engines, 2800 IHP; three Scotch boilers, 14-4 diam.; Isherwood framing; launch Nov. 15/20.

W. H. Libby, hull 17, shelterdeck oil-tanker for Standard Oil Co. of N. J.; dim., etc., same as John Worthington; launch Dec. 15/20.

Livingston Roe, hull 18, shelterdeck oil-tanker for Standard Oil Co. of N. J.; dim., etc., same as John Worthington; launch Jan. 15/21, est.

Calgarolite, hull 19, shelterdeck oil tanker for Imperial Oil, Ltd.; dim., etc., same as John Worthington, except boilers, which are 14-9 diam.

Albertolite, hull 20, shelterdeck oil-tanker for Imperial Oil, Ltd.; dim., etc., same as Calgarolite.

W. F. STONE & SON, OAKLAND

Purchasing Officer: Lester F. Stone.

Sea Lion, tug for S. O. & M. Tug Boat Co.; delivery Jan. 21, estimated; 150 LBP; 30 beam; 16 loaded draft; 12 loaded speed.

Sea Monarch, tug for S. O. & M. Tug Boat Co.; delivery Feb. 21, estimated; dim., etc., same as Sea Lion.

Sea Ranger, tug for S. O. & M. Tug Boat Co.; delivery Mar. 21, estimated; dim., etc., same as Sea Lion.

Sea Scout, tug for S. O. & M. Tug Boat Co.; delivery April/21, estimated; dim., etc., same as Sea Lion.

Doris Crane, aux. schr. for Fanning Island Trading Co.; keel laid June 28/20; launching Nov. 23/20, delivery Dec. 1/20; 136 LBP; 32 beam; 12½ loaded draft; 6 loaded speed; 500 DWT; gas eng., 150 IHP.

TODD DRYDOCK & CONSTRUCTION CORPORATION, TACOMA

No name, Isherwood steel motorship for Alaska S. S. Co.; 360 OA; 29-6 beam; 22 loaded draft; 6500 DWT; McIntosh & Seymour four-cycle Diesel engines; 1200 IHP, 140 RPM.

Three scout cruisers for United States Navy, 555-6 LOA; 550 LBP; extreme beam 55-4; molded beam 54-9; depth molded 26; mean loaded draft 13-6; displacement 7100 tons; Westinghouse Parsons turbines and reduction gear, developing 105,000 IHP, driving four propellers; designed speed 34 knots; RPM each propeller 375 to 389; shaft HP to each propeller 24,500 max. at 389 RPM, 22,500 max. at 375 RPM; twelve Yarrow WT boilers, working pressure 265 pounds; oil-burning; twelve 6-inch rapid-fire guns, two 3-pounders, two machine guns, two twin torpedo tubes.

First of these vessels launched Dec. 14/20 and christened Omaha; keel laid by Seattle Construction & Drydock Co. July/17 but removed for merchant work; relaid by Todd Dec./18.

UNION CONSTRUCTION COMPANY, OAKLAND

Liebre, hull 12, oil-tanker for General Pet. Co.; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engines, 3000 IHP; three Scotch marine boilers, 15-4x11-8; keel June 9/20; launch Dec. 15/20.

R. J. Hanna, hull 14, oil-tanker for Standard Oil Co. of Calif.; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engines, 3000 IHP; three Scotch marine boilers, 15-2x11-6; keel July 12/20.

No name, hull 15, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; 412 LBP; 53-5 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec. engines, 2600 IHP; three Scotch marine boilers, 15-6 x 11-7.

Tampa, hull 16, cutter for USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engines, 2600 IHP; two watertube boilers; keel Sept. 27/20.

Haida, hull 17, cutter for USCG; dim., etc., same as hull 16; keel Sept. 27/20.

Mojave, hull 18, cutter for USCG; dim., etc., same as hull 16.

Modoc, hull 19, cutter for USCG; dim., etc., same as hull 16.

Shawnee, hull 20, cutter for USCG; 150 LOA; 30 beam; 13-6 loaded draft; 12½ loaded speed; 1000 DWT; rec. engines, 1000 IHP; two watertube boilers.

No name, hull 21, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec. engines, 2600 IHP; three Scotch marine boilers, 15-6 C x 11-7.

No name, hull 22, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; same dim., etc., as hull 21.

No name, hull 23, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; same dim., etc., as hull 21.

All cutters on transverse system; others on Isherwood system.

WALLACE SHIPYARDS, NORTH VANCOUVER, BRITISH COLUMBIA

Canadian Highlander, cargo for Canadian government; launching Oct. 13/20; 8400 DWT; 413 long; 52 beam; 31 dep; 11½ loaded speed; del. Dec./20.

Canadian Skirmisher, cargo for Canadian government; keel laying Oct./20; sister to Canadian Highlander.

Coastwise steamship for Canadian Pacific; 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel laid Oct./20.

Miscellaneous Construction

ALBINA ENGINE & MACHINE WORKS, PORTLAND

Building pontoon for Portland Dock Commission; two sections completed; two 45 per cent completed; probably launch these late November; one more section to lay down.

BABCOCK & WILCOX COMPANY, CHARLES C. MOORE, SAN FRANCISCO, PACIFIC COAST MANAGER

Steamer Quinault, Hart-Wood Lumber Co., installation of two Babcock & Wilcox marine boilers.

Steamer Pacific, Pacific Marine Iron Works, installation of two Babcock & Wilcox marine boilers.

COLUMBIA STEEL COMPANY, PITTSBURG, CALIFORNIA

Steel castings for many steel vessels now under construction in the Pacific Coast yards, including dreadnought Montana and sister ships 49, 50, 52; also for Coast Guard cutters under construction in the Union Const. Co. yard.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING COMPANY, PHILADELPHIA

Twelve Parsons manganese bronze propellers for scout cruisers 4, 5 and 6 building by Todd Drydock & Construction Corporation, Tacoma. Two right-hand and two left-hand propellers for each vessel. Weight of propellers 13,200 pounds each; diameter 11-3; pitch 11-10.

ALLAN CUNNINGHAM COMPANY, SEATTLE

On order and under construction: Eight large steam steering gears of the geared quadrant type; twelve large steam anchor windlasses, and several smaller ones; 27 steam cargo and warping winches. For two large motorships: electric anchor windlasses, steering gears, capstans and cargo winches; 16 hydraulic telemotors.

DOW PUMP AND DIESEL ENGINE COMPANY, ALAMEDA

Unnamed, motorship for Standard Oil Company; one 200 IHP, two 267 IHP Diesel auxiliary electric drive engines.

FORD & GEIRRINE, AGENTS, SAN FRANCISCO

McNab direction indicator, mfd. by the McNab Co., for hulls 11, 12, 14 at Union Const. Co., hull 163 at Moore's; Willett-Bruce whistle control, mfd. by the McNab Co., for hull 14 at Union Const. Co., hull 5305 at Bethlehem; Todd-White fuel-oil system, Todd Drydocks, Inc., hull 19 at Southwestern; Brown steam tiller, Hyde Windlass Co., for hull 5308 at Bethlehem; National stockless anchors, Upson Walton Co., for hull 165 at Moore's; Dean feed pumps, Dean Bros. Steam Pump Works, for 166 at Moore's; Reliance forced draft equipment, John Reid & Co., for hulls 165, 166, at Moore's.

LIDGERWOOD MANUFACTURING COMPANY, NEW YORK, SAN FRANCISCO, LOS ANGELES

One 10x10 inch screw gear steering engine for U. S. S. Holland building at Puget Sound Navy Yard.

One 13x13 inch automatic tension towing engine for Merrill-Ring Lumber Co.'s tug Wanderer.

LLEWELLYN IRON WORKS, LOS ANGELES

Five marine engines for G. M. Standifer Construction Corporation, 24½ x 41½ x 72, 48 stroke, TE, 2800 IHP.

One, same dimensions, for Mary Luckenbach, Southwestern Shipbuilding Company.

One for steamship Montebello, Southwestern Shipbuilding Company, 24 x 34 x 51 x 74, 54 stroke, QE, 3300 IHP.

One for tanker Liebre, Union Construction Co., 27 x 47 x 78, 48 stroke, TE, 3200 IHP.

One for tanker Hanna, Union Construction Co., same dimensions as above.

MAIN IRON WORKS, SAN FRANCISCO

Purchasing Officer: B. W. Bengston.

Outfitting four tugs for Shipowners' & Merchants' Tug Boat Co.; 150 over-all; 30 beam; 16 loaded draft; TE engines, 1000 IHP; two Scotch marine boilers, 11-6.

MARINE IRON WORKS, CHICAGO

For transportation company, Barranquilla, Rep. de Colombia, S. A.: 350 HP stern wheel engines.

For transportation company, Cuba; 150 HP propeller engine.

For towing company, Michigan: 195 HP fore and aft compound engine.

SKANDIA PACIFIC OIL ENGINE COMPANY, OAKLAND

Purchasing Agent: A. Bolander.

Two 850 BHP Werkspoor Diesel engines building for Standard Oil Co.'s motorship; 6 cylinder, 135 RPM; delivery Oct., 1920.

Ten 850 BHP Werkspoor Diesel engines building for USSB; 6 cyl., 135 RPM; delivery Nov. 1 to April 1/21.

STEWARD DAVIT & EQUIPMENT CORPORATION, NEW YORK, SAN FRANCISCO, SEATTLE

Steward davits are being installed in the following: At Alameda works, Beth. S. B. Corp.: Algonquin, hull 5304, for Standard Trans. Co. of Del.; W. S. Miller, hull 5305, for Standard Oil of Calif.; Yerba Linda, hull 5307, for Gen. Pet. Co. At Union Const. Co.: Charlie Watson, hull 11, for Standard Oil Co. of Cal.; Coast Guard cutters, hulls 16, 17, 18, 19, for U.S.; Liebre, hull 12, for Gen. Pet. Co.

At Todd's: SS. Edmore.

At Long Beach: SS. Mazatlan.

At Moore's: Vacuum, hull 157, for Vacuum Oil Co.; hull 164, for Vacuum Oil Co.; S. C. T. Dodd, hull 160, for Standard Oil Co. of N. J.; M. F. Elliott, hull 161, for Standard Oil Co. of N. J.; Thos. H. Wheeler, hull 162, for Standard Oil Co. of N. J.

For Pacific SS. Co.: Admiral Schley.

UNION GAS ENGINE COMPANY, OAKLAND

Purchasing Agent: E. H. Cole

Doris Crane, hull 390, aux. schr. for Fanning Island Trdg. Co.; installation gas and kerosene engines as follows: Union gas type 150 IHP propelling; 9 HP Union hoist; 8 HP Union electric light and pump outfit; 5 HP Union refrigerating set.

Drydocking and Repairs

BETHLEHEM SHIPBUILDING CORP., LTD.

Potrero Works

Purchasing Agent: O. W. Street

Miscellaneous repairs: SS. Bradford, SS. Waikawa, SS. Steel Exporter, SS. Asbury Park, SS. Standard Arrow, SS. Wilhelmina, SS. Hattie Luckenbach SS. Tamaha, SS. West El Cajon, SS. Frederick Luckenbach, Stm. Yacht Venetia, SS. Mary Luckenbach, SS. San Jose, SS. Cape Natal, SS. Tahchee, Barge Fullerton. Drydocking and painting, removing cribbing, etc.: U.S.S. California. New tailshaft: SS. Claudine, SS. Lyman Stewart. Miscellaneous repairs, drydocking and painting: SS. Derbyline, motor barge Olinda, SS. Greenwood, SS. Rose City (also new rudder), M.S. Balcatta, bark Noemi, bark Bayard, SS. City of Topeka, SS. Haxtum, SS. West Cajoot, ferry boat San Pablo, SS. El Segundo, SS. West Kedron, SS. Fort Wayne, SS. Durango, SS. Eagle, SS. Senator, SS. Maui, barge Hercules, SS. Fairhaven, SS. Ventura (also installation of new crankshaft), SS. Havilah. New air pump, renew furnaces, retube boilers, new smoke stack: SS. Shabonee. New piston rods: SS. Sonoma. Engine and boiler repairs, hull repairs, drydocking and painting: SS. Bali, SS. Wm. F. Herrin (also miscellaneous repairs). Miscellaneous repairs, repairs to stern, drydocking and painting: Tug Standard No. 2. New piston rings: SS. Tamaha, SS. Astral, SS. Richmond, SS. Acme. Engine and boiler repairs: SS. Waitemata, SS. Waihemo, SS. Tofua (also hull repairs).

Alameda Works

Miscellaneous repairs, drydocking and painting: SS. Whittier, Six Minute ferry barge, Stm. Schr. Claremont, ferry str. Chas. Van Damme, ferry str. City of Martinez, stm. sch. Pacific, stm. sch. Daisy Putnam, sch. Raita. New propeller: SS. Henry T. Scott, stm. sch. Wilmington.

FELLOWS & STEWART, INC. WILMINGTON

Purchasing Agent: V. B. Stewart.

General repairs and engine installation, a pair of 45-HP C-O engines: Schr. Lily, for Harry Wilson, 300 DWT. General repairs: Ferry Ramona, for Coronado Ferry Co., 600 DWT; schr. yacht Edris, for Thomas Ince, 50 DWT; glass bottomed boat Emperor, for Wilmington Tranpn. Co., 150 DWT; barge No. 4, for General Petroleum Co., 350 DWT.

LOS ANGELES SHIPBUILDING & DRYDOCK COMPANY, SAN PEDRO

Purchasing Agent: L. R. McFie.

General overhauling and painting: SS. West Eldara, for Emergency Fleet Corp., 8800 DWT.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: M. G. Waites.

Drydocking, cleaning, painting and miscellaneous repairs: Tug Pedro Costa, tug Christopher Columbus, schr. Invincible, stm. schr. San Antonio, str. Edna, ship Golden Gate, SS. West Camak, SS. Charlie Watson, schr. Meteor, stm. schr. Wapama, stm. schr. San Mateo. Extensive hull and engine repairs: Str. Arakan, str. Dilworth. Hull repairs: Str. West Nilus. Hull and engine repairs: SS. City of Reno.

NAVY YARD, MARE ISLAND

Repairs to a large number of naval vessels.

NAVY YARD, PUGET SOUND

Cleaned and painted bottom, miscellaneous alterations and repairs: U.S.S. Seattle, armored cruiser U.S.S. Charleston (also extensive machinery repairs), U.S.S. Orion (fuel ship), U.S.S. Vulcan (fuel ship), U.S.S. Ortolan (minesweeper) destroyers U.S.S. Edwards, Dent, Dorsey, Waters, Talbot, Rathburne, Roper; Ammunition Lighter No. 3, Ammunition lighter No. 4.. Miscellaneous alterations and repairs: Armored cruisers U.S.S. Charlotte, U.S.S. Missoula; fuel ship U.S.S. Neptune; cargo ship U.S.S. Houston; minesweeper U.S.S. Swallow; destroyer tender U.S.S. Prairie; subchasers U.S.S. 294, U.S.S. 310; tugs U.S.S. Pawtucket, U.S.S. Challenge; Alaska patrol U.S.C.G. Bear; patrol U.S.S. Eagle No. 57.

SOUTHWESTERN SHIPBUILDING COMPANY, EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

Miscellaneous repairs: Lavada, Pleiades, Luckenbach S. S. Co.; Admiral Wainwright, Admiral S. S. Co.; City of Reno, Jeptha, West Camak, Salina, Shipping Board; Broad Arrow, El Segundo, Standard Oil Co.; U. S. Kelp Harvester No. 5, U. S.

News of Pacific Yards

San Francisco

Delivery of the 7500-ton concrete tanker Peralta, building by the San Francisco Shipbuilding Company for the Shipping Board, probably will be made in January instead of December, as originally scheduled. This vessel is the last of the government's concrete construction on the Pacific Coast.

Standifer

Two large tankers have been launched by the G. M. Standifer Construction Corporation, Vancouver, Washington, the John Worthington, an 11,740-ton tanker for the Standard Oil of New Jersey, having been launched in November, and a sister, the W. H. Libby, in December. At the time of the launching the Worthington was the largest vessel built in the Northwest. The Standifer yard is building three of these vessels for the Standard Oil and two for the Imperial Oil.

Northwest Bridge

The tanker Swiftsure, 12,000-tons deadweight, building by the Northwest Bridge & Iron Company for the Swiftsure Oil Transportation Company, was launched in December. She is the first of seven sisters.

Long Beach

The last of the Shipping Board vessels built by the Long Beach Shipbuilding Company, the 8800-ton steamship West Kebar, was delivered in December. She was launched in October.

Los Angeles

Another delivery by a Los Angeles yard was by the Los Angeles Shipbuilding & Drydock Company, which completed the 8800-ton West Honaker in December. Two sister ships, the West Cusseta and the West O'rowa, still are under construction, in addition to five 11,000-ton freighters. The keel of one of the latter, the West Prospect, was to be laid in December instead of November, as formly estimated; and the keel of the West Chopaka, another 11,000-tonner, is scheduled to be laid in February instead of January.

Navy

The dreadnought California, built at the Mare Island Navy Yard, was towed to the Hunters Point graving dock of the Bethlehem Shipbuilding Corporation November 29 and 30. Seven tugs were required to handle her, as her propellers had not been installed.

Scout cruiser No. 4, the first of three vessels being built by the Todd Drydock & Construction Corporation, Tacoma, for the United States Navy, was launched in December and christened Omaha. She probably will be ready for delivery in November, 1921. These three vessels bear a striking resemblance to destroyers, but of course are much larger.

Delivery of the Nitro, an ammunition carrier for the Navy being built at the Puget Sound Navy Yard, probably will be made in March and of the repair ship Medusa in August. No date has been set for the laying of the keel of the submarine tender Holland.

Harbor Marine

The steamship Canadian Winner, built by the Harbor Marine Company, Victoria, for the Canadian government merchant marine, was delivered November 27. On her trial November 25 she made 13.66 knots over a measured mile and her highest speed was 14.45 knots, which is regarded by the builders as a record for vessels of her class. The engines were built by John Inglis & Company. A sister to the Canadian Winner, christened Canadian Traveller, was sent to the Victoria Machinery Depot for outfitting, shearlegs having been erected for the work. The only work being carried on at the Harbor Marine yard is a car ferry for the Canadian Pacific Railroad, which is nearing completion. "It has been necessary to lay off a large number of men in the last few months," says an announcement of the Harbor Marine Company's employment department, "and the employment situation for the coming winter is a very gloomy one."

Coughlan

J Coughlan & Sons, Vancouver, B. C., delivered the steamship City of Victoria, an 8800-ton vessel built for their own account, in December. Two other vessels, the Canadian Transport and the Canadian Freighter, probably will be delivered in January. The latter are 8350-tonners for the Canadian government merchant marine.

Wallace

The Wallace Shipyards, North Vancouver, B. C., completed and delivered the 8400-ton freighter Canadian Highlander for the Canadian government merchant marine in December. The vessel averaged 13.5 knots an hour for six hours. She loaded for Australia on her maiden voyage.

U. S. S. B. Building

Vessels under construction in Pacific Coast yards for the United States Shipping Board December 1 totaled 23 of 218,100 deadweight tons, as compared with 26 of 248,700 tons November 1 and 32 of 316,750 tons October 1. One of the vessels, the Peralta, was a concrete tanker; the others were steel. All the deliveries of November were freighters, so that the tanker tonnage as of December 1 was unchanged, seven vessels of an aggregate tonnage of 67,800. Freight vessels were 16 of 150,300 tons.

In the following table T indicates tanker and C cargo; the figures are deadweight tonnage and the dates those of estimated delivery:

Bethlehem Shipbuilding Corporation, San Francisco — Hambro, T, 10,100, April; Hamer, T, 10,100, May; Hammac, T, 10,100, June; Hanley, C, 11,800, December.

Moore Shipbuilding Company, Oakland — Narcissus, C, 9400, December; West Bohemian, T, 10,000, June; West Tustem, T, 10,000, June; West Lubrico, T, 10,000, July.

Hanlon Drydock & Shipbuilding Company, Oakland — Medon, C, 5350, December; Memnon, C, 5350, January.

Pacific Coast Shipbuilding Company, Bay Point—Namasket, C, 9400, January; Meanticut, C, 9400, March; Nashaba, C, 9400, June.

Long Beach Shipbuilding Company, Long Beach—West Kebar, C, 8800, December.

Los Angeles Shipbuilding & Drydock Company, San Pedro — West Honaker, C, 8800, December; West Cusseta, C, 8800, January; West O'Rowa, C, 8800, February; West Lewark, C, 11,000, May; West Faralon, C, 11,000, June; West Greylock, C, 11,000, August; West Prospect, C, 11,000, September; West Chopaka, C, 11,000, November.

San Francisco Shipbuilding Company, Oakland — Peralta, concrete tanker, 7500, January.

Union Construction Work

The 10,200-ton tanker Liebre, built by the Union Construction Company, Oakland, for the General Petroleum Company, was launched December 15. She is 435 between perpendiculars, 56 in beam, 26 in loaded draft, and will have a loaded speed of 11 knots. She has three Scotch boilers and reciprocating engines developing 3000 indicated horsepower. Immediately after the launching of the Liebre the keel of hull 21, the second of four 8400-ton tankers for the Anglo-Saxon Petroleum Corporation, was laid. Delivery of the Liebre probably will be made about February 1.

Following the Liebre the next launching of the Union Construction Company will be that of the first of the Anglo-Saxon tankers about February 1. These four vessels are sisters, 421 between perpendiculars, 53-6 in beam, 24-9 in loaded draft and having a loaded speed of 11 knots. About February 15 the first of four cutters building for the United States Coast Guard will go down the ways. Names of the four cutters have been assigned as follows: Tampa, Haida, Mojave and Modoc; and the fifth Coast Guard vessel, a sea-going tug, will be christened Shawnee.

Moore

A 10,100-ton tanker, the S. C. T. Dodd, built by the Moore Shipbuilding Company, Oakland, for the Standard Oil Company of New Jersey, has been bought by the Standard Oil Company of California. She had her trial December 14 and was delivered later in the month. A sister to the Dodd, building for the Standard Oil of New Jersey, was launched December 5 and was christened by Mrs. Roy N. Bishop, daughter of Thomas H. Wheeler, for whom the vessel was named.

Moore delivered the 9400-ton freighter Narcissus to the Shipping Board in December, thus bringing to a close the extensive freighter construction the yard has done for the government. The Narcissus had been preceded by the Narbo, a sister. Building for the board continues, however, contracts being held for three tankers, West Bohemian, West Tustem and West Lubrico. Keels of the first two were laid October 23 and November 24 and the keel of the third remains to be laid.

Work has begun on hull 166, a 10,100-ton tanker for the Vacuum Oil Company and a sister to the Vacuum, in constructing and delivering which the Moore yard made such an excellent record. The keel of the new tanker was laid December 9.

A 4750-ton motorship for the Standard Oil Company of California, which was to be named F. H. Hillman, will be given another name, and a larger vessel will be christened Hillman.

At the middle of December the Moore boiler shop was engaged on work for vessels as follows: three boilers for Vacuum tanker, Moore; three for the R. J. Hanna, Standard Oil tanker, Union Construction; ten for the two 14,000-ton freighters of the Matson Navigation Company, Moore; six for vessels building at the yard of the Los Angeles Shipbuilding & Drydock Company; three for the second Vacuum tanker, Moore; and nine for the Shipping Board tankers, Moore. The large tanker, Tamihua, 16,340 deadweight tons, building at Moore's for the Southern Pacific-Atlantic Line, will have only three boilers as compared with five for the Matson freighters.

In repairs the principal work at the Moore yard has been the completion of the Java-Pacific steamship Arakan and ferry steamship Sausalito and the beginning of the extensive overhauling of the Matson steamship Enterprise.

Bethlehem

The Union works of the Bethlehem Shipbuilding Corporation delivered four vessels in November, the 11,800 D.W.T freighter Hannawa to the Shipping Board, the 10,200 D.W.T. tanker William H. Doheny to Pan American Petroleum, the sister ship Franklin K. Lane to Pan American Petroleum and 10,100 D.W.T. tanker Algonquin to Standard Transportation of Delaware. The keel of the 10,100-ton freighter Hammac, the last of the cargo vessels building by Bethlehem for the Shipping Board, was laid November 30; that of the 10,100-ton tanker Hamer, the second and last of two for the government, November 1. The Pan American tanker Crampton Anderson was launched November 30 and will be delivered about the first of the year. Delivery was made in December of the tanker W. S. Miller to the Standard Oil Company of California. The freighter Hanley, a sister to the Hammac, will be delivered about the first of the year. The 10,100-ton tanker Yorba Linda, launched November 22 for the General Petroleum Company, will be delivered about January 20. In naval work Bethlehem has delivered the destroyers Nicholas and Young.

Southwestern

The Southwestern Shipbuilding Company, Los Angeles, delivered the 8400-ton tanker Mary Luckenbach to the Luckenbach Steamship Company in December. This vessel was laid down as a freighter, but plans were changed immediately after the keel was laid and she was completed as a tanker for builder's account. The Luckenbach Line bought her prior to launching. The Mary Luckenbach is an excellently constructed vessel, vying with the best that have been turned out by Pacific Coast yards.

Hanlon

The 5350-ton freighter Medon, built by the Hanlon DryDock & Shipbuilding Company, Oakland, for the Shipping Board, was delivered in December. A sister ship, the Memnon, the last of the vessels building for the board, will be delivered in January.

Pacific Coast

The Pacific Coast Shipbuilding Company, Bay Point, delivered the 9400-ton freighter Cuprum, hull 947, to the Shipping Board November 15, and followed this with the Associated Oil tanker Midway, 10,000 barrels, December 8. Three sisters to the Cuprum, the Namasket, Meanticut and Nashaba, all for the Shipping Board, remain to de completed. The Meanticut, the ninth vessel of the Pacific Coast Shipbuilding Company's program, was launched in December. She probably will be delivered in March.

Stone

W. F. Stone & Son, Oakland, delivered the auxiliary schooner Doris Crane to Wightman & Crane, San Francisco, representing the Fanning and Washington Island copra plantations, on December 1, and the vessel sailed December 13 on her maiden voyage to Fanning Island. She was launched November 27. The Doris Crane is 138 feet long and has a beam of 32 feet. Between San Francisco and Fanning and Washington Islands she will be used to transport supplies and copra, but she also will be employed as a labor-recruiting vessel between Fanning and the Gilbert Group, and accordingly has been designed with a view to carrying a large number of natives. She is equipped with a 150-horsepower 4-cylinder Union open crosshead engine of the type supplied to the United States Navy and the War Department, which will drive her at a speed of 12 knots; an 8-horsepower Union electric light and fire-pump set, a 5-horsepower Union refrigerating set and a 9-horsepower Union ship's windlass. The engines will operate on kerosene.

Four tugs built by W. F. Stone & Son for the Shipowners' & Merchants' Tugboat Company, San Francisco, probably will be delivered at the rate of one a month commencing in January. They are being outfitted by the Main Iron Works, San Francisco.

Yard Notes

Union machinists employed at the plant of the Todd Drydock & Construction Corporation, Tacoma, demanded the 5 per cent increase in wages and the bonus granted by the navy yards. The demand was based on the fact that the men were working on three scout cruisers being built for the navy. The Navy Department advised Senator Jones that it could not direct the Todd yard to put the navy scale into effect or to pay the bonus.

Contracts have been awarded to the Doran Brass Foundry Company, Seattle, for the construction of four manganese bronze propellers for the Anglo-Saxon tankers building at the yard of the Union Construction Company, Oakland, and for three propellers for Anglo-Saxon tankers building at the yard of the Southwestern Shipbuilding Company of Los Angeles. The Union Construction Company also ordered four spare propellers of iron. Twelve small manganese bronze propellers will be built for the Monticello Steamship Company, and two large wheels for tankers building at the yard of the G. M. Standifer Construction Corporation, Vancouver, Washington.

Offices of the Columbia Steel Company will be in the new Balfour Building, California and Sansome Streets, San Francisco. The Columbia Steel Company has a steel foundry and rolling mills at Pittsburg, California, and a steel foundry at Portland.

B. & W. Boilers

The steamship Pacific, owned by the Pacific Marine Iron Works, and the Quinault, of the Hart-Wood Lumber Company's fleet, now being equipped with Babcock & Wilcox watertube boilers, are the 107th and 108th Pacific Coast vessels in which these B. & W. boilers have been installed, according to a return of Charles C. Moore & Company of San Francisco, agents of the Babcock & Wilcox Company. The first vessel on the list is the Dirigo, built in 1897. For several years the largest number of boilers installed in any vessel was four, but that record was broken when the Matson steamship Maui received eight. Other 1920 installations besides the Pacific and Quinault include the Asuncion, reboilered; and the McCormick steamship Everett.

Along the Atlantic

In Bethlehem Yards

Five bulk-oil carriers, totaling nearly 60,000 deadweight tons, are nearing completion at the Fore River plant of the Bethlehem Shipbuilding Corporation. Two of these vessels, each of 12,600 tons, are to be delivered to the Standard Transportation Company, and the third, of the same tonnage, is for the Atlantic, Gulf & West Indies Steamship Company. Two of the 12,600-ton tankers were to be launched before New Year's, and the third in January. Two other tankers, each of 10,600 deadweight tons, are to be launched early in 1921. They are to become part of the Sinclair Oil Company's fleet.

New Slip at Fore River

A new building slip capable of accommodating a freighter ship 500 feet long, has just been completed at Fore River, giving the yard seven slips for 500-foot vessels and one for a 900-foot ship. Fore River's naval construction program for the coming year includes the building of the superdreadnought Massachusetts, which will have a displacement of 43,200 tons, and the 35-knot battle-cruiser Lexington, 880 feet in length.

The keel of the Massachusetts will be laid soon after New Year's day. The Massachusetts will be larger than any vessel now in the United States Navy, having a length of 660 feet overall, 106 feet beam and displacement of 43,200 tons. She will have electric drive and engines of 60,000 horsepower, and her speed will be 23 knots. The armament will comprise twelve 16-inch guns and a secondary battery of sixteen 6-inch guns.

To Build Battle-cruiser

The keel of the Lexington will be laid soon after that of the Massachusetts. She will have almost exactly the same beam as the Massachusetts, but her length overall is to be 880 feet and her displacement 43,500 tons. Her engines of 180,000 horsepower will yield a speed of 35 knots under electric drive. She will mount eight 16-inch guns and sixteen 6-inch guns and also will have eight torpedo tubes.

These two huge warships embody the latest developments in naval construction and incidentally show how rapidly types have changed in recent years. The locks of the Panama Canal, which are 110 feet wide, will allow only two feet margin on each side for the passage of a vessel of the Massachusetts' beam.

Scouts at Fore River

Two unnamed scout cruisers, with 90,000 horsepower engines and a speed of 35 knots, also will be built at Fore River in the coming year. They are to be 550 feet long, with 55 feet beam and are to carry eight 6-inch guns each.

The Fore River plant, which launched seventy-one destroyers during the war and was the first American shipyard to complete the destroyer contracts let in that period, is now working on naval construction that will total approximately $75,000,000. Two AA-type submarines, 269 feet long, of 1500 tons displacement, which are the largest craft of the kind ever built in this country, and twelve S-type submarines, of 900 tons displacement and 220 feet length, are already overboard or on the slips. Keels are soon to be laid for six S-boats, 225 feet long. The yard can lay down eighteen submarines at one time.

Record at Harlan

The installation of one single-ended Scotch boiler ten minutes after the launching of the 10,600-ton tanker Eugene V. R. Thayer for the Sinclair Navigation Company and the placing into position of the others immediately after, is believed to be a record by shipbuilders of the Harlan plant of the Bethlehem Shipbuilding Corporation. The speeding-up of construction was for the purpose of getting the big tanker into the petroleum trade in Mexico, where the Sinclair Navigation Company's problem is one of ships. Three more tankers are being built at the Harlan yard for Sinclair, and two at the Fore River plant of the Bethlehem Shipbuilding Corporation, Quincy, Massachusetts.

Hog Island Work

Hog Island News reports that to November 15, 1920, the yard had launched 125 ships of a total deadweight tonnage of 956,750, of which 115 ships of 900,750 tons had been delivered These vessels had steamed more than 3,043,441 miles and had carried more than 3,020,665 tons of cargo. During the year ended April 27, 1920, seventy-one A-class vessels of 555,575 deadweight tons and eight B-class of 64,000 tons were launched and seventy-four A-class vessels of 579,050 tons were delivered. The average of the year was 2224 deadweight tons launched each eight-hour day and 2080 tons delivered; or one vessel launched each three and one-half working days and one delivered every three and three-quarter working days.

Plant Improvements

Bethlehem Ship News has this to say regarding the new drydock at the Sparrows Point plant of the Bethlehem Shipbuilding Corporation: This 6000-ton dock will prove to be a splendid addition to Baltimore's ship-repairing facilities, and, in connection with the yard's great 20,000-ton dock, will enable the corporation to handle its greatly increased repair business with dispatch. The new dock will facilitate repairs on the coastwise and smaller foreign vessels which go in and out of the port of Baltimore. It will accommodate vessels drawing twenty feet of water, and no more than 6000 gross tons, and not exceeding the length of the dock, which will be 418 feet. The width of the new structure between the wings will be 75 feet, and the extreme width, including the wings, 100 feet. Eleven pontoons, each 100 feet long, 32 feet wide and 11 feet deep, will float the dock, and it will be emptied of water by twenty-two centrifugal pumps, each operated by a 35-horsepower motor.

Yard for Jugo-Slavs

Information received from the American legation at Bucharest is to the effect that a Jugo-Slav syndicate, under government supervision, intends to construct a large yard for the building of new ships and for the repairing of existing ships. The building of a large shipyard for the construction and repair of the extensive river shipping is a matter which has long been under discussion in Jugo-Slavia. The syndicate mentioned above controls practically all the Jugo-Slav ships on the Danube and Save Rivers and is an important institution. Copy of the plans for this yard, with descriptive text in Serbian and German, and an English translation of the text, may be examined in the Bureau of Foreign and Domestic Commerce, at Washington, D. C., or at its district and co-operative offices by referring to file No. NE-27.

Upon his return from the East, J. J. Coughlan, of J. Coughlan & Sons, Vancouver, B. C., announced that his company would construct on Burrard Inlet a drydock 725 feet long, 110 feet wide and 48 feet deep at a cost of $3,500,000. Two years will be required for the work.

Operating News and Views

Operators Look Ahead

Although the dullness of Pacific shipping continued during December, some important forward-looking plans were made by different companies. In particular, Swayne & Hoyt of San Francisco requested of the Shipping Board the assignment of three of the new 535 passenger and freight steamships with which to maintain a service between the Pacific Coast and Mediterranean; the Pacific Mail was advised by the Shipping Board that two vessels of the 502 class would be assigned to the company for the San Francisco-Manila-East Indies service; and the General Steamship Corporation received approval of the Shipping Board of a plan to fit the 8800-ton freighter West Camargo with refrigerating space sufficient for about 200 tons of butter and frozen meat, which will be brought to the Pacific Coast from Australia and New Zealand.

Union Construction Given Contract

This last is noteworthy beyond the intrinsic importance of the installation because there has been a marked demand on the Pacific for refrigerator ships, especially from the fruit-growers of Washington, Oregon and California, who have been handicapped severely in marketing their products in the Eastern States because of the advances in railroad rates of August 26. Inasmuch as the Shipping Board has displayed a willingness to fit one vessel with insulated space the Pacifis hopes that others may be remodeled with special regard for the intercoastal fruit business or that some of the board's refrigerator vessels will be provided. Much more space than that to be provided for the West Camargo would be necessary for the fruit trade, however. The General Steamship Corporation did not desire large ice-house capacity because much of the outward cargo of vessels in the Australasian service is oil, which could not be loaded into the refrigerator rooms, so that waste space on the outward voyages would have resulted from too large an ice house. A contract has been awarded to the Union Construction Company of Oakland for the West Camargo work. In order that the service might not be disrupted by the temporary withdrawal of the West Camargo, the work was postponed until April, when another vessel will replace her while she is at the Union Construction yard.

How the consumers of the Pacific Coast take to frozen meats probably will determine largely the extent to which the General Steamship Corporation will go in requesting the remodeling of other vessels. Heretofore the only American company transporting refrigerated goods from Australia has been the Oceanic, and no American line handled such cargo from New Zealand. The round voyage of the West Camargo requires 110 days, so that the one vessel will not throw a great quantity of foodstuffs on the Pacific market.

Need for Service Obvious

Swayne & Hoyt's request for three 535's for a Pacific Coast-Mediterranean service was inspired by the obvious need of such a line and the belief that if none were opened by an American Company a foreign corporation would step in. With three 535's, one sailing each month could be maintained. As outlined tentatively the vessels would call at Cadiz, Barcelona, Marseilles, Genoa, perhaps Naples as well and finally at a port of Greece, probably Piraeus. Excluding time in port, the steaming time of one of these 17-knot vessels would be only twenty-six days or so, San Francisco to Piraeus. Something might be done to extend the service to Alexandria, if the vessels are allotted, or advantage might be taken of the proposed Mediterranean feeder service of Lake-built vessels.

An investigation by Swayne & Hoyt led them to the conclusion that approximately 1500 persons arrive in the Western States from Italy each month, this number representing both new immigrants and persons returning from visits abroad. Probably 700 or 800 go to Italy each month. Such travel should provide large passenger lists, although the steerage accommodations of 535's, which are adequate for only 300 persons, should be enlarged. The first-class accommodations for 249 persons should be ample. Should the bill prohibiting immigration for one year be passed, however, the proposed line would be affected adversely.

Cargo Prospects Good

No difficulty would be experienced in filling the vessels with freight for the eastbound voyages. Cargo for the westbound sailings would be more difficult to obtain, but a natural increase should follow upon the immigration of many Italians and other Southern Europeans, who would demand many home products. Moreover, the expense of discharge of goods at New York and the dispatch overland by rail or via the Panama Canal probably has discouraged exports from Southern Europe to the Pacific Coast, and the opening of a direct and cheaper service might reasonably be expected to stimulate trade.

Swayne & Hoyt have been given some influential support in their plans. The Pacific Coast as a whole unquestionably would welcome the proposed line, the opening of which comes within the provisions of the Jones Act directing the survey and establishment of pioneering trade routes.

Third Vessel Expected

A request of the Pacific Mail that some of the 502-class steamships be assigned for its San Francisco-Manila-East Indies service, to replace the Colusa and Santa Cruz, was complied with by the Shipping Board. Two vessels, the Creole State and the Wolverine State, will be delivered to the Pacific Mail in San Francisco in January and February, and a third vessel probably will be assigned.

From San Francisco the vessels will steam for Honolulu and thence to Manila, making the voyage to the Philippines in twenty-two days. From the Philippines they will proceed to Saigon, Singapore, Calcutta and Colombo. Their time to Calcutta will be thirty-four days.

Such a service as this should go far toward silencing the outcry raised in the Philippines against the extension of the coastwise laws to the islands beginning February 1, 1922. Heretofore Manila has been the tail to the Hongkong dog. Until the Pacific Mail opened its East Indian service the Philippines lacked a fast mail and passenger service with the States, for although the United States Army transports carried mail they scarcely could be described as fast, and civilian passengers were compelled to make their voyages by way of Hongkong and ports of Japan. The eastbound mail service was especially bad, inasmuch as the army transports returned to San Francisco by way of Nagasaki, where they called for coal, which resulted in the loss of considerable time; and all the Oriental liners, British, Japanese and American, steamed to the Pacific Coast by way of Hongkong, Kobe and Yokohama.

Best Service to Manila

The Pacific Mail, an American company operating American vessels assigned by the United States Shipping Board, has given Manila the best service with the States that the city ever has had. Both the company the the officials of the government have demonstrated their desire to improve the service, for which they certainly are entitled to the gratitude of the Philippines. One means of showing that gratitude would be to cease crying against the extension of the coastwise laws to the islands and to work in harmony with American companies for more and more American steamships.

Both the Creole State and the Wolverine State will have refrigerator space for 1200 tons of cargo. An opportunity is thus afforded to introduce California fresh fruits in the Far East. Allocation of the steamships was received with relief on the Pacific Coast, for the withdrawal of the Santa Cruz and Colusa had threatened to destroy the commerce built up with the East Indies.

New Ocean Services

Three geared-turbine freight and passenger vessels, built by the Asano Shipbuilding Company, Tsurumi, Japan, will be added to the South American fleet of the Toyo Kisen Kaisha. The first vessel, the Ginyo Maru, probably will be delivered in July; the second, the Bokuyo Maru, in August, and the third, the Rakuyo Maru, in September. Each will have a deadweight capacity of 12,500 tons, so that they will be of approximately the same size as the Anyo Maru, now the largest vessel of the South American service.

First Geared Turbiners

Particular interest attaches to these new vessels because they appear to be the first geared-turbine vessels built in Japan. As a matter of fact, direct-drive turbine vessels have been relatively few, the conspicuous ships of this type being the Shinyo Maru and the Tenyo Maru of the T. K. K., for Japan has clung with marked persistence to the reciprocating engine and the Scotch boiler, except of course for naval vessels. The new T. K. K. steamers will be twin-screw and will have turbines and reduction gear of American manufacture. Details of their dimensions have not been received in the States, but the assumption is that they will be of approximately the size of the Anyo Maru, or 460 feet long, 60 broad and 36 deep. They will follow the same route as the three in use now; that is, Japan to San Francisco to Los Angeles to Balboa, Arica, Antofagasta, Lima, Callao and Valparaiso. They will carry 75 first-class, 25 second-class and 600 steerage passengers, as compared with 30 first-class, 50 second-class and 646 steerage carried by the Anyo Maru. In common with other vessels of the T. K. K., the new liners have names ending in the syllable "yo."

Until the new vessels are delivered the South American service, which heretofore has had three steamships, will be augmented with three standard Asano 8800-ton freighters, the Tokuyo Maru, Heyo Maru and Reiyo Maru. The first of these was due to make her appearance in the service about the first of the year and will be followed by the Heyo in February and the Reiyo in March. When the combination vessels have been delivered these freighters probably will be diverted to other routes, perhaps to the Japan-Atlantic service, but they would be available for use in the South American trade should freights require.

T. K. K. to Call at Dairen

Announcement has been made by the Toyo Kisen Kaisha of the addition of Dairen to the ports of call of the Persia Maru and the Siberia Maru. Both vessels will omit Nagasaki hereafter, their routes being San Francisco, Honolulu, Yokohama, Kobe, Dairen, Shanghai and Hongkong. Diversion is possible because the Persia and Siberia are not subsidized and therefore are not subject to regulation by the Japanese government, as are the Shinyo, Tenyo and Korea, the last of which, although American-built, is subsidized as having succeeded the Chiyo Maru, lost at Hongkong in 1916.

This new Dairen service is the first direct passenger connection between San Francisco and Dairen. The latter port is old Dalny, a few miles distant from Port Arthur, and is the principal harbor of Manchuria and the terminus of the Southern Manchuria Railway, which connects with the Chinese Eastern.

United American Hamburg Service

Pursuant to the policy of the United American Lines to extend its service between the United States and Hamburg to Southern Atlantic and Gulf ports, the steamer Kerkenna, a vessel of 5500 deadweight tons, of the United American Lines, sailed from Hamburg in December for New Orleans, and will load from New Orleans to Hamburg. This is, it is believed, the first steamer since the war from Hamburg to New Orleans carrying general cargo, and it is probable that it will be the beginning of a regular service. The Kerkenna, it is expected, will sail from New Orleans for Hamburg late in January.

With the arrival in the port of Buenos Aires on October 11 of the Lloyd Royal Belge steamer Pays de Waes, a new direct steamer service was inaugurated between Antwerp and the River Plate. This vessel, which is 9735 tons displacement, made the trip in twenty-three days, stopping at Lisbon and Rio de Janeiro. Other vessels are promised shortly and a regular service will be maintained, says a report of Trade Commissioner G. S. Brady, Buenos Aires.

Los Angeles Steamship's Plans

The Los Angeles Steamship Company will open its Los Angeles-San Francisco service with the passenger steamships Yale and Harvard March 1. One vessel will depart each port at 4 o'clock in the afternoon, arriving at her destination at 10 o'clock the next morning, a running time that compares favorably with the trains. Adolph Ottinger has been appointed passenger traffic manager, with offices in San Francisco and Los Angeles, and Roy Crowder, formerly of the T. K. K., will be general passenger agent. One of the vessels is being refitted at the yard of the Ralph J. Chandler Company, Wilmington, and the other at the yard of the Los Angeles Shipbuilding & Drydock Company. Each will carry 550 cabin passengers.

Roy V. Crowder, recently appointed general passenger agent of the Los Angeles Steamship Company

Astoria-Honolulu Sailings

Following upon representations made by Astoria to the Shipping Board that Columbia River interests earnestly desired a direct service with Honolulu, J. N. Teal, newly-appointed member of the Shipping Board, advised the Astoria Port Commission that the steamship Hollywood, operated by the Matson Navigation Company in its triangular service, would call at Astoria provided that 500 tons of freight was forthcoming. A former decision of the Shipping Board was that the vessel would not call for less than 1500 tons, under which, said a telegram of B. F. Stone, chairman of the Astoria commission, to Mr. Teal, "flouring mills and producers of this section are eliminated from trading with Honolulu, as the local freight from Astoria to Seattle precludes all transactions."

Advices received in San Diego state that five freight steamships formerly operated by a company of Vera Cruz but now under government management would ply coastwise between San Francisco, San Diego, Guaymas, Mazatlan, Acapulco, Manzanillo and Salina Cruz. The vessels formerly were owned by Salvador Alvarado, recently governor of Yucatan but now in the Obregon cabinet.

Announcement was made in Portland that the Isthmian Line, represented by Norton, Lilly & Company, would increase sailings of its vessels in the intercoastal service from one every two weeks to one every ten days, and that the vessels of the Societe Generale de Transports de Maritimes a Vapeur would call once a month instead of more infrequently and irregularly.

An improvement in the Harrison Direct Line service has been announced, the vessels Statesman and Chancellor of the West Indian fleet having been ordered to the Pacific Coast-United Kingdom route.

Pacific Mail's 535's Sailings

A schedule of the Baltimore-San Francisco sailing of the steamship Golden State has been made public by the Pacific Mail Steamship Company. She will depart as follows: Balitmore, February 15; Havana, February 19; Cristobal, February 22; Balboa, February 23; La Libertad, February 25; San Jose de Guatemala, February 25; Los Angeles, March 3; arrive San Francisco March 4. She will depart March 19 for Hongkong and usual way ports. The Golden State will be followed by the Empire State, the Palmetto State, the Hoosier State and the Lone Star State.

The Japanese steamship company, the Osaka Shosen Kaisha, opened its own office in Buenos Aires on September 1, says a report by Trade Commissioner George S. Brady, Buenos Aires, to the Department of Commerce. This company's steamers and business have been handled for the past three years by an American company, but henceforth the Osaka Shosen Kaisha will transact all its South American business directly, the Buenos Aires office being the managing office for the South American branches. The South American service of this line has six modern steamers of 10,000 tons each. En route to Buenos Aires calls are made at Yokohama, Kobe, Moji, Hongkong, Singapore, Durban, and Cape Town, and on the return trip the vessels call at Santos, Rio de Janeiro, Habana, New Orleans, Panama Canal, and Los Angeles.

Ecuador-Panama Service

With the sailing of the steamship General Goethals on the 11th instant for Guayaquil, Ecuador, a regular monthly service has been established between that port and Cristobal by the Panama Railroad Steamship Company, says Vice Consul Odin G. Loren, Colon, Panama, under date of November 4. It is planned to allocate the steamers Allianca, General Goethals and General Gorgas to this service. On the southbound trip the steamers will stop at the port of Buenaventura, Colombia, and on the northward trip they will stop at Manta, Bahia de Caraques and Esmeraldas, Ecuador, and Buenaventura in Colombia. In view of the withdrawal of United States Army Transport Service from the New Orleans-Cristobal run, it is anticipated that the Panama Railroad Steamship Company will inaugurate a Cristobal to New Orleans service. The Army transports will hereafter sail between New York and San Francisco, touching, as formerly, at Porto Rico and the Canal Zone.

Announcement has been made in Washington that the Atlantic, Gulf & Pacific had purchased of the Shipping Board the steamships Cape Henry and Liberator, both of 11,700 tons deadweight.

Calls at Portland

The first line service Portland has had with Australia and New Zealand was given by the General Steamship Corporation's West Camargo, which sailed in December. Portland exporters are endeavoring to assemble sufficient cargo to warrant calls by following vessels of the line.

A representative delegation of Portland business men will make a trade excursion to the Orient on the first trip of the United States Shipping Board passenger steamship Wenatchee, which will be operated by the Pacific Steamship Company between Seattle and the Orient. Announcement of the plans for the voyage was made by the Foreign Commerce Club and the Oregon State Chamber of Commerce.

Received with Enthusiasm

Consul Thomas H. Beevan of Bahia, Brazil, has this to say regarding Swayne & Hoyt's Pacific-Argentine-Brazil Line: The announcement of this new service was received by the Bahia exporters with considerable enthusiasm. Formerly all of the cacao, coffee and hides exported to the western cities of the United States had to be routed via New York and shipped across the continent by rail. There is considerable demand in Bahia for California canned and dried fruits, as well as flour, which is now being imported from the United States in large quantities. These commodities will help to make up the southbound cargoes.

Royal Mail Coming

The Royal Mail Steam Packet Company is expected to place vessels in the Pacific Coast European trade in conjunction with the Holland-America Line early in the year. A joint service by these companies was announced in the fall, but no Royal Mail vessels have been placed in the service, the Holland-America maintaining a six-week schedule with its own steamships. The Royal Mail's quota probably will permit of sailings every three weeks. Announcement has been made by the Royal Mail in New York that it would open a service early in the spring between New York and Southampton, Cherbourg and Hamburg, using three intermediate liners. Advices to the San Francisco offices of the Holland-America Line state that the first shipments of Pacific Coast apples were received in Europe in good condition. Each vessel is carrying between 25,000 and 30,000 cases of fruit in addition to frozen fish, which is maintained at a temperature about midway between freezing and zero.

N. Y. K. to Vancouver

Announcement that the Nippon Yusen Kaisha would send its vessels to Vancouver, B. C., gave rise to reports that Seattle would cease to be the principal port of call on the Pacific Coast, but these reports have been met with denial by officials of the N. Y. K. in Seattle. B. W. Green & Son, Yorkshire Building, Vancouver, have been appointed agents for freight, passenger and general business.

The Nippon Yusen Kaisha has announced that it would add two large freight steamers to its present fleet and a fast passenger liner, the Finisterre, former Hamburg-American Line steamer, for the Seattle-Oriental traffic. Thirty-six N. Y. K. steamers will depart from Seattle in 1921.

The Finisterre is of 12,000 tons and has accommodations for 450 first-class, 400 second-class and 600 third-class passengers. She has little or no cargo space and is fitted to carry only stores, express, mail, baggage and passengers. The company is also building three steamers of the Katori Maru type, the first to be placed on the run in May. The increased sailings of this company, together with the additions of five 535-foot liners, which have been allocated to the Pacific Steamship Company by the Shipping Board for passenger business to the Orient, will make 1921 an epochal year in Seattle's trans-Pacific passenger business.

New York to Levant

The Moore & McCormack Steamship Company, New York, has announced that it would represent the Svenska Lloyd, Swedish, in the United States. Regular Freight services will be established by Moore & McCormack to Spain, North Africa, Mexico and ports of the Black Sea.

The British Chamber of Commerce in Mexico City has received advice that several British steamship lines desire to establish direct service for passengers and freight between Great Britain and ports of Mexico on the Gulf. It is understood that as soon as possible service will be inaugurated from Liverpool to Vera Cruz.

New Lines to Brazil

According to official information received by Consul Pickerell, the following companies are planning to establish transportation service between Para and European ports: Royal Mail Steam Packet Company, Hamburg Amerika Line (Hamburg-America), Companhia Transportes Maritimos do Estado. All of these companies announce that they intend to make the ports of Hamburg, Havre and Rotterdam, stopping also at Liverpool, Lisbon and other ports as necessity requires. The first company is English, the second is German, and the last Portuguese. In partial consequence of this proposed increase in transport facilities, freight to British ports have dropped about 20 shillings a ton. A report from Consul Haeberle also advises that three French steamship companies, which maintained services to Argentine and Brazilian ports before the war, have combined and recommenced operations between France, Rio de Janeiro and Buenos Aires. The first steamer, the Lutetia, arrived on October 20, 1920.

Steamship Charles H. Cramp, Atlantic-Gulf & Pacific Line, which made a voyage between Baltimore and Los Angeles in sixteen days

U. S. S. B. Idle Tonnage

On December 17 ten vessels were tied up in the Pacific Coast district of the Shipping Board. Of these, six vessels were new, never having been commissioned; and the other four were the steamships Mohinkis, Eastern Gale and Dellwood, withdrawn from the Hawaiian service of the Matson Navigation Company, and the steamship West Harts, operated by the Robert Dollar Company to the Orient. At the middle of December indications were that eight additional vessels would be withdrawn: steamships Diablo and Havilah, operated in the tramp service from the Puget Sound district but held in San Francisco; Fort Wayne, engaged in the intercoastal service, and West El Cajon and Eastern Ocean, both tramps, besides three new vessels: West Honaker, West Kebar and Narcissus, all freighters.

This showing is not as bad as other sections of the country have been reporting, especially in view of the fact that three of the ten vessels withdrawn were from the Hawaiian trade, which undergoes a pronounced seasonal slump, due to the falling off in sugar shipments at this season of the year. The new sugar crop will begin to move in January.

Fast Run to Pacific

An unusually rapid passage between Baltimore and Los Angeles was made by the new 9500-ton oil-burning steamship Charles H. Cramp, of the Atlantic-Gulf & Pacific Line, which arrived at Los Angeles in December, 16 days, 2 hours and 18 minutes out. She made the run from Cape Henry to Colon in 6 days and 2 hours, clearing Cape Henry at 10 o'clock in the morning of November 24 and arriving at Colon at noon November 30.

A cargo of 8400 tons was carried by the Cramp for Pacific Coast ports. Of this amount 2200 tons was discharged at Los Angeles, 2500 at San Francisco, and the remainder, 3700 tons, at the new Parr Terminal, Oakland.

Semi-monthly sailings in the intercoastal trade are being maintained by the Atlantic-Gulf & Pacific. Two vessels departed from Pacific Coast ports and two from Atlantic ports in December and the schedule for January is the same.

T. J. Wade is general freight agent with offices at 60 California Street, San Francisco.

Bareboat Charter Plan

Discussion of the bareboat charter plan for Shipping Board vessels has been revived following the formulation of MO4, the operators' new agreement. The Pacific American Steamship Association received a suggestion from its representative on the general committee that it draw up a bareboat form, but declined to go to the time and trouble until assured that the board would follow the desire of the association in preventing competition between chartered vessels and those still under control of the government. Should the board keep in its hands control of ocean routes the question of competition and of maintaining pioneering services could be settled without difficulty, but in the event that the board relinquishes control both these points would remain to be considered. A large group of shipping men on both the Atlantic and Pacific desire the adoption of the bareboat plan.

Admiral Benson appears to be favorably disposed, as witness a recent address in Charleston, a portion of which follows:

"I can sum the whole matter up by saying that a long step forward has been taken in getting a simple agreement which makes the manager work for his compensation and rewards him when he does—an agreement which has the recommendation of the steamship men of the whole country who are to work under it and who are therefore responsible for its success. But this should not be a final stopping place. There should be further progress. With the assistance of these same steamship men the board now wants to commence the working out of a further plan whereby the manager becomes responsible for the expenses of the vessel as well as for the gross earnings, and where he will be gradually given almost complete independence of operation and where, as a consequence, the board's personnel and overhead expenses, particularly in foreign ports, will be greatly reduced. When this can be brought about and the managers are operating the ships free from the board's supervision and assistance, independently, in stabilized trades, where the vessels have proved their value, then the American people, led by these steamship managers, will buy the ships and a great desideratum—privately owned American merchant marine—will be accomplished."

Harbor Improvements

Washington Harbors

The Port of Seattle Commission in a letter to Colonel Edward H. Schulz, district engineer in Seattle, urges that the Lake Washington ship canal be deepened to thirty-seven feet and widened 300. Reasons urged are that many lumber mills would be benefited; that within a short time the shores of Lake Union will be entirely filled with docks and industrial plants and Lake Washington also is developing rapidly; that vessels find navigation of the channel difficult; that the port of Seattle constructed a terminal on Salmon Bay at a cost of $600,000, but that this cannot be used to the best advantage because scows must be employed; finally, that in 1919 the vessels passing through the canal locks numbered 24,630, the total net tonnage of which was 1,020,710, log rafts excepted. Although 5500-ton vessels have used the canal, no 8800-tonners have entered.

Tacoma to Issue Warrants

Between $50,000 and $60,000 worth of 6 per cent warrants will be issued by the Port of Tacoma so that Pier 1, the open pier, may be placed in service. The money will be used to lay railroad tracks to the pier, to purchase a large crane and to do other finishing work. Bids will be asked for immediately and opened January 6 for a five-ton, ninety-foot beam hammerhead crane. A locomotive crane has been installed.

Within a short time vessels entering Puget Sound by way of the Strait of Juan de Fuca will be able to navigate with the assistance of radio compass stations. A series of stations has been erected by the navy department from Cape Flattery to the vicinity of Port Townsend. Radio compass stations will also be in operation soon at the entrances to the Columbia River, Grays Harbor and Willapa Harbor. This work will be undertaken by the Coast and Geodetic Survey cutter Surveyor as soon as she can be refitted, says the Seattle Chamber of Commerce.

Oil Products' Plans

The Vegetable Oil Products Company of Seattle has been incorporated with a capital of $400,000. It will engage in the producing and refining of vegetable oils at a plant on the Lake Washington Canal. The property has a deep-water frontage of 400 feet and will be improved by the construction of docks, loading and unloading platforms, storage tanks and sumps. P. H. Holdsworth is president and general manager.

Representatives of the ports of the Pacific Coast are discussing a proposal of formulating uniform charges or at least a uniform system. Due to the lack of any uniformity each port has made charges as it saw fit, some imposing both docking and cargo charges, others exempting vessels and levying everything against the cargo. As a result considerable difficulty may be experienced by shipowners and shippers in determining precisely what the actual costs are at each port.

In Oregon Ports

A bond issue of about $1,000,000 will be necessary if the port of Portland is to carry on its work during the year 1921. The requirements of the port total $1,341,572 as against $444,766.76, the maximum tax levy under the 6 per cent limitation. Expenditures for the year have been estimated as follows: dredge operation and engineering, $527,040; towage and pilotage, $124,268.12; traffic department, $30,000; administration, $25,200; bonded debt, $62,400. Operation alone, therefore, will result in a deficit of $249,874, to which must be added $258,787.38, the difference between the cost of new work contracted for and the amount that the port can pay; rehabilitation of the port drydock property, pledged to the dock commission, $117,500; necessary equipment for the dredge Columbia, $199,143.85; harbor improvement work, $71,500. Relief may be sought either through a bond issue or by requesting the state legislature to pass the consolidation measure defeated at the recent election, which would have increased the bonding power.

Portland authorized a bond issue of $1,000,000 in 1919, the fund to be used to give bonuses to steamship lines so as to equalize the towage and pilotage rates of Portland with those of Puget Sound cities. This money has been held up temporarily by an opinion submitted to the port authorities to the effect that the bonuses would involve the use of public money for the encouragement of private enterprise. A test case probably will be instituted and carried to the Supreme Court.

The Commission of Public Docks of Portland has given permission to the owners of nine condemned docks to repair and maintain their properties for two years. At the end of two years the docks are to be removed if the Laugaard plan of development has not been authorized.

James H. Polhemus, chief engineer and general manager of the port of Portland, reported in November that all shoals in the ship channel between Portland and the sea would have been removed before the first of the year. All bars between Portland and Astoria had a channel 33 feet and 300 feet wide except only for Martin Island, which was being dredged by the government suction dredge Multnomah and was to be completed in December. The one spot remaining where there was less than 33 feet of water was between Fort Steven and Desdemona Sands, below Astoria, where advantage could be taken of the tide. Two port dredges, Willamette and Tualatin, removed 1,426,670 cubic yards of matter during the year from the Columbia channels.

A contract has been awarded to the General Electric Company by the port of Astoria commission for a motor generating set to operate the cargo cranes on the new pier. The commission has sold $500,000 worth of 6 per cent bonds to P. W. Chapman & Company, Chicago, for $485,000 plus accrued interest at the time of delivery.

California Development

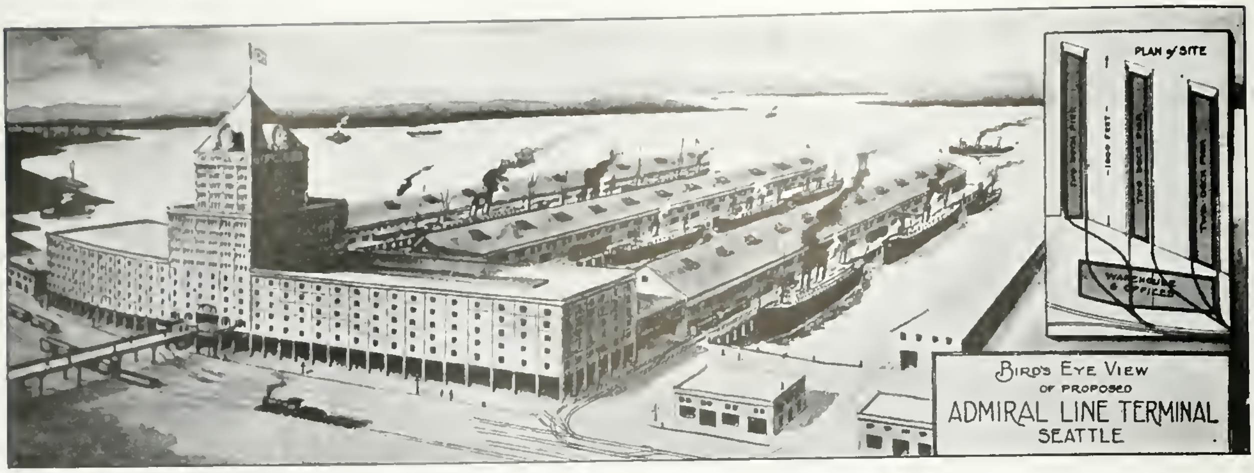
Representative J. A. Elston of Berkeley, California, announced prior to departing for Washington that he would endeavor to obtain appropriations for the development of Oakland and Berkeley harbors. Deepening the channel to the proposed wharf units of Berkeley is the major project, the minor is providing fairways for further development in West Oakland. Oakland first received government assistance in 1913, since when, according to the harbor development committee of the Oakland Chamber of Commerce, industries on the inner harbor have increased from seventeen to seventy-three.

The San Francisco Chamber of Commerce will oppose any effort in the California legislature to transfer the control of the city's waterfront from the state to the municipal government. A resolution to this effect was passed by the board of directors. The chamber supported the charter amendment passed at the last election, which will enable the city ultimately to take over and manage its waterfront as is now done by other cities of the state. It is the view of the chamber, however, that no hurried action should be taken.

Long Beach Would Buy

A committee of five has been appointed by a meeting of citizens of Long Beach to appraise the 250-acre holdings of the Dock & Terminal Company, maker of Long Beach harbor, to obtain a sale price of the entire property and to report upon the advisability of municipal purchase. The price asked probably will be about $2,500,000.

Richmond, California, is preparing for construction of a warehouse to be built near municipal wharf No. 1 at a cost of $150,000. The warehouse will be 523 feet by 110 and will have hollow-tile walls and a steel roof. Bonds for this work and also for the improvement of the harbor, the latter totaling $400,-


PLAN of SITE
1000 FEET
WAREHOUSE & OFFICES
BIRD'S EYE VIEW OF PROPOSED ADMIRAL LINE TERMINAL SEATTLE

View of Proposed Admiral Line Terminal, Seattle

Birdseye view of the great $6,000,000 ocean terminal, the building of which for the Pacific Steamship Company on the 26-acre site of the former Skinner & Eddy yard at Seattle the Shipping Board has under construction.

Plans for the terminal call for the construction of three 1000-foot piers with berthage for twelve ocean liners at one time and a large steel and concrete warehouse and office building. The piers, transit sheds and warehouse would have a total cargo capacity of 325,000 tons at one time and it would be possible to handle millions of tons of freight during the year. The three piers are to be 144 feet wide each and the slips 210 feet. The first floor of the warehouse and office building is open space for teams and railroad cars; the second for passenger waiting rooms; the passengers to be handled from up-town streets by means of a viaduct; third, fourth and fifth floors and wings, warehouses and tower, general offices.

According to the specifications concrete piling will be used in the construction of the piers and the floors will be concrete. The equipment will include batteries of electrical conveyors, freight jitneys and all modern freight-handling devices to assist in giving the steamers a quick dispatch. On each side of all three piers double tracks will be installed.

The Pacific Steamship Company, which submitted the proposition to the Shipoing Board a few weeks ago, would concentrate all its shipping activities at the proposed terminal, which means that a total of 120 vessels, including the ships owned by the company and those operated for the Shipping Board, would use the gigantic dock as their American base. The time required to erect such a project would be no less than two years, it is estimated.

000, were approved at a recent election.

Lange & Bergstrom of San Francisco have been awarded a contract for the construction of a 600-foot concrete dock at the North Island naval air station, San Diego, work to begin in December. Their bid was $360,000.

An interesting project for the development of India Basin, San Francisco, is covered in detail on page 29, this issue.

Trans-Pacific Work

President Wilson has approved a bond issue of the Territory of Hawaii of $200,000 for the construction of a wharf at Nawiliwili, Kauai. To this amount the Federal government will add $200,000 for development of the port, so that the Island of Kauai is in a fair way to realize its ambition of a deep-water harbor with a wharf for the berthing of vessels. In order for sugar from the southern section of the island to be shipped at Nawiliwili, however, rail connections must be made. In addition to the money now available for Nawiliwili, there is an appropriation of $182,000 made by the territorial legislature of 1919 for Kapaa, on the same side of Kauai as Nawiliwili. G. N. Wilcox of Kauai agreed to take the entire territorial bond issue of $200,000 for Nawiliwili.

$600,000 for Kahului

An appropriation of $600,000 was made by the recent special session of the territorial legislature of Hawaii for a wharf at Kahului, Maui, which had been recommended by Governor McCarthy. Although Kahului has had a breakwater, lightering sugar has been necessary, the result being, said Governor McCarthy's message, "a constant loss of money in handling cargoes and in delay to vessels. In 1911 the board of harbor commissioners was ready to recommend an appropriation for the building of a suitable wharf at the port, but would not make the recommendation unless the Kahului Railroad Company surrendered the license it held to build a wharf there. This the railroad company refused to do until recently." Maui interests have agreed to buy the bond issue of $600,000.

Governor McCarthy also urged that an appropriation be made for the preparation of plans for the construction of a wharf for inter-island steamships at Kawaihae, Hawaii.

To Dredge Kewalo Basin

Bids for the dredging of the Kewalo basin, Honolulu, were opened November 27. The Hawaiian Dredging Company was the only bidder, its bids ranging from 85 cents to 35 cents a cubic yard depending upon the work and disposition of matter dredged. A lumber wharf 900 feet long will be built in this basin.

The Standard Oil Company of California has completed a $200,000 station at Port Allen, Kauai, into which tankers lying in the harbor can discharge. The capacity of the fuel-oil tank is 34,000 barrels, and there are other smaller tanks for refined oils. The principal function of the new station will be to serve the Island of Kauai.

New Zealand Loans

The New Zealand government, under an order in council making it obligatory on the part of public bodies to obtain the consent of the New Zealand government, has authorized the raising of loans for harbor boards as follows: Whangarei Harbor Board, $583,980; and the Auckland Harbor Board, $486,650. It is expected that improvements will be made as soon as the bonds can be placed at 5½ per cent and sufficient material and labor can be secured. This, of course, will call for a large amount of supplies and material, much of which must be imported, especially machinery, hardware, and lumber.

Improvement of the port of Yokohama at a cost of yen 14,000,000 has been decided upon by harbor officials, according to reports from Japan. Plans also are under way for improving the harbors of Kobe, Shimonoseki and Kuratsu.

Taku Plans Approved

The proposed construction of Taku harbor has been approved by the Allied Consuls at Tientsin, who have resolved to aid the plan. The proposal has also elicited the approval of the steamship companies. The plan is to construct a breakwater twelve thousand feet long in the outer harbor of Taku, and by dredging the river bed, to enable steamships of 6000 tons and of twenty feet draft to freely enter the harbor. The expenditure required for the construction of the front breakwater is nine hundred and eighty-four thousand taels, for the back breakwater one hundred and twelve thousand and sixty taels, and for reclamation three million five hundred thousand taels, total four million five hundred and ninety-six thousand taels. The entire work is to be completed in three years.

On the East Coast

Congress will be asked to adopt a plan for the construction of a canal across New Jersey through Bordentown, on the Delaware, to Morgan, on Raritan Bay, to connect with New York waterways. Plans had been prepared providing for a canal 25 feet deep and 150 wide and also for one 12 feet deep and 90 feet wide. At a hearing held in New York City General Goethals recommended the sea-level type as the most desirable.

At the closing session of the New York State Waterways Association at Buffalo in November a resolution was adopted opposing the proposed St. Lawrence ship canal on the ground that the United States should not spend money for work outside the jurisdiction of the country and that the canal and power project were economically impracticable.

Mexico and S. A.

A general outline of the contemplated port works at Manzanillo, Mexico, which were made by an American contractor and have been approved by the secretary of public works and communications, has been forwarded by Consul Walsh to the United States Department of Commerce. The opening of the work depends, undoubtedly, upon the action as to finances of the impending congress:

The breakwater is to be extended 200 meters (657 feet). The present breakwater is 1446 feet long and has a solid concrete crown 26 feet wide and 14 feet high (from mean low tide). It has a maximum depth of 78 feet and a cross section at the end of 328 feet. The sea side is faced with granite blocks ranging between 30 and 60 tons. The extension will not encounter a greater depth of water than 12.5 fathoms.

Two Piers 780 Feet

Two piers, approximately 780 feet long each, are to be built to provide four railway tracks. There are to be three warehouses on each wharf, with a capacity of 40,000 tons. There will be overhead traveling cranes on each side. The construction will be concrete and steel, including roofs; granite coping, concrete floors, steel doors, windows, ventilators, etc.

A quay wharf is also to be built, resting on the malecon fronting the harbor. It will be 600 feet long, occupying the space between the two piers. The construction will be creosoted piling and lumber.

The malecon is to be extended eastward from the railroad to Punta de San Pedrita, a distance, approximately, of 1500 feet, and filled to level. About eight acres will be involved in the area of land gained. The water depth is no greater than six or seven feet.

Dredging will be done to give a minimum depth of 30 feet. Some of the ledges now rise to within 20 feet of mean lower water, though they are not extensive in area.

Extensive work also will be done in the city proper.

Rio de Janeiro Bids

Bids for the new port works to be constructed in Rio de Janeiro will be received at noon on January 8, 1921, at the office of the Inspectoria Federal e Portos, Rios, e Canaes, Praca Maua, 10, Rio de Janeiro, Brazil. It is estimated that about $2,000,000 will be spent for these works, which include 600 meters of dock wall, to extend 10 meters depth below the minimum level of the tide at the port; and two breakwaters of about 82,000 cubic meters volume. A set of the designs and specifications for the works have been forwarded to the Bureau of Foreign and Domestic Commerce by Assistant Trade Commissioner Connell, and may be examined upon reference to exhibit No. 43909. Of interest to possible bidders, also, is the translation of the conditions regulating the awarding of the contract which accompanies the exhibit.

Construction work has been begun on the first of a series of eight radio stations which the Argentine Navy Department intends to have along the Argentine coast. The contract was let to a German firm, and German material and instruments will be used. This first station will be located near the municipal bathing pier at Buenos Aires and will have two steel towers of a height of 115 meters (1 meter=3.28 feet). The station will have a radius of from 1800 to 2500 kilometers (1 kilometer=0.621 mile).

Work at Bahia

A new contract for enlarging the present port facilities of Bahia, Brazil, is to be awarded to the company which holds the federal concession for the construction of the port, says a report by Consul Thomas H. Bevan, Bahia, Brazil. The first part of the work, which must be completed within eighteen months from the date of commencement, includes the completion of the Mercado dock, the building of a wall for 26-foot dock, and the dredging alongside to a depth of 26 feet, the completion of the waterworks on the dock, the installation of harbor lights and buoys, the installation of six movable three-ton cranes, and the construction of a permanent depot for inflammables. The warehouse capacity of the port is also to be doubled by the construction of seven large warehouses covering a total area of approximately 17,700 square yards.

The second part of the contract calls for the completion of the final section of the inner breakwater, and for the dredging of a 32-foot channel 600 feet in width from the southern entrance through the breakwaters to the docks. This channel will be about a half mile in length. Several of the docks which now have 26 feet of water are to be dredged to a depth of 32 feet. Provisions are also made for the laying of railway lines along the piers and for the installation of electric light and power. An import duty of 5 per cent ad valorem will have to be paid on all materials imported in connection with the work. The Latin-American division of the Department of Commerce has the address of the main office of the construction company from which specifications may be obtained.

At the National Capital

With the Shipping Board

The Shipping Board met December 1 in Washington and the members were sworn in by John J. Flaherty, secretary. A list of members of the board, their political affiliations and terms for which appointed follow: W. S. Benson, Demcrat, Georgia, six years; Frederick I. Thompson, Democrat, Alabama, five years; Joseph N. Teal, Democrat, Oregon, four years; John A. Donald, Democrat, New York, three years; Chester H. Rowell, Republican, California, two years; Guy D. Goff, Republican, Wisconsin, one year; Charles Sutter, Republican, Missouri, one year.

Duties Are Divided

As provided for in the Merchant Marine Act, the Shipping Board has divided its duties among the commissioners as follows: Port facilities: Sutter and Goff. Ship sales: Donald, Sutter and Goff. Insurance: Rowell and Sutter. Personnel: Benson. Regulations: Teal, Thompson, Sutter and Benson. Advertising and publishing: Rowell. Interstate Commerce Commission conferences: Teal, Thompson and Rowell. Fuel oil purchases: Benson. General controller's office: Teal, Thompson, Goff and Rowell. Treasurer and disbursing office: Teal and Thompson. Industrial relations: Benson. Construction claims board: Sutter and Rowell. Law: Goff. Supply and sales: Thompson and Goff. Construction and repairs: Donald and Thompson. Division of operations: Donald, Rowell and Teal.

The financial statement for the fiscal year ending with June 30, 1920, made public by the Shipping Board, shows profits from the operation of ships of $251,000,000 since the beginning of the board. The entire balance sheet showed a loss of $513,000,000, which included bookkeeping items such as insurance, depreciation and items connected with the war activities.

Edward M. Hyzer, assistant general counsel of the board and the corporation, has been appointed general counsel to succeed Colonel Goff, who was sworn in as commissioner. R. A. Dean and R. H. Bailey have resigned as temporary trustees of the Emergency Fleet Corporation. They were appointed to these positions following the resignations of Commissioners Scott and Stevens in order to establish a quorum.

Erskine Wood of Portland, Oregon, admiralty counsel of the Shipping Board, resigned effective November 30. He had succeeded Charles F. Dutch of Boston in October.

The special committee appointed by Admiral Benson to check up the records of approximately 136 operators of Shipping Board vessels has submitted its first report on eleven companies, recommending the elimination of three for inefficiency, failure to comply with sections of the Merchant Marine Act or some other violations of the law. The task is a large one and may not be completed for several months. Members of the committee are Guy D. Goff, commissioner; Alonzo Tweedale, general comptroller; R. A. Dean, special assistant to the chairman; Captain Paul Foley, director of operations; and R. H. Bailey, assistant to the chairman.

Section 28 Suspended

Following a hearing held in Washington by the Shipping Board on the advisability of a further suspension of Section 28 of the Merchant Marine Act, the board decided to request the Interstate Commerce Commission to suspend the section indefinitely. Section 28 would prohibit the granting of import and export railroad rates to cargoes moving to and from the United States in foreign bottoms. The text of the Shipping Board's resolution follows:

"Whereas, adequate shipping facilities to handle the commerce of the United States to or from all foreign ports and ports in the possessions or dependencies of the United States are not afforded by vessels documented under the laws of the United States;

Enforcement Promised

"Resolved, That the United States Shipping Board certify to the Interstate Commerce Commission that adequate shipping facilities for handling the commerce of the United States to and from all foreign ports and ports in the possessions or dependencies of the United States are not afforded by vessels documented under the laws of the United States and that the operations of the provisions of Section 28 of the Merchant Marine Act, 1920, should be further suspended by said Interstate Commerce Commission until further action by the United States Shipping Board;

"Further resolved, That as soon as adequate shipping facilities as required and defined by Section 28 of the Merchant Marine Act, 1920, to or from certain ports become available, prompt certification of conditions will be made and the enforcement of the provisions of Section 28 will be requested;

"Further resolved, That every effort will be made to hasten the providing of American shipping facilities so that the provisions of Section 28 will be made operative at the earliest pacticable date."

Had the board not acted the suspension formerly granted by the Interstate Commerce Commission would have expired January 1. One argument urged against immediate application of the section was that there were not sufficient passenger vessels under the American flag.

San Francisco's Attitude

The following statement prepared by the San Francisco Chamber of Commerce, which may be taken as representing the more moderate attitude toward Section 28, was filed with the Shipping Board by Seth Mann, manager of the traffic bureau of the chamber:

"It is the feeling of the San Francisco Chamber of Commerce that the suspension of Section 28, which expires on January 1, 1921, should be extended at least six months longer. The present suspension was granted by the Interstate Commerce Commission acting on recommendation of the United States Shipping Board in recognition of the fact that there is not at the present time on the Pacific Coast sufficient American tonnage to serve our requirements.

"In spite of the fact that there has been a marked decline in freight movements and that we are now suffering a temporary depression in foreign commerce, this chamber feels that it would be most injurious to our trade should Section 28 be applied at this time. Our requirements for passenger accommodations are much in excess of our facilities and all the trans-Pacific steamers are booked three and four months ahead, or until February and March, 1921, and there is no present indication of the demand for passenger accommodations decreasing.

"Further, the chamber does not feel that any temporary depression should be accepted as an indication that the time is now ripe for the application of Section 28, and it recognizes that the present depression is a purely temporary one, due chiefly to economic and political disturbances in the Far East.

W. S. Scammell, president of W. S. Scammell & Company, who has added the Ferris-type schooner Fort Laramie to his fleet

"The effect of applying Section 28 at this time also would not be in accordance with its intent, due to the fact that Section 34, providing for preferential customs duties on goods brought to this country in foreign ships, has been rendered inoperative by the President's refusal to comply with its provisions ordering the abrogation of certain commercial treaties or portions of them. The result would be that Section 28 would restrict outgoing cargoes to American ships, but these ships would undoubtedly encounter great difficulty in securing return cargoes, since Section 34 was designed to furnish the homeward load. In other words, the application of one section without the other would merely constitute an act more or less vicious in effect, without accomplishing the objective of the section. In view of these facts, the chamber feels that Section 28 should again be suspended."

On the Street

Personals

J. B. Banning, secretary of the Pacific American Steamship Association, San Francisco, has resigned to enter the newly-established Los Angeles agency of the Matson Navigation Company. Mr. Banning will have charge of the new 535's in Los Angeles, passenger business excepted. His post with the Pacific American Steamship Association has been filled by John P. Williams, who was agent at the Panama Railroad in San Francisco prior to the opening of the Panama Canal, and who recently has been in the Orient in the service of the China Mail in Japan, China and the Philippines.

John Galt, formerly of the Union Steamship Company of British Columbia, has been appointed Vancouver, B. C., agent of Struthers & Dixon.

Robert C. Hill, for ten years manager of the Merchants' Exchange, Seattle, has resigned and has been succeeded by Frank R. Hanlon. Mr. Hill was a newspaper man and editor of Railway and Marine News prior to becoming manager of the exchange

Announcement has been made by the Toyo Kisen Kaisha of the appointment of S. L. Kreider, Pacific Electric Building, Los Angeles, as freight and passenger agent of the company in Los Angeles and San Diego.

Paul Page Whitham, formerly chief engineer to the Seattle Port Commission and more recently United States trade commissioner and commercial attache, has resigned to become China manager of the Foundation Company of New York. He will depart in January for the Orient, where he will have charge of large construction projects. Mr. Whitham is well known to business and shipping men of the United States by reason of his reports to the Department of Commerce and his addresses at the National Foreign Trade Convention.

David Rodgers, general manager of Skinner & Eddy, Seattle, while that company was doing its remarkable war work, was seriously ill at his home in Seattle late in November, but has improved.

A. H. Bishop, president and general manager of the Cooper Company of Manila, was a recent visitor in San Francisco, where he made his headquarters at the offices of his company's American agents, Guy T. Slaughter & Company. The Cooper Company has a large power-boat building plant in the Philippines and also acts as representative of the Skandia-Pacific Oil Engine Company, Oakland, having sold approximately $500,000 worth of Skandia Werkspoor Diesels. Mr. Bishop renewed his contract with the Skandia company for three years.

R. S. Campbell, superintendent of machinery at the Harlan plant of the Bethlehem Shipbuilding Corporation, assumed the same duties at the Sparrows Point yard December 1. Mr. Campbell had been directing head of the machinery department at the Harlan plant since January 1, 1917. His assignment to Sparrows Point is regarded as a promotion of consequence, inasmuch as the Maryland yard has a building capacity just double that of the Delaware yard. On December 1 C. W. Weaver, who has acted as superintendent of hull construction at the Harlan plant of the Bethlehem Shipbuilding Corporation for four years, assumed the duties of general superintendent. This promotion was occasioned through the promotion of Mr. Campbell. Mr. Weaver is splendidly equipped for his duties both with regard to a well-grounded shipbuilding and executive training, and the sort of personality which is no small asset of a real leader.

M. E. Donnelly has opened an office in the Merchants Exchange, San Francisco, for the Los Angeles Shipbuilding & Drydock Company, which is making a strong bid for ship repair work following upon the completion of a new 12,000-ton floating drydock.

Deaths of a Month

John H. Drew, assistant secretary of Castle & Cooke, agents of the Matson Navigation Company in Honolulu, died December 6 of injuries received December 5, when an automobile in which he was riding collided with a train near Honolulu. In his capacity as assistant secretary of Castle & Cooke, Mr. Drew had charge of the Matson and China Mail business in Honolulu. With him at the time of the collision were Mrs. Drew; his brother, Charles A. Drew, and Mrs. Drew; and Walter A. Tuft, dock agent of the Matson Line in San Francisco, and Mrs. Tuft. Mr. Drew was born in Farmingdale, Maine, August 21, 1869, the son of Captain John H. and Louise Lancaster Drew. After being graduated from high school in 1885 Mr. Drew made on voyage from New York to the Orient, after which he entered business in Boston. For a time he was in the shipping department of Welch & Company, San Francisco. In 1896 he went to Honolulu and entered the employ of Castle & Cooke. He is survived by Mrs. Drew and one daughter.

Colonel Thomas W. Symons, U. S. A., retired, formerly in charge of rivers and harbors work in Washington and Oregon and builder of the Buffalo breakwater, in Washington, D. C., November 23.

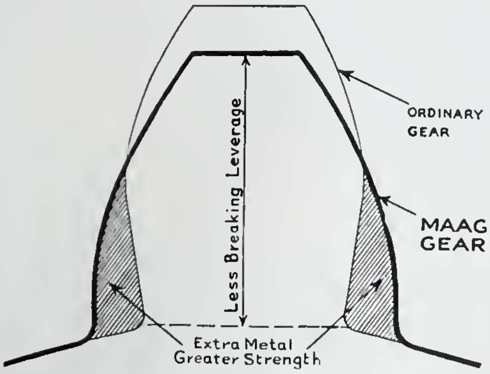
Mrs. Fannie E. Bryant, widow of the late Captain William J. Bryant, United States inspector of hulls in Seattle from 1885 to 1903, in Seattle December 9. Mrs. Bryant was born in Bangor, Maine, her father being Captain George Herriman. Three of her sons are well known in marine circles of the Pacific Coast: Captain W. H. Bryant, A. H. Bryant, of the American Bureau of Shipping, Portland; Walter C. Bryant, president of the Marine Supply Company, Seattle.

Super-Accurate Gears for Marine Turbine Use

HITHERTO the one weak spot in steam turbine practice has been the reduction gears. These have never been quite satisfactory because of two reasons—lack of accuracy in the gears and lack of strength in the pinions. Maag Gears overcome both these obstacles to success.

Cut, first of all, with an accuracy far beyond that possible in ordinary gears, Maag Pinions for high speeds are case hardened and then GROUND to final perfection.

By case hardening, the originally very strong Maag tooth—which is strongest at the base where other gears are weakest—is made still stronger. By grinding, any distortions due to the hardening process are not only remedied to produce a tooth outline of superaccuracy, but the grinding actually increases the resistance of the metal to wear and tear.



Maag turbo-reduction drives, made in this way, have given results that approach 100% efficiency. For example a standard set of Maag Gears, after being more than 12 months in continuous service, have shown no discernable wear whatever; the original fine grinding lines still remaining visible and unchanged.

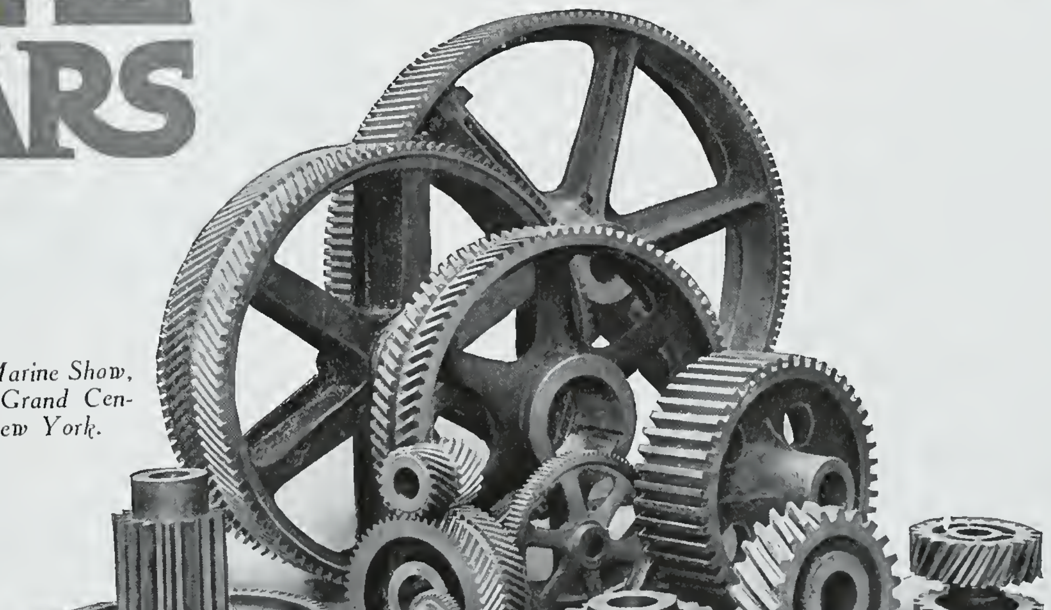
We'll be glad to give you figures on high speed Maag Gears for steam turbine, rotary pump, and electric motor reductions.

MAAG GEARS

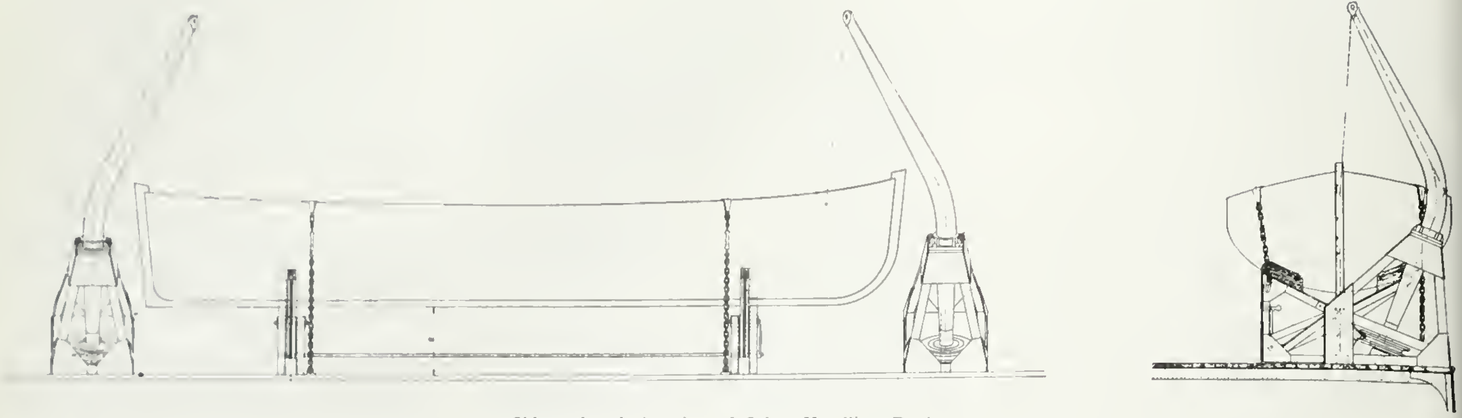
NILES-BEMENT-POND CO.

111 BROADWAY NEW YORK CITY

See them at the Marine Show, January 24-29, Grand Central Palace, New York.



A NEW BOAT HANDLING SYSTEM



Side and end elevation of Schat Handling Davits

For many years the attention of marine engineers has been directed to the design of life-saving appliances that would function well in the case of sudden emergencies at sea and thereby make possible the saving of the lives of the passengers and crew of ocean-going vessels. The tremendous losses of life at sea during the war have again concentrated the minds of inventors in the effort to secure an improvement in the existing systems of handling ships' boats in emergencies.

Mr. Ane P. Schat, a Dutch engineer, has invented a davit system which combines many very excellent features. In the Schat system the boat is normally held on two chocks, each of which consists of a double steel frame rigidly fixed to the deck, forming the fixed inboard arm of the chock and providing a point of support for the movable outboard arm of the chock which is supported on a pivot between the two sides of this frame.

As will be seen from the drawing illustrating this article, the vertical center line of the boat is outboard of the pivot supporting the movable or collapsible chock arm so that the latter will always have a tendency to collapse, this tendency being prevented by a cam hook for each collapsible arm, the two cam hooks for any one boat being mounted on a camshaft actuated by a lever. These cam hooks are designed so that practically very little force is required on the lever to operate them and unlock the chocks. The grips, both inboard and out, in the Schat system are held by chains with adjustable turnbuckles and fixed on slip hooks open outboard. The davits are pivoted with an upper and lower bearing mounted in frames at each end of the boat station in such fashion that the straight pivoted portion of the davit is inclined at an angle of twenty degrees to a perpendicular line from the deck of the vessel. Just above the lower bearing of the davit there is fixed to the davit shank a grooved brake disk. Brake shoes applied to each side of this disk are actuated by means of a bell crank and brake levers through the weight of the boat, the upper block being suspended from the davit head by a wire rope connected to the bell crank. A lever operating a worm screw is provided on the inboard side of each davit frame opposite this brake, by means of which the pressure on the brake shoes may be relieved and the davits swing outboard under the weight of the boat. A very slight movement of the lever releases the brake. On releasing the lever, it automatically swings back and the brake is again operative.

In the operation of this boat handling system normally the boat is lying in the chocks with the grip chains perfectly taut. By turning the lever shift actuating the cam hooks the movable part of the chocks are set free and collapse, whereupon the boat, losing her support, will swing outboard very slightly and coming down with the weight upon her tackles will set the brake holding the davits. The boat as now hung has a strong tendency to swing outboard, which is prevented only by the pressure on the brake shoes. By a slight turn of the handle to the worm screw mentioned above, the brake pressure is released and the boat swings outward. On account of the angle of the davits it is evident that the davit heads will move downward slightly, thus slackening the grip chains so that they slip off the hooks without any other action being necessary on the part of the crew. The swinging out of each end of the boat may be performed singly or a man may be stationed at each end and both ends swing out simultaneously. It is evident that the braking power on the davits is directly proportioned to the weight in the boat so that with safety the boats under this system may be swung out and lowered either empty or fully loaded, and that by the moving of a lever which is equivalent practically to what might be called the twist of a wrist.

The inclining of the davits in this system enables the swinging out of a loaded or empty lifeboat against a list of slightly less than twenty degrees, and when swinging out a boat on the lower side of a ship at twenty degrees list, the davits can be stopped at any point to keep the boats close to the ship's side. In demonstrations with these davits on fully loaded boats the release from the chocks and the swinging out to a point suitable for lowering was performed by one man in less than thirty seconds.

One very favorable point for this system is that it can be operated by even the most inexperienced persons after a single instruction. The system requires practically no upkeep, is reliable, quick in action, and satisfies the most exacting requirements of life saving service.

The patents covering Schat's system are in possession of the International Nautical Trading Company, No. 3 Kanaalstraat, The Hague, Holland.

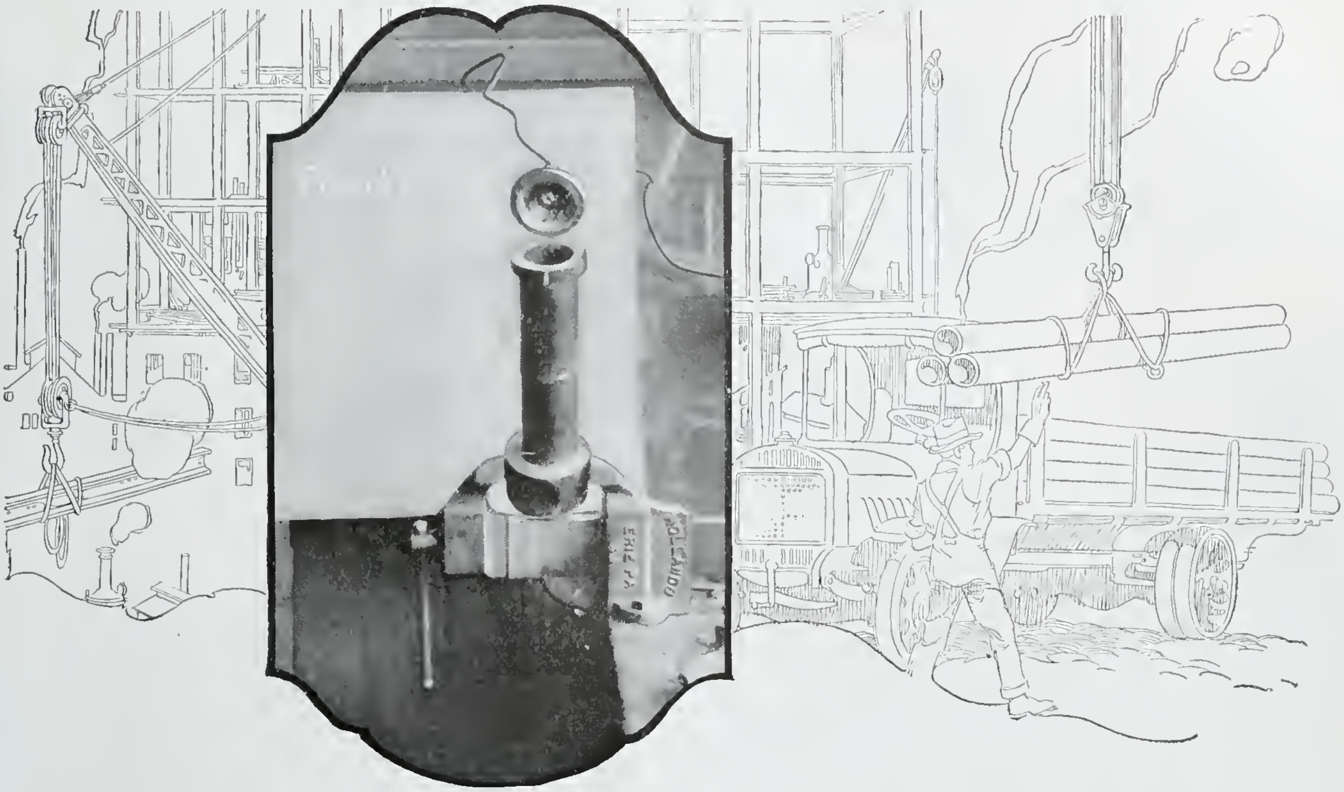
Schat Davit swinging off fully manned lifeboat against a list of 15 degrees

American Marine Iron Works

The American Marine Iron Works of Portland, Oregon, is one of the plants which, starting during the war, has survived the subsequent closing down of the government's shipbuilding operations in that district.

This plant is located in the lower Portland harbor, having both rail and water facilities and consists of a foundry with a capacity of 35 tons per day, equipped to turn out cast iron and semi-steel castings up to 15 tons each, together with well-equipped machine and pattern shops.

The American Marine Iron Works furnishes the cast iron castings for the G. M. Standifer Construction Corporation of Vancouver, Washington, which yard has been operating continuously for the past three years and is now building 12,000-ton tankers for the Standard Oil Company. Besides marine and general jobbing work which the American Marine Iron Works turns out, it also manufactures for its own account the Beers pipe bending machines, valvesless pumps, safety water drains and all metal drag saws.



The cap broke at 6,200 pounds

THE Oxy-acetylene welded joint in this test length of pipe easily held a hydrostatic pressure of 6,200 pounds. At this high pressure the cap blew off, but the weld withstood the pressure without an indication of failure.

Prest-O-Lite

DISSOLVED ACETYLENE

The Universal Gas with The Universal Service

was of course used exclusively in making these welds.

This test proves again the fact that for permanency—for strength—for perfect welds—Prest-O-Lite is the surest choice.

Ask us all about Prest-O-Lite and the Nation-Wide Service of our forty plants and warehouses.

THE PREST-O-LITE COMPANY, INC.
General Offices, Carbide and Carbon Building
30 East 42nd Street, New York
Kohl Building, San Francisco
In Canada
Prest-O-Lite Co. *of* Canada, Limited, Toronto

PW-523

NEW SOUTHERN CALIFORNIA STEEL PLANT

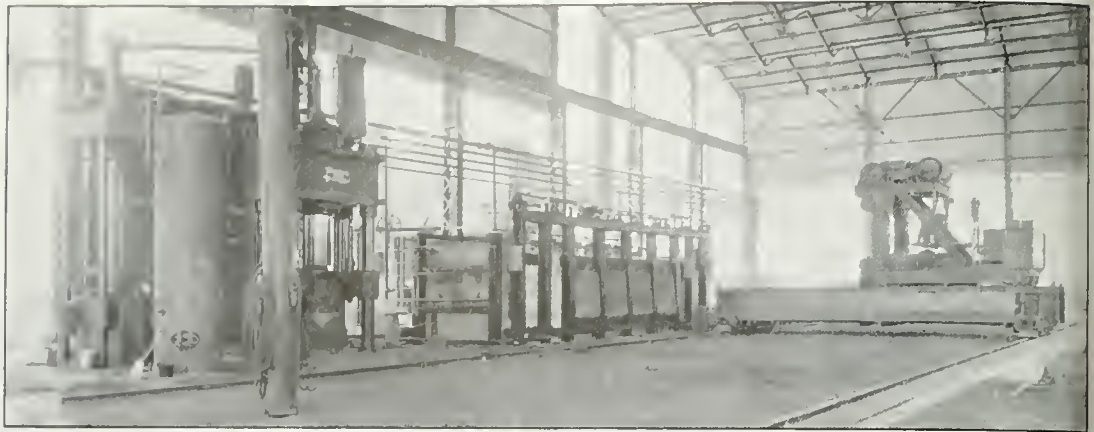
THE Southern California Iron & Steel Company, one of the largest and most progressive industrial institutions in Los Angeles, has been operating at Fouth and Mateo Streets for the past eighteen years, making open hearth bar steel, Havemeyer reinforcing bars, bolts of all kinds, hot pressed nuts and rivets.

They also have a large and complete galvanizing plant for galvanizing hot and cold, anything from a pin to a large pipe.

They have outgrown their present quarters and are now constructing a new million and one-half dollar plant on Slauson Avenue, east of Huntington Park. The work of construction has been going on for the past eight months and at this time they have completed construction of the open hearth and electric furnace buildings, forge press building, bolt shop, and have now in operation the electric furnace and forge press and one open hearth furnace about to be put in commission.

The electric furnace is a 6-ton Heroult furnace, and the forge press is a 1000-ton hydraulic, built by the United Engineering & Foundry Company at Pittsburg, Pennsylvania. The manipulator is built by the Alliance Manufacturing Company of Alliance, Ohio, and handles the ingots automatically to the heating furnace and forge press, where they are forged down into billets of the required size.

The forge press, furnace and manipulator are handled by four men through the whole process. Without this combination of machinery to do the work, a force of forty or fifty men would be required.


Hydraulic Forging Press and Furnaces at new plant of Southern California Iron & Steel Company

The above-mentioned units are in operation at the new plant of the company, east of Huntington Park. The plant, when completed, will occupy twenty-five acres, running, in addition to the above, five open hearth 30-ton furnaces, also a large and completely equipped rolling mill and bolt works.

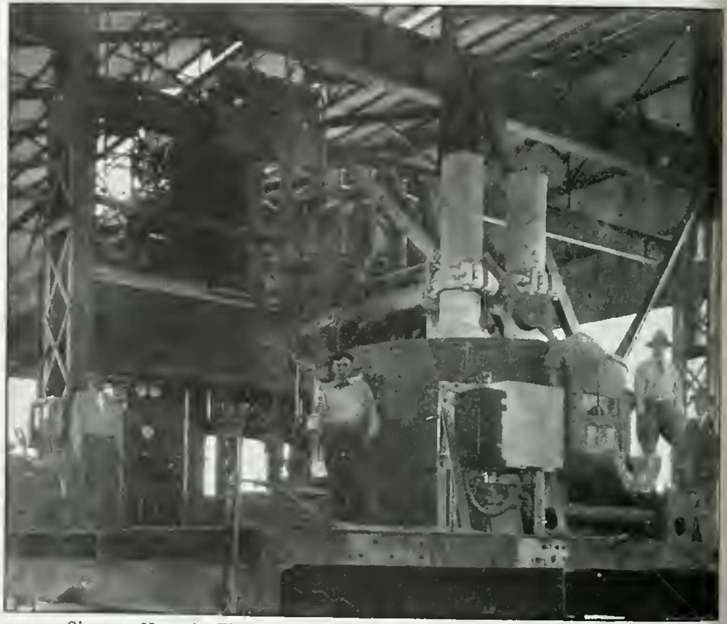
There is considerable construction work yet to be done, and it is hoped to have the new plant in complete operation by mid-summer.

The company's product is supplying the Pacific Coast, Arizona, Nevada and the West Coast of South and Central America, and Mexico, together with Hawaiian and Philippine Islands and the East Indies.

The present officers of the company are A. C. Denman Jr., president; A. W. Grier, secretary; Geo. B. Stephens, general superintendent; G. H. Pettengill, assistant superintendent.

The new plant will be up-to-date and complete in every particular, and will be electrically operated. The electrical installation is one of the largest and heaviest in Southern California.

The company employs about 500 men and is an institution of which Los Angeles may be justly proud.


Six ton Heroult Electric Furnace at the Southern California plant

Thirty-five Miles of Ships Have Used Biturine

THAT the employment of an approved bituminous coating for surfacing the interior of ships as a protection against rust and corrosion has become almost universal, is evidenced by some statistics recently published by Hill, Hubbell & Company, 1 Drumm street, San Francisco, manufacturers of Biturine Solution and Enamel. According to this report a total of 455 ships of various tonnages and types have been coated with Biturine Enamel during the past few years—most of them, of course, during the war period.

The larger contracts include sixty-six destroyers and twelve submarines built for the United States Navy and the following ships built for the United States Emergency Fleet Corporation: eighteen by the Shaw-Batcher Company; eight ships by the Hanlon Drydock & Shipbuilding Company; ten ships by the Union Construction Company; thirty-one ships by the Bethlehem Shipbuilding Corporation; 171 vessels built for the Emergency Fleet Corporation in the vicinity of the Sound, Seattle, Washington; eighty-seven vessels constructed at the Portland yards; and fifty-two at Los Angeles.

These vessels placed end to end would extend over thirty-five miles. Mile Rock Light, which stands squarely in the entrance of the Golden Gate, exposed to the full sweep of the Pacific, has been adopted by Hill, Hubbell & Company as the registered trademark for "Biturine." This trademark is particularly appropriate, not only because the base of the light itself wears a coat of Biturine Enamel, applied in 1906 and still intact, but because hundreds of the ships that pass the light have been treated with the products of this company.

Biturine Enamel is a solidified bituminous composition designed to meet the most severe conditions in the protection of iron and steel against corrosive agents, and in the water-proofing of concrete and masonry. It is made from refined bituminous coal tar pitch, natural rock asphalt, and a fine mineral filler. It is applied hot, after the surface to be treated has first been thoroughly cleaned and treated with a priming coat of Biturine solution. Direct application of the enamel is impracticable, for the reason that no bituminous composition that is solid at ordinary temperatures can be made sufficiently fluid by heating to adhere firmly to metal or masonry. The base of Biturine solution and enamel being identical, the fusion of the two produces a perfect bond, without which no coating can be in any degree permanent. Biturine enamel is melted and heated to about 380 degrees Fahrenheit and applied in the fluid state, either by dipping or by brushing. The usual application is from 1/16 to 1/8 inch in thickness. The enamel hardens immediately, forming a bright, black, hard, yet tough and elastic coating, which is absolutely impervious and practically indestructible. Expert care in the application is an important factor in insuring the success of the enamel as a protective coating. Large jobs are usually executed by the Hill, Hubbell & Company's trained organization, working on a contract basis.

SINCE 1875

THE BEST IN TOOLS ONLY

When You See This Nameplate Attached
Quality Is Assured

HARRON, RICKARD & McCONE
SAN FRANCISCO LOS ANGELES

Our 45 Years' Experience

In handling and watching the "Stand Up" qualities of the various lines of Machine Tools has enabled us to select for you those lines that have a world wide reputation for service

"EVERYTHING FOR THE MACHINE SHOP"

Medium Duty Engines Manufactured in San Francisco

Since 1918 A. G. Hebgen has been manufacturing medium duty gasoline and kerosene engines from 3½ to 10 horsepower, single and double cylinder.

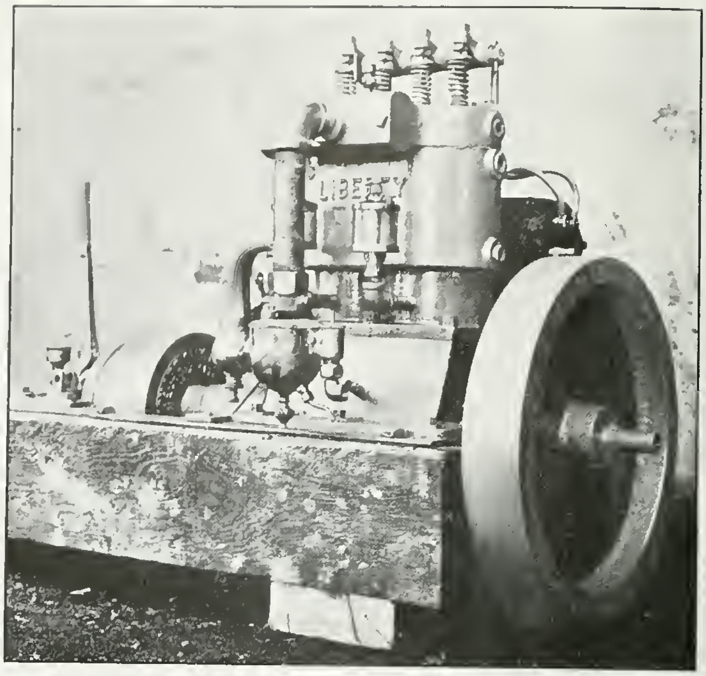
These engines, which are manufactured in San Francisco, have been very widely distributed on the Pacific Coast including Alaska; also the Philippines, China, Japan, Hawaii, West Coast of Mexico, Australia and South Sea Islands. Recently a large steamship company placed orders for a number of these engines for installation in small boats for use of officers in making landings on the West Coast and other points where cargoes are unloaded in midstream. A recent order from one of the Scandinavian countries included 100 of these engines.

The single cylinder engine manufactured by A. G. Hebgen is known as the "Liberty Kid." This sturdy little engine which develops from 3½ to 4 horsepower is of the four-cylinder valve-in-the-head type, valves operating by cams. This insures smooth, steady action. A big feature of the Liberty Kid engine is that it is built to take Ford automobile parts, and the usual automobile spark plug which may be purchased anywhere. The sturdy design of this engine and the simplicity and economy in operation have resulted in the development of many uses for this engine.

The 2-cylinder engine, which is known as the "Liberty Twin," develops from 8 to 10 horsepower at 850 r. p. m., and is also of the 4-cycle, valve-in-the-head type, burning either gasoline or kerosene. This engine has found a wide use amongst the fishing men and other small craft users, and owing to the simplicity of design and efficient operation, a high speed is maintained with a minimum fuel cost.

Both the Liberty Kid and Liberty Twin engines are constructed under a program of quantity production, and every part of these engines is made with jigs so that each part is interchangeable with any engine, and in the assembling of the engines no machine work is required. Every engine is thoroughly tested, and run under its own power for six hours or more before being passed from the factory.

Some of the features of these engines are the solid polished bronze rocker arms, push rod guides, pump, etc. The magneto is geared to the engine and runs at crank shaft speed, insuring a steady and perfect spark. A very efficient lubrication system in the crank case is obtained with oil scoops and drilled holes in connecting rods.


8-10 hp. Liberty Twin Engine

The Liberty Twin, 2-cylinder engine has a bore of 3¾ inches and stroke of 4¼ inches. Designed for 850 r. p. m., this engine, which develops from 8 to 10 horsepower, weighs only 270 pounds. Hundreds of these engines are now in use, and owing to their simplicity and ruggedness, with their light weight, they are proving to be efficient little power units.

A. G. Hebgen has recently announced that a 4-cylinder engine is now under development. This engine will be of 25 horsepower, and judging by the popularity of the single and 2-cylinder engines, the larger engine is expected to find a ready market where a high-grade, medium-duty engine is required.

NEW MACHINERY CORPORATION

The formation of a five-million dollar corporation for the manufacture of machinery for canners and dried fruit packers is announced by the Berger & Carter Company interests of San Francisco. The new company will be known as the Berger, Fleming & Brown Company and will have its main offices and factories at San Jose.

The new corporation absorbs the following companies:

B. & C. Machinery Company, Hayward, California, manufacturers of fruit and vegetable canning machinery.

Smith Manufacturing Company, San Jose, California, manufacturers of machinery and equipment for packers of dried fruit.

Wonder Dehydrator Company, San Francisco, California, manufacturers of "Wonder" portable and custom dehydrators operating under the Hammond process patents.

National Axle Corporation, San Jose, California, manufacturers of auto truck axles.

The factory equipment of the B. & C. Machinery Company will be moved to the plant of the Smith Manufacturing Company, while a new unit to be added to the National Axle Corporation plant will take care of the building of dehydrators.

The officers of the Berger, Fleming & Brown Company are Otto A. Berger, chairman of the board of directors; W. W. Fleming, president and general manager, and E. W. Brown, vice-president and treasurer.

Otto A. Berger is president and chairman of the board of directors of the Berger & Carter Company, San Francisco; W. W. Fleming, vice-president and secretary, and E. W. Brown, treasurer.

OLOMEL WATERPROOFING PRODUCTS

The Olomel Manufacturing Company of Eighteenth and Hampshire Streets, San Francisco, are producing at their factory Olomel in three forms as hereinafter described; bitumel; excelsior red; electrimel; bituminous enamel; oxide iron paint; copper paint; noncorrosive paint; and acid resisting paint.

Olomel, which is the result of patient experiment and long practical experience, is claimed by its makers to be the "best oil and water stop manufactured today." It is a substitute for and is used in much the same manner as the older generation of shipbuilders used red lead. Olomel is cheaper and better than red lead. It is manufactured in three forms: **Olomel Solution; Olomel Compound; Olomel Tester Putty.**

Olomel Solution is used for painting the faying surfaces of plates and shapes used in ship and tank building. It is also used as a thinner for the compound. When canvas or burlap is used for packing, each side of the canvas or burlap is given a heavy coat of the solution, rolled up and allowed to lay for forty-eight hours, then hung up to dry. When dry it becomes as stiff as light cardboard. The packing is then cut to suit work and given a second coat of the mixture of solution and compound, mixed to a syrup-like consistency. When the packing is wet it is placed between the steel and bolted into place.

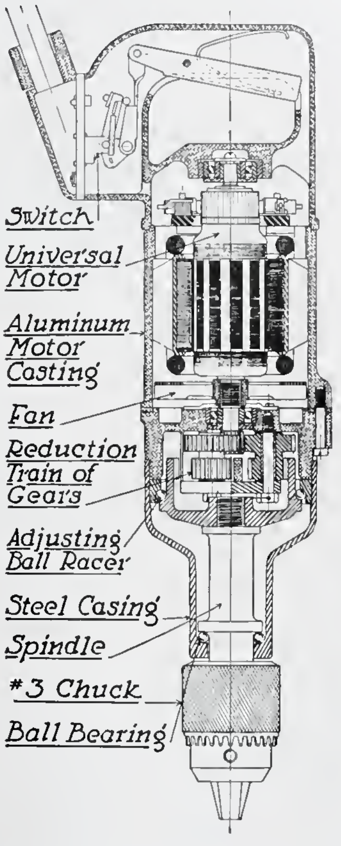
The solution is made thin so that it will carry the pigment through canvas. The method of applying to canvas is as follows: Do not paint the canvas. Use a small ladle to pour the solution on the canvas, spreading it around with a paint brush. When the canvas is soaked through, roll it up and allow it to absorb the solution for forty-eight hours, then hang it up to dry.

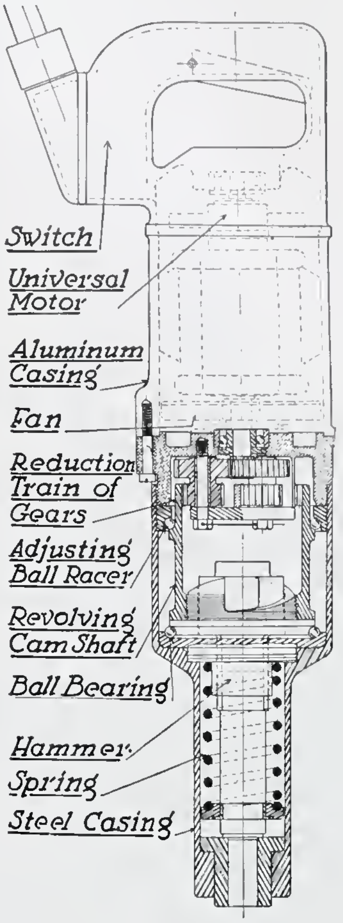
Olomel Compound is used in thickening solution for painting canvas when cut to shape and ready to insert between steel, also to fill spaces where water might travel, as, for instance, where plates are cut short between double bars and in places where material does not fit properly. Olomel Compound is also used to fill in behind double angles where water or oil is liable to travel.

All oil-tight bulkheads on the destroyers built at the Union plant of the Bethlehem Shipbuilding Corporation were packed with Olomel, and although the seams and rivets were not caulked not one per cent of the seams or rivets leaked under the strict government tests.

Olomel is used for bedding deck fittings of all kinds. Olomel was used on the record 24-day boat built at the Alameda Bethlehem plant. Olomel is used by practically all the West Coast and a good many Eastern yards.

A New Electric Combination Tool





Drawing above shows tool arranged for drilling and grinding; at right, tool is arranged as a hammer or chisel.

ECONOMY and utility, the saving of labor and time, together with a maximum of efficiency, are the requirements demanded of any new tool or tools which may, in this present day, be offered to industry, and these seem to be embodied in the new electric steel hammer which is now being manufactured by the Electric Steel Hammer Company, Inc., 313-314-315 Marion Building, Seattle, Washington. This product is certainly a very striking development of the application of electricity to the operation of tools. First, electricity was used in lighter tools and soon it began to be utilized in the heavier tools of the industrial trades, where electrically-driven tools began to supersede those operated by air or steam, performing work impossible by hand except with great effort and loss of time.

The application of electrical power to such heavy tools as the pneumatic hammer and drill means a great saving in auxiliary equipment and cost of operation and it means also specially constructed tools. Electrical hammers and drills were invented and proved comparatively successful as special tools though still imperfect and carrying imperfections which interfered with high efficiency. These tools have been just hammers or just drills, heavy and in most cases not properly balanced for accurate use. It has fallen to the lot of the Electric Hammer Company to supply the demand for a portable tool of general utility, scientifically adjusted and balanced so as to provide the maximum of accuracy and efficiency. This tool is called the **All-in-one Electric Hammer,** invented by H. G. Kessler of the H. J. Duthie Company, Seattle, which is not only a hammer of remarkable power, but is adjustable to drill, grinder and chisel as well—a really universal tool. It is an instrument of light weight, and performs its many functions with equal facility, being instantly ready for use by attachment to any electrical plug. In fact, its very versatility has gained for it the name of the mechanical "Jack of all trades," as wherever hammering, drilling, grinding or chiseling are desired, whether in steel, iron, wood or concrete, it is ready for immediate use, and by the simple operation of changing a portion of this tool from the hammer to a drill attachment (see drawing), requiring but a moment, it is ready for any drilling or grinding operation in any material, drilling holes up to 9/16 inch in diameter. Its advantages as an accurate drilling tool are based upon its centerline balance, as it is the only electrical hammer in which everything is constructed through and around a symmetrical center line, of the same shape as the familiar pneumatic hammer. Other electrical hammers or drills, each performing only one of these operations, and 30 per cent heavier, are constructed with an offset casing in which the motor is set. This, because of the side pull, makes for more or less of a side blow or an oblique hole when used as a drill, whereas the All-in-one hammer, having no side extension, can be manipulated and operated at any angle, a feature of vital importance in all industrial operations. It also has unusual concussion powers, fully equal to those of the air hammer. It strikes 2000 to 4000 blows per minute. A revolving cam, operating directly from the motor through a train of rotary gears, presses against a strong, compressed spring, thus giving the reciprocating or backward and forward movement of the hammer in a straight, direct line.

The All-in-one electric hammer is 50 per cent lighter per unit of work than other tools of a similar but special sort, and is constructed in two sizes, Nos. 1 and 2. No. 1 is a small hammer weighing about ten pounds with ¼-horsepower Universal motor, its working parts of high-grade alloy steel, the motor casing of aluminum, and the hammer and drill attachment casing of cold rolled steel. Has drill attachment up to ¼ inch in diameter. This hammer is particularly adaptable to rapid work where the hammer must be continually moved, where space is limited, and where particular care in operation is necessary. No. 2 hammer is a medium-sized hammer weighing twenty pounds, carrying one-third horsepower motor, of the same general construction as Hammer No. 1.

Some of the uses for which these hammers have been specifically planned include light and heavy chipping of large castings, driving rivets in structural steel where half-inch rivets are used, drilling holes in concrete, chiseling steel, caulking steel and wooden ships, as a wood augur to prepare heavy timbers for bolts, scaling ships and boiler tubes, buffing of all brass work, and hammering and drilling on all heavy machinery.

The All-in-one electric hammer is operated from a ¼ to ½ horsepower Universal motor and can be attached by a cord to any electric light socket. It uses from four to six amperes of electricity at an estimated cost per eight-hour day of about six cents. There are but four moving parts in the hammer attachment, and these are of simple construction, and easily replaced. The economy of operation of this hammer has been thoroughly demonstrated in shipyards and machine shops

---

THE 80-horsepower engine which has recently been built by the Enterprise Engine Company of San Francisco, is of the 4-cycle solid injection Diesel type, operating on 14° gravity crude oil. Considerable interest has been shown in this engine, owing to the novel design of the fuel nozzle and the method by which combustion is obtained without the use of high pressures.

A study of this new engine shows the following points: the frame, which is of heavy design, is cast in one piece. The cylinders are cast separately, and the cylinder heads are made from a special mixture of close grain iron. Connecting rods and piston rods are forged and machined from Lloyd steel. The crankshaft, which is 5½ inches in diameter, is bored throughout for force-feed lubrication.

There are three valves for each cylinder. The forward valve is used for exhaust. On the push rod of this valve a small lever operates to relieve compression when starting. The intermediate valve is used for air inlet for starting only. The after valve is used for fuel injection. A fuel pump of the force-feed plunger type is installed for each cylinder, and is directly controlled by the governor, which is of the usual ball type enclosed in suitable housing.

The pistons are of a special mixture of close grain iron of long trunk design with seven piston rings to each piston. The wrist pins are 4⅝ inches in diameter. This large size pin is designed for rugged wear and long life. Wrist pins are hardened and ground after machining. The wrist pins as well as the connecting rods are lubricated by a high pressure oil system. A feature of this system is noted in the fact that complete circulation is obtained throughout, which tends toward economical consumption of lubricating oil. The lubrication for cylinders is independent of the main lubrication system. Two special oil feeds for lubrication for each cylinders are designed for perfect cylinder lubrication.

The camshaft, which is enclosed, is driven by helical gears from the crankshaft. Cams are keyed to this shaft after hardening and grinding. The air compressor is of the single acting type for pressure of approximately 150 pounds. This air is used for starting only.

The builders of the Enterprise Diesel engine have had many years' experience in manufacturing the well-known Enterprise gasoline engine, as well as many years' experience in foundry work for this type of engine, and have a knowledge of the best iron and steel mixtures for internal combustion engines. Present indications point toward a very wide distribution of the Enterprise Diesel engine.

CONDENSER

TUBING

SCOVILL MANUFACTURING COMPANY

A Tube is no better than the brass it contains.

SCOVILL TUBING under the microscope shows a dense homeogeneous refined structure, the metal in a perfect state of equilibrium, being practically free from all drawing strains, impurities, seams and blisters. This dense fine grain offers the best resistance to corrosion and results in greater strength and longer life.

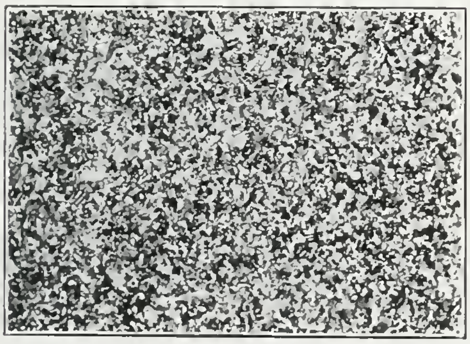


Illustration shows micrograph of specimen of our condenser tubing: magnification 75 X, note the dense crystalline structure.

We will display our tubing at the National Marine Exposition, Grand Central Palace, January 24th to 29th, 1921, booth 301, mezzanine floor. Several interesting tests will be shown.

SCOVILL MANUFACTURING COMPANY

ESTABLISHED 1802

WATERBURY, CONNECTICUT

New York
Chicago
Rochester

Boston
Detroit
J. D. FRENCH COMPANY, San Francisco

Cleveland
Philadelphia

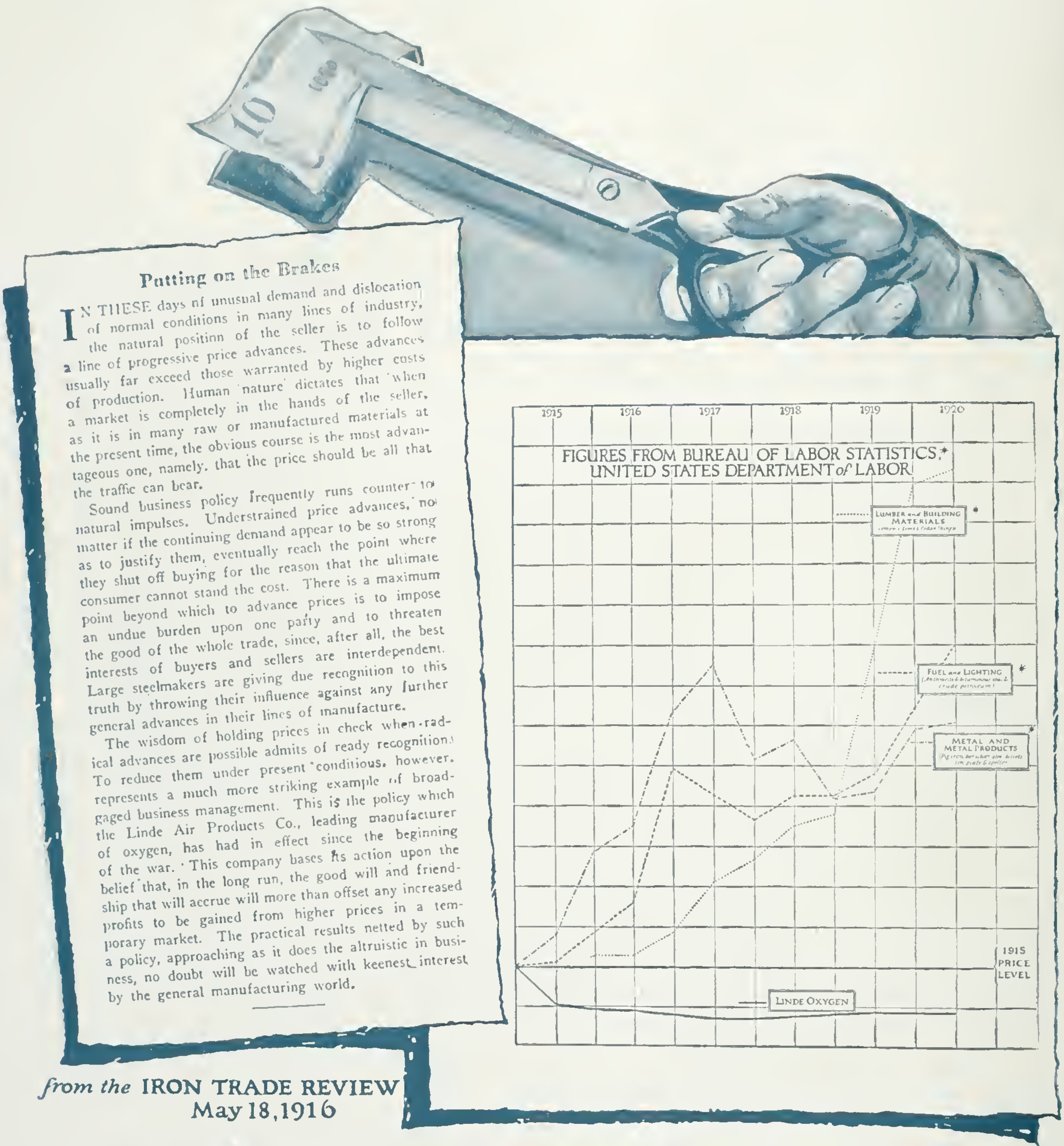
Pacific Marine Review

The National Magazine of Shipping

S.S. WALTER A. LUCKENBACH; 16-KNOT FREIGHTER OF LUCKENBACH INTERCOASTAL SERVICE

ebruary
921

Pacific Marine Review Vol. 16, No. 2 Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.



Putting on the Brakes

IN THESE days of unusual demand and dislocation of normal conditions in many lines of industry, the natural position of the seller is to follow a line of progressive price advances. These advances usually far exceed those warranted by higher costs of production. Human nature dictates that when a market is completely in the hands of the seller, as it is in many raw or manufactured materials at the present time, the obvious course is the most advantageous one, namely, that the price should be all that the traffic can bear.

Sound business policy frequently runs counter to natural impulses. Understrained price advances, no matter if the continuing demand appear to be so strong as to justify them, eventually reach the point where they shut off buying for the reason that the ultimate consumer cannot stand the cost. There is a maximum point beyond which to advance prices is to impose an undue burden upon one party and to threaten the good of the whole trade, since, after all, the best interests of buyers and sellers are interdependent. Large steelmakers are giving due recognition to this truth by throwing their influence against any further general advances in their lines of manufacture.

The wisdom of holding prices in check when radical advances are possible admits of ready recognition. To reduce them under present conditions, however, represents a much more striking example of broad-gaged business management. This is the policy which the Linde Air Products Co., leading manufacturer of oxygen, has had in effect since the beginning of the war. This company bases its action upon the belief that, in the long run, the good will and friendship that will accrue will more than offset any increased profits to be gained from higher prices in a temporary market. The practical results netted by such a policy, approaching as it does the altruistic in business, no doubt will be watched with keenest interest by the general manufacturing world.

10
1915
1916
1917
1918
1919
1920
FIGURES FROM BUREAU OF LABOR STATISTICS.*
UNITED STATES DEPARTMENT of LABOR
LUMBER and BUILDING MATERIALS *
FUEL and LIGHTING *
(Anthracite & bituminous coal & crude petroleum)
METAL AND METAL PRODUCTS *
1915 PRICE LEVEL
LINDE OXYGEN

from the IRON TRADE REVIEW
May 18, 1916

A policy, an editorial and a chart

DURING the days of war when things were being turned upside down The Linde Air Products Company maintained its standards of uniformly pure quality, comprehensive service and *low price.*

While prices of other essentials were mounting up towards the peak the average price of Linde Oxygen was reduced, and, through the most trying period of the war, continued practically on an even keel. This splendid record was made possible by the great volume of business accorded to Linde by manufacturers and other oxygen users the country over.

A continuation of this generous patronage will enable Linde to make more effective its unchanged policy of supplying American Industry with oxygen of the highest purity, anywhere, in any quantity and at the lowest possible price.

THE LINDE AIR PRODUCTS COMPANY

Carbide and Carbon Building, 30 East 42nd Street, N. Y.
Balfour Building, San Francisco

The Largest Producer of Oxygen in the World

L-529-21

Pacific Marine Review

CONTENTS

FEBRUARY, 1921

Cesser and Lien—A Discussion of the Clause in Charter Parties, by Harold M. Sawyer 67

Charles M. Schwab, An Appreciation 69

Subsidies, by Frederick S. Samuels 70

Fred L. Baker 71

Marine Engineering Trends II, by A. J. Dickie 73

Editorial 74

In the Graveyard Watch, by the Second Mate 76

Oil Engines and Motorships 77
Motor Shipbuilding in America; The Case for the Motorship; Motor Shipbuilding in Europe; Diesel Electric Tanker, by D. W. and R. Z. Dickie; The Motorship Project, Statement of William Denman.

Aeroplane View Southwestern Shipbuilding Company 85

Nobless Oblige, by Pierre E. Haynes 86

The Transfer of the Coast Guard to the Navy, by John W. Kean 89

European Marine Developments 92

The New Scout Cruisers 94

Forty Freighters Finished 95

Operating Costs, by T. Alfred Porter 96

Material Handling 97
Port Development at Portland; Electrical Auxiliaries on Shipboard.

Marine Insurance 101

Pacific Machinery 104

Full Speed Ahead 108

STANDARD OIL TANKER
CHARLIE WATSON
on her trial trip Nov. 9, 1920
equipped with
two 550 B.H.P.
WERKSPOOR DIESEL ENGINES
This is the first Standard Oil Tanker using full Diesel engines. Another Tanker is now under construction in which two 850 B.H.P. WERKSPOOR DIESEL ENGINES will be installed.

SKANDIA PACIFIC OIL ENGINE CO.
OAKLAND, CALIFORNIA

Pacific Marine Review

The National Magazine of Shipping

February, 1921

Copyright, 1921, by J. S. Hines

CESSER AND LIEN

A Discussion of the Clause in Charter Parties

By HAROLD M. SAWYER

NEARLY every voyage charter party contains a classic provision, commonly known as the Cesser and Lien clause, which in terms purports to release the charterer from all liability as soon as he has loaded the vessel with a full cargo. This release is the cesser part of the clause and derives its name from the fact that it provides for a cessation of the charterer's liability. Then follows a provision for the creation of a lien upon the cargo as a substitute for the personal liability of the charterer.

In a voyage charter the principal liabilities of the charterer are freight, dead freight and demurrage both at the port of loading and the port of discharge. The cesser clause is intended to release the charterer from these liabilities and the lien clause gives the ship the substitute remedy of a lien on the cargo as security for the performance of what would have been the charterer's personal obligation.

The theory underlying the cesser and lien clause is that as soon as the charterer has loaded a full cargo, there is no reason why a lien on the cargo should not be just as good security for freight, dead freight and demurrage as the charterer's personal responsibility. Furthermore a domestic charterer should not be liable for matters occurring after the loading of a full cargo. The port of discharge is often in a foreign country and frequently the discharging is beyond the charterer's control; but as long as the ship has a lien on the cargo the master should have no difficulty in indemnifying his owners against any loss arising from slow discharge. So the cesser and lien clause is a perfectly fair and reasonable arrangement on its face and seems to afford ample protection for the interest of all concerned.

The fundamental equities of the situation have been clearly recognized by all courts, both English and American, and the validity of the cesser and lien theory has been upheld in every case in which the question has arisen. Yet in every modern case in England and this country there has been an emphatic refusal to give the clause any operative effect, and the charterer has in every instance been held to the full measure of his personal responsibility notwithstanding the cesser and lien clause. There is no case in this country where the charterer has been relieved and the early English cases, in some of which relief was granted, have been severely criticised and must be regarded as overruled.

English law relating to the clause was settled in 1891 by the case of Clink v. Radford.(1) In that case the shipowner had recovered a judgment against the charterers for detention at the port of loading. The ship was fully loaded and it was urged by the charterers that they were relieved from any liability for detention at the port of loading by the cesser and lien clause. The language of the particular clause was, "the charterer's liability to cease on the cargo being loaded, the owners having a lien on the cargo for the freight and demurrage." The charter specified a demurrage rate applicable to unloading at the port of discharge, but failed to provide expressly for demurrage at the port of loading, merely stating that the ship was to load "in the usual and customary manner a full and complete cargo of coal."

After declining to review and attempt to harmonize the early English decisions, the Court of Appeal declared that from all the cases there were they deduced a broad fundamental principle applicable to all cesser and lien clauses. They said that the object of the lien clause was to create a substitute remedy in place of the charterer's personal responsibility which is released by the cesser clause. Hence the measure of the release must be determined by the scope of the lien. Therefore, the question was simply whether or not a lien for demurrage was broad enough to include detention at the port of loading, and the court decided it was not. They reached this result because, while the charter named a rate of demurrage applicable to unloading at the port of discharge, it failed to provide any rate governing loading. Hence, they concluded that the word demurrage did not, under the circumstances, of this case, include detention at the port of loading. This being so, it followed that the failure to create a lien for detention at the port of loading showed conclusively that there was no substitute for the charterer's personal liability in this respect, and therefore the personal liability had not been released by the cesser clause.

The case is one of the two leading cases in England. It is an unquestionable authority for the proposition that the cesser clause will not release the charterer from personal liability unless a security fully equivalent thereto is created by the lien clause. But in passing it should be observed that the court did not hold the charterer's liability for detention at the port of loading could not be released, but merely that the language of the particular charter was not broad enough to accomplish that result.

The other leading case in England is Hansen v. Harrold,(2) decided by the Court of Appeal in 1894. In this case the shipowners sued to recover a balance of unpaid freight against the charterers. A full cargo of oats was loaded and the charterers claimed they were released from personal liability for freight under the charter party by the cesser and lien clause. The language of the clause in this case was "the liabilities of charterers to cease on the vessel being loaded, the master and owners having a lien on the cargo for freight and demurrage under this charter party." The charter provided for the payment of £4000 as a lump sum freight, but gave the charterers the option of rechartering, and provided that if the freight payable under subcharter was less than the chartered freight, the difference should be paid in cash by the charterers. It was also provided that the master should sign bills of lading "according to the custom of the port at the current or any rate of freight required, without prejudice to this charter party." The option to subchartet was exercised and the cash diffeence in freight was paid by the charterers at the port of loading. But the bills of lading called for freight on delivered weights, and as there was a shrinkage of over 5 per cent, there remained an unpaid balance of chartered freight, for which the suit was brought.

Upon these facts the Court of Appeal held that, although the lien clause purported to create a substitute security in place of the charterer's personal obligation to pay the chartered freight, yet the substitute was not the full equivalent of the personal obligation because the bills of lading issued pursuant to the subcharter provided for freight payable on delivered weights. The shrinkage of the cargo impaired the extent of the security, and, as the master was obliged to sign bills of lading without prejudice, the result was that there was no security for the unpaid balance of the chartered freight. Consequently, as the security afforded by the lien clause was not equivalent to the personal obligation of the charterers, the latter was not released by the cesser clause.

These two cases are regarded as establishing the rule that the scope of the release embraced in the cesser clause is measured by the extent of the substitute security created by the lien clause, and that the security must be the full equivalent of the personal obligation before the charterer is released from the latter.

Turning to the American decisions, we find that our own courts have been profoundly influenced by these two English cases.

The leading case in this country is Crossman v. Burrill,(3) decided by the Supreme Court of the United States in 1900. According to the charter in this case, the charterers were to pay for demurrage at port of discharge at an agreed rate. There was also a provision that bills of lading should be signed by the master as presented. It appeared that the bills of lading contained no provision for payment of demurrage and made no reference to the charter party except that they were without prejudice to it. Demurrage having accrued at the port of discharge through the fault of the assignees of the bills of lading, the owners brought suit to recover the same from the charterers. The latter claimed that, having loaded a full cargo, they were released by the cesser and lien clause. The language of the clause was, "Vessel to have an absolute lien upon the cargo for all freight, dead freight and demurrage; charterer's responsibility to cease when the vessel is loaded and bills of lading are signed."

The court held the charterers liable for the demurrage and based its decision entirely upon the English cases. They said the substitute security was not commensurate with the personal liability of the chaterers, because the latter could and did destroy the value of the lien, by presenting bills of lading which failed to make the shippers and their assignees liable for demurrage. If, as the court said was the case, the bill of lading was the sole contract between the shippers and the ship, the latter was obliged to deliver the goods and could assert no lien for demurage against the shipper. Hence, there was, on the facts, no substitute whatever for the personal liability of the charterers, and therefore it was not released by the cesser clause.

This case is the first and last word of the Supreme Court on the subject, but since its decision the question has been passed upon in the Circuit Court of Appeals for the Ninth and Fifth Circuits.

The case in the Ninth Circuit, Elvers v. W. R. Grace & Co.,(4) arose in the Northern District of California. Judge Dooling of the District Court held that the charterers were released by the cesser clause from liability for detention at the port of loading, because a lien as a substitute therefor was created by the lien clause, and there was nothing in the charter party which enabled the charterers to render the lien valueless.

But the decision was reversed on appeal by the Circuit Court of Appeals,(5) upon the ground that the cesser clause was ambiguous and did not clearly cover detention at the port of loading, although probably it embraced demurrage at the port of discharge. In other words the court thought that the intention was to release only liability accruing subseqent to loading, and that antecedent liability was not released.

Here again, as in the English case of Clink v. Radford,(1) the decision rests upon a construction of the language of the particular charter party. There is no holding that both classes of liabilities could not be released, but merely that the parties had not made it clear that such was their intention. The difference of opinion between Judge Dooling and the Circuit Court of Appeals seems to be one of fact and not of law.

The case in the Fifth Circuit,(6) which is the latest reported case on the subject, also goes off on a question of construction. In that case a charterer was held liable for demurrage at the port of discharge notwithstanding a most explicit and clearly phrased cesser clause purporting to release him from all liability "for any matters, past or future, or for any loss, damage or other claim of breach of charter party." The reason assigned in the opinion is that the clause making him liable for demurrage at port of discharge was written whereas the cesser clause was printed; therefore, in case of conflict the former must prevail according to the well established rule of construction.

In the absence of any decision at all the interpretation of a cesser and lien clause would seem to present little difficulty. The language is not particularly technical. Doubtless nine laymen out of ten would understand and agree perfectly upon its meaning. On the other hand, a superficial examination of the cases would lead one to believe that the whole subject is shrouded in deep and impenetrable obscurity.

It is suggested, however, that, notwithstanding the apparent difficulties and the unbroken series of defeats which charterers have experienced, charterers can successfully avail themselves of the principle upon which cesser and lien clauses rest.

It is universally agreed that the scope and extent of the lien clause is the measure of the release from personal liability expressed in the cesser clause. The two clauses are co-extensive and equivalents of each other. Whatever liability is secured by lien is released, and whatever liability is released must be secured by lien. This is the principle of the whole matter and the only qualification is not a qualification at all but merely a logical corollary. The security of the lien must be of such character that it cannot be impaired by the charterer, through bill of lading or otherwise.

Bearing in mind these principles, the drafting of an adequate and effective cesser and lien clause presents no insuperable difficulty of either fact or law. There are no artificial rules of public policy to consider. Nothing is required but the expression of a well-defined intention in accurate and unambiguous English. Provided apt language is used, all liability, antecedent as well as future, may be effectually released, either absolutely or conditionally.

---

(1) Clink v. Radford (1891), 1 Q. B. 625.
(2) Hansen v. Harrold (1894), 1 Q. B. 612.
(3) Crossman v. Burrill, 179 U. S. 100; 45 L. Ed. 106.
(4) Elvers v. W. R. Grace & Co., 231 Fed. 361.
(5) Elvers v. W. R. Grace & Co., 244 Fed. 705.
(6) Compania Anonima Maritima Union v. Strachan S. Co., 261 Fed. 57.

ERRATA

In an article on the Davis-Bournonville Oxygraph published on page 114g of the December issue of Pacific Marine Review there appeared an error in that reference was made to the cutting of brass strap hinges. This should have read "wrought iron hinges." It is possible by the use of compound plates to cut brass, copper and other non-ferrous metals with the Davis - Bournonville Oxygraph, but it is not feasible commercially.

CHARLES M. SCHWAB

WE wish here to express an appreciation of our good friend "Charlie" Schwab, the man to whose contagious enthusiasm was due the great success of the American Emergency shipbuilding effort.

When in the spring of 1918 Charles Piez had by almost superhuman efforts brought order out of chaos in the Emergency Fleet Corporation, we were suddenly confronted with the threat of labor trouble. The administration sought out Charles M. Schwab and urged him to take charge of the situation. The magical way in which the personality of this man suddenly changed the attitude of labor and brought about an intense enthusiasm to see the job through, is a matter of record. It is also a matter of record that for this service there was no recompense other than the usual reward of virtue.

The recent notoriety given to absolutely unfounded charges against Mr. Schwab is only another evidence that the political type of mind is incapable of appreciating high ideals. Congressional investigation committees should be made to realize that the character and the reputation of American men are of far higher value than all the material wealth in America.

SUBSIDIES

By FREDERICK S. SAMUELS

HOW repellent has been this word subsidy to the ear! The very fear of it has cost this nation billions in money. Have we learned our lesson, or shall we drift back to our pre-war inactivity on the ocean, which we inevitably will if we do not immediately banish our horror of this word, and recognize its true meaning as applied to ships?

It has frequently been argued: "If foreign nations can transport our commerce more cheaply than we can, why not let them do it?" The answer is: We did let them do it before the world war, with the result that during the war transportation broke down completely; our commerce was disrupted; freight and insuance rates leaped all bounds; and we were driven to an enormous waste of money in construction of tonnage, much of which is valueless, through not having had at this crisis a merchant marine to provide for even our bare necessities on the ocean. We are now burdened with a staggering debt as a penalty for our shortsightedness. Shall we permit this again?

Penalty for Neglect

The Jones Bill, the Seamen's Act, have come into existence through the recognized necessity of protecting our merchant marine against the lower costs of construction and operation of similar vessels belonging to other nations. These measures devise the means whereby foreign vessels, seeking to trade in United States ports, are to be forced up to the standard costs of American tonnage. Incidentally this results in higher transportation charges on all United States exports and imports, and to that extent puts this country at some disadvantage with other nations trading between themselves with no restrictions on their methods of conducting their business. Nevertheless, as an offset, we are no longer entirely dependent on foreign tonnage to handle our foreign trade, and in event of two or more maritime nations being at war we will still be able to conduct business under our own flag with neutral nations. History is too recent for every one not to know the enormous penalty we paid, and are now paying, for not having had an ocean merchant marine.

However, we now have launched our great fleet, and it must be kept afloat for all time. But this fleet is not well balanced: it lacks what is essential to all merchant marines, the regular liners, and it is on their behalf that every one should know the real meaning of the word "subsidy"—not as it is defined in the dictionary, but as it is understood on the Seven Seas.

LIBERAL CONSTRUCTION NEEDED

This article on subsidies by Frederick S. Samuels, operating manager of the Oceanic Steamship Company, is especially pat at this time, when the American Line has refused to renew its contract with the government and the Oceanic contract will expire within a short time. Mr. Samuels has stated in moderate language the brief for the subsidy; he might have been much more emphatic, and with justification, for the Postoffice Department has dealt shabbily with the mail subvention lines, as was proved in Pacific Marine Review for December.

The report of Postmaster General Burleson for the fiscal year ending June 30, 1920, made public in December, shed a bit of additional light. After reciting that there were five contract lines (New York to Puerto Cabello, Venezuela; New York to Maracaibo, Venezuela; New York to Vera Cruz, Mexico; San Francisco to Sydney; and New York to Plymouth, Cherbourg and Southampton), Mr. Burleson went on to say: "The net result, therefore, is that the contract service cost $544,924.76 less than if the conveying steamers had not been under contract. . . . In the case of steamships under contract the department has no alternative except to allow the contracts to end by expiration of their terms, there being no authority to extend the time of any existing contracts."

A widespread and vigorous demand exists in the United States for the safeguarding of America's merchant marine. Congress has authorized the Shipping Board to maintain and to establish necessary services, even though they must be operated for a time at a loss (Section 7, Merchant Marine Act); and authority also was given to the board to assist in the construction of vessels by lending not to exceed two-thirds of their cost. Congress has manifested a will to aid in the development of our shipping; the Merchant Marine Act is sufficient authority; the leading question is whether the word "subsidy" shall prevent what Mr. Samuels urges: "a liberal construction" of Sections 7 and 24.

Any merchant marine without its fleet of regular liners would be as hopeless of success as a main line railroad without passenger equipment. This must be comprehensible to the most ordinary intelligence. Regular liners require special consideration for many reasons. They represent a capital investment from three to ten times greater than ordinary freight vessels. They are especially fitted for the trades for which they are intended: if the trade fails them they would have difficulty in finding employment elsewhere. On the contrary, cargo boats can seek any trade they like: they can "tramp" in every sea, or be laid up at a moderate expense if freights at the time are unprofitable. For this reason, among many others, all maritime nations grant special assistance to their regular liners. This assistance takes several forms, but the short word for any of them is "subsidy," and if we are to have regular liners they likewise must have "subsidies."

The American people dislike the word, yet as a plain fact practically the whole industry of the nation has been built up under tariff laws—a form of protection which is tantamount to a "subsidy." The general idea is absolutely erroneous that "subsidies" as granted to vessels are simply a gift to bloated ship-owners, for which they offer nothing in return. As a matter of fact, it is only compensation paid to them to invest and risk large capital in an enterprise which is absolutely essential for the national benefit. Other nations of vast experience, in stimulating their foreign activities, have found it necessary to pay these compensations, and so shall we.

Restrictions Undesirable

For operation on a regular line, vessels must be designed of a size, speed and with mail and passenger accommodations to suit the particular trade in which they are to be operated. As it requires several vessels to maintain a suitable schedule, a heavy capital outlay is a consequence; therefore a shipowner who knows either through close investigation or actual experience what conditions confront him, and who stakes his money and reputation in the enterprise, should not be too closely restricted in planning his fleet.

There are certain essentials, however, which must enter into his calculations.

The vessels must be suitable for army and navy transport service.

They should not be less than 7500 tons gross register, of 16 knots speed, and from that minimum, which is adapted to some trade routes, to vessels of

Hoover Art Co L.A.

Hoover Art Studios, Los Angeles

FRED L. BAKER

STARTING in as a boy in the '70s, Fred L. Baker has had a life time of experience in California as an iron manufacturer, beginning with a small shop in the little town of Los Angeles of his early days and expanding with the growth of the city in the forty-three years of his active service.

Steady expansion of trade and widening markets for the business have made him one of the well known manufacturers of California.

A few weeks after the declaration of war in 1917, Mr. Baker as President of the Los Angeles Shipbuilding & Dry Dock Company secured the location of seventy acres at San Pedro, Los Angeles Harbor, upon which is the extensive plant of the Company, which employed 10,000 men in 1918 before the armistice. The company has launched thirty 8800-ton vessels contracted for by the United States Emergency Fleet Corporation, and has five 11,000-ton vessels now building. During 1920 the company installed a 12,000-ton dry dock, which has been in service for repairs of Emergency Fleet vessels, the concrete ship San Pasqual, the Yale and Harvard, the well-known "fliers" of the California coast, and other large vessels. The company has the largest industrial plant in Southern California.

The Los Angeles Steamship Company, of which Mr. Baker is President, will operate the Yale and Harvard between Los Angeles and San Francisco. He is also President of the Los Angeles-Pacific Navigation Company, operating a fleet of vessels between Los Angeles, Yokohama, Shanghai, Hongkong and Singapore.

As President of the Baker Iron Works and of the Automobile Club of Southern California, with interests in other enterprises, Mr. Baker is closely identified with the industrial development of Southern California.

over 20 knots and 12,000 gross tons or over, adapted to other trade routes.

They must be constructed to highest classification in the American Bureau of Shipping, and conform to the rigid requirements of United States inspection laws.

What Shipowner Does

It is absolutely imperative, in order to induce private ship-owners to invest in such character of tonnage, and to commit themselves to operate in competition with similar vessels of other nations, that they should be granted a sufficiently reasonable compensation from the United States to justify them in the risk. This compensation is not gratuity or bonus for which no quid pro quo is granted by the shipowner. In return he directly—

1. Carries all mails and parcel post from United States ports free.
2. Carries cadets in the engineering and navigating departments, to whom he pays wages, and whom he trains to the sea.
3. Holds his vessels at the disposal of the government, always ready for service in case of need, as transports.
4. Increases commercial relations with foreign countries by furnishing regular and speedy connections, both for cargoes and merchants, and promotes the interchange of bulk commodities, which follow in the slower, and less expensive to operate, cargo boats.

Established Lines Necessary

It is absolutely useless to hope that without established lines we can long maintain a merchant marine. Furthermore, if a nation expects ambitious young men to go to sea, it must see to it that they are able to look forward to a higher career than a humdrum existence in a cargo boat.

Beyond this is the economic value to the nation of the earning power of such fleets. Their income would be expended in the United States. It is the income from ocean transportation, all paid in gold, that to a great extent has made Great Britain the most powerful maritime nation in the world.

Granting the fact that we must have regular liners, what support should be accorded to them by the United States?

Ocean Mail Act

The only law now existing which directly provides a subsidy is the Ocean Mail Act of 1891, which is so absolutely inadequate that in the thirty years of its existence it has produced little or no results.

1. It practically invests the postmaster general with the control of our maritime commercial relations. He views the law from a postal revenue standpoint, not in regard to its commerce promoting features, for which it was really intended. His mind is concentrated on keeping his expenditures within his receipts, and he has no high regard for building up foreign trade relations at the expense of his department. This control should be taken entirely out of his hands.
2. Its classification of vessels is now thirty years behind the times.
3. Its rates of compensation are so absurdly low that only two or three lines have attempted to operate under it, and such lines have met with little or no success.
4. It is too restrictive in the sense that a shipowner must enter into a contract with the government to undertake a service for not less than five years. He is placed under heavy bonds, and is liable to additional penalties if he fails to carry out his contract. Should his expectations of success not be realized, he must continue to operate at a loss, no matter how heavy. If he loses a vessel he must replace it, even though the condition of the trade does not justify such replacement.

What Should Be Done

The contract should be regulated so that the government would agree to a compensation per voyage for a term of ten years, but at the option of the shipowner that he could withdraw the service, or any part of it, at any time, upon six months' notice, should he be able to prove to the satisfaction of the government that it has proved unprofitable.

Subsidy Conditions

Any subsidy measure should have incorporated therein the following essential provisions:

Class 1: Vessels of 12,000 tons gross register, or over, capable of 20 knots speed, should receive a fair compensation per statute mile for distance traveled by schedule on each round voyage.

Class 2: Vessels of 7500 tons gross register, or over, capable of 16 knots speed, should receive a fair compensation per statute mile for distance traveled by schedule on each round voyage. (This calls for higher type of vessels and would increase the compensation provided for in Ocean Mail Act of 1891.)

All mails, including parcels post, outward from the United States, to be carried free. (This will result in a great saving to the postoffice department.)

That all vessels are to be classed in American Bureau of Shipping.

That vessels may be taken over and paid for at time of taking by the government for national service, at original cost less a reasonable allowance for depreciation.

That existing lines may have preferential right to subsidy.

That within reasonable limits shipowners may select as to type and quantity of tonnage to be employed, and may add to or reduce as conditions require.

Cadets to be carried, one for each 1000 tons of gross tonnage.

Vessels must maintain their class and speed capability throughout the subsidy term.

Agreement for subsidy: ten years. (This is to justify the investment of capital in special type vessels.)

The amount of annual subsidy required for the purpose of establishing a reasonable number of routes, would not be difficult to determine when routes are selected and class of vessels and frequency of sailings determined; but, whatever the amount may be, it will be recouped to the nation in ways direct and indirect.

Government Saves Money

At present, under the Ocean Mail Act of 1891, subsidies are paid out of postoffice appropriations. As a matter of fact, the few vessels that have been operating under this law have actually been a source of profit instead of an expense to the postoffice. This is because in recent years the value of having the mails carried free in subsidized vessels considerably exceeded the amount of subsidy paid to them; so that in any consideration of subsidies it must be remembered that there is a direct saving to the government, depending on weight of mails and parcels post carried.

Sections 7 and 24 of the Merchant Marine Act of 1920 call for the establishment of regular lines and permanent service, giving adequate postal facilities to all desirable markets wherein our commerce may be promoted, developed and expanded, and provide that a reasonable and just rate of compensation shall be paid therefor, the amount of which is to be determined by the Shipping Board and the postmaster general.

Herein lies the hope that through a liberal construction of these sections we may yet have direct and regular mail and passenger communication under the American flag with many important foreign markets, and be no longer dependent upon our competitors, who now handle our connections by indirect routes, and whose interests are to promote their commerce to the detriment of our own.

MARINE ENGINEERING TRENDS

II

By A. J. DICKIE

IN our survey of marine engineering progress we have thus far merely sketched out the broad general lines of development in the application of power to marine propulsion. We found:

1st. That at the beginning of this century the reciprocating steam engine was the universal prime mover in the merchant marine of the world and that it had reached a stage of development practically equal to its position today.

2nd. That the steam turbine in 1900 had been applied in direct drive to a few torpedo boats.

3rd. That during the last twenty years the turbine, either mechanically or electrically geared, or both, had been applied in a constantly increasing number of ships, and is now more frequently installed in new vessels than is the reciprocating engine and gives a much better over-all economy than does the latter.

4th. That the most important improvement from the standpoint of operating economy during this century had been the development of the internal combustion engine using heavy crude oil and eliminating the boiler plant.

Fuel

Let us now look at the matter from another angle and consider some aspects of the present world situation as to fuel for marine boilers and for the internal combustion engine.

In order to get a foundation for our thinking on this subject, let us get firmly fixed in our minds the present status of the world's merchant fleets as regards fuel. Lloyd's Register, which, notwithstanding some recent lapses, we still regard as an authority, gives the tonnage division as to power plant thus:

	1918	1919
Coal burning steamers....	82 %	76 %
Oil burning steamers......	10.5%	16.3%
Internal comb. eng's......	1.5%	1.7%
Sail only	6 %	6 %

It will be seen that coal-burning steamers, as we stated last month, are still vastly in the majority. Oil-burning steamers are making a steady advance, as are also the motorships, while sail power is stationary.

From a purely economic point of view it is much to be regretted that oil-burning equipment has been introduced in so many of our steamers because it involves great waste when compared with the use of oil through internal combustion engines. This appears particularly unfortunate when we consider that the majority of these oil-burning plants were installed at a time when the internal combustion engine had already demonstrated its wonderful economy and reliability in ocean service. In our emergency shipbuilding program we in our hurry were largely responsible for this situation, and we can only excuse that responsibility on the ground of war haste. But we are still offending along the same line. Our reasons are, lack of plant in the United States to produce internal combustion engines of large power; lack of experienced engineers; high first cost of motorships.

The first reason cannot stand for long in any court of inquiry, because we have, both on the Atlantic and the Pacific Coasts and in the interior, plants which are now producing first-class Diesel engines of various types up to very respectable horsepowers and which have the designs and the facilities and the willingness to produce powers up to the highest yet produced in Europe, if we will give them a little encouragement.

The second reason is simply another way of saying we are asleep at the switch, for we should have competent motor engineers and can have them when we provide more jobs for them.

The third reason is at the present time a real obstacle, although not to the extent that is ordinarily supposed. In this connection study carefully the comparative figures for equal tonnage capacity given in the department for oil engines and motorships in this issue of Pacific Marine Review. However, any additional first cost is a heavy handicap to the American shipowner in interest and depreciation charges, and consideration of this phase of the subject leads us to some conclusions and a suggestion.

If a shipowner decides to build a motorship which will cost him, say, $300,000 more than a similar steamship, that additional money is out to him, as are also his interest payments thereon and his depreciation charges, but to the country at large that money and the interest payments are in, representing simply that much more currency in useful circulation. On the other hand, the additional oil which is burned under the boilers of the steamer is gone and cannot be recovered. It is a part of the natural wealth of the country wasted.

From these conclusions of embryo political economy we draw the idea that here is an opportunity for the Federal government to effect some real conservation of natural resources and at the same time promote many industries. This high first cost of motorships would have no terrors for the shipowner if he could obtain his capital at a low interest rate. The Federal government is or should be extremely anxious to conserve the fuel oil supply. Put these two ideas together and you get the proposition that it would be the part of wise statesmanship to have our power plants ashore and afloat converted to the most economical use of coal or fuel oil and to have the capital cost of such conversion advanced at low interest rates from the Federal treasury. The same theory and argument apply to hydro-electric development.

But, as our figures show, coal is still the great fuel of the sea, and there are many very well informed ship operators and marine engineers who maintain that it will never be replaced by oil. In fact, our own Pacific marine has recently witnessed some movement back to coal, and no doubt, if the price of oil continues to rise, there will be a similar movement all over the world, and the contest will be more sharply drawn as between the coal-burning steamer and the motorship.

Taking this as granted, the mind of the marine engineer should be constantly alert to suggest developments in the design of more perfect coal-handling and coal-burning appliances on shipboard, and to adopt methods for the greater utilization of superheat, the refinement of turbine design and construction, and the better application of hydraulic, mechanical, and electrical gearing.

Many experiments are being made, both in America and in Europe, to produce a colloidal fuel with combinations of oil and coal dust which shall have the stowage and handling advantages of oil and added to these a higher B. T. U. content on account of the coal carried in suspension. But these experiments indicate that there is little advantage to be gained in this direction.

What is needed for the over-all economy of the coal-burning turbine-driven steamer is a general arrangement of bunkers, boiler and turbine room so as to give the same operative conditions as apply in our large central stations ashore. This arrangement should be the product of the combined best thought of naval architect and marine engineer. The use of mechanical stoking should be made practicable. Boilers and turbine should be so positioned that the firing is constantly under the direct inspection of the engineer on watch. All auxiliary machinery should be operated electrically and the ship should be wired so that current for the operation of cargo-handling winches could be plugged in from the dock in home ports at least, thereby allowing complete shutdown and discharge of crew at home ports. This latter provision is necessary, of course, only until such time as our port authorities get sufficiently ship-minded to supply adequate cargo-handling facilities on the dock itself.

(To be Continued)

Pacific Marine Review
A National Magazine of Shipping

576 Sacramento Street
SAN FRANCISCO, CALIFORNIA U. S. A.

Official Organ of the Pacific American Steamship Association

Subscription Price, per year (Domestic) $3.00
(Foreign) $3.50
Single Copies . . . . 35 cts

J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . Associate Editor
J. G. BRAY . . . . Pacific Coast Adv. Mgr.
E. R. HARRIS . . . . . Northwestern Representative

NEW YORK OFFICE
339 at 30 Church Street
M. B. STEWART, Manager

Pacific Marine Review is sold at all leading News Stands
Entered as second class mail matter at Postoffice
San Francisco, California

Published on the First of Each Month. Copyright
1921 in the United States by J. S. HINES

FINANCIAL JUGGLING

CONGRESS in its present session has shown a sad tendency to putter with very important legislation. This is particularly apparent in matters of finance, and in some of this juggling the Shipping Board and the American merchant marine are being dealt with in a very sorry manner.

When the Emergency Fleet Corporation of the U. S. Shipping Board presented its budget for the fiscal year of 1922, that budget carried a request for $147,000,000 to carry out its program. This amount was stricken out of the Sundry Civil Appropriations Bill in committee, and it was recommended by the committee that in lieu thereof the corporation be allowed to use $55,000,000 from its receipts. The bill limited the sources from which this fund was to be derived as "(a) the amount on hand July 1, 1921; (b) the amount received during fiscal year 1922 from operation of ships; (c) not to exceed $55,000,000 from payments on ships and from proceeds of sale of plant and material sold during 1922."

The House later struck this provision from the bill, and if their decision had remained unaltered the Emergency Fleet Corporation would have passed out of existence on June 30, 1921. However, on January 7 by a vote of 133 to 121 this $55,000,000 was reinstated.

There seems to be a strong sentiment in favor of throwing out of the Urgent Deficiency Bill the amounts making provision for the deficiency of the Shipping Board and of the Emergency Fleet Corporation for the fiscal year of 1921. Inasmuch as $95,000,000 of the $147,000,000 asked for 1922 was to cover shipbuilding program, contract for which is already placed, and inasmuch as there is no insurance of the $55,000,000 provided being obtained from the sources prescribed, it would seem to be only fair to everybody concerned that the 1921 slate be cleaned up so that the officials of the Emergency Fleet Corporation may have some reasonable chance of carrying on in the face of the present depressed conditions in shipping.

Chairman Good of the Appropriations Committee of the House of Representatives has flatly refused to recommend another cent for Shipping Board purposes. Admiral Benson, chairman of the Shipping Board, had asked for $95,000,000. Congress will probably find a happy medium between zero and $95,000,000 that will keep things moving until the new administration and a new Shipping Board take charge.

REPAIRS

WE have always had a great admiration for the man with the courage of his convictions who stands up and speaks right out in meeting, and our hats are off today to William H. Todd and Edward P. Morse for the courageous and straightforward way in which they have tackled the investigation of repair prices in New York harbor by Commander R. D. Gatewood of the Bueau of Construction and Repair of the United States Shipping Board.

At a hint from Gatewood that unless repair costs were lowered they would have to be put up to competitive bidding, Mr. Todd came right back with the remark that nothing would suit him better. Mr. Morse, in a letter sent to Commander Gatewood (which letter has been given to the press with the sanction of the commander), shows in a very clear statement some of the handicaps under which repair men are working. All private operators of ships recognize the fact that in order to get quick delivery on repair jobs they have to pay the price and that that price includes a very large proportion of overhead expense which would naturally not be incurred in the matter of shipbuilding.

We can probably take it for granted that if the Shipping Board ships were all busy earning money at good freight rates there would be no complaint about repair bills. Commander Gatewood in his preliminary remarks at this conference of ship repair men indicated that the annual bills of the Shipping Board for repairs had now been gotten down to about $50,000,000. Spread over the Shipping Board fleet, this $50,000,000 is not at all an excessive amount for maintenance and repair, as it would be on the Shipping Board's valuation of its fleet about 2½ per cent.

Mr. Todd pointed out that the repair yards in the New York district, both large and small, were being very unjustly dealt with by the Shipping Board on account of the fact that bills totaling $6,000,000 are unpaid by the Shipping Board, some of these bills dating back for a considerable period of time. This is a matter which makes it very difficult for the ordinary business man to do business with the Shipping Board. The difficulty of collection is such that many firms would rather not do business at all than do it with the board.

All of this discussion and dispute emphasizes the fact that the Shipping Board's operation of its fleet is inefficient and unsatisfactory, and it is to be hoped that the new administration will appoint Shipping Board commissioners with sufficient backbone and commonsense to wind up the affairs of that department of the government so far as ownership and operation of the fleet are concerned.

DAMAGES BY GOVERNMENT AGENCIES

PUBLIC welfare requires that private business enterprise should recover, with all the promptness consistent with ascertainment of the facts, compensation for damages done to its property by agencies and instrumentalities of the government. Otherwise, a proportionate amount of capital is kept out of productive activity. Provisions of law now exist under which compensation for damages caused by public-owned vessels used for merchant purposes may in proper cases be recovered, but regardless of the resulting inequities and hardships to our private shipping interests and all business concerned in exporting and importing merchandise, means for prompt recompense for damage done by public vessels, numbering many hundreds, do not exist. The government properly possesses means for speedy collection of compensation for damages done to its public vessels by private vessels and for services of assistance rendered on the high seas by its public vessels. Congress should at once make these rights reciprocal.

A UNIQUE CONTEST

A RATHER unique method of stimulating the interest of Young America in affairs maritime has been evolved and set in operation recently by A. C. Callan, president of the Pacific International Company, at Portland, Oregon.

Mr. Callan has offered a number of prizes to the students of Oregon in a contest, the object of which is "to promote an understanding of and an interest in shipbuilding, shipping, and foreign commerce; to learn about types of commerce bearing ships, their operation, and the kinds of cargo carried to and from Oregon ports in commerce with foreign ports," this knowledge to be expressed in the form of a model of some type of ship accompanied by a five hundred word essay describing the type, cost of operation, personnel of crew, motive power, estimated speed, amount of cargo, tonnage, insurance requirements, and possible routes, and how vessel is cleared from port.

This contest ran from November 15, 1920, to January 15, 1921, and created a tremendous amount of interest especially in the technical departments of the grade and high schools. The contest was open to four groups: First, college students, first prize to be $100 in cash; second, high school students, first prize to be $75 in cash; third, grade school students in fifth to eighth grades, inclusive, first prize, $50 in cash; fourth, grade students below the fifth grade, first prize $25 in cash.

A proposition of this kind might well be put on in the schools of all our states and would certainly do a great deal to stimulate interest in foreign trade and commerce by sea and in the seafaring life. It might also do a very great deal in stimulating the interest of the American people toward investment in ship shares, as it will be found generally true that whatever interests the school children in a home interests the parents as well. Some of our public-spirited shipping men should take this matter up for California.

AN INTERESTING DECISION

By C. H. CALHOUN

THE District Court of the Canal Zone has just rendered an important decision to the effect that the terminal ports of the Panama Canal are harbors of the United States within the meaning and intendment of Section 4530 of the Revised Statutes of the United States, which provides for the payment of part of wages earned by seamen on American and in harbors of the United States on foreign vessels. The ports of Cristobal and Balboa have been considered in some cases foreign and in others American, so far as the application of the navigation laws to American vessels is concerned. This is the first case of a demand by seamen of a foreign vessel for payment of part wages at a Canal port.

The decision was the result of the libel by seamen of the British steamship Orca of the Pacific Steam Navigation Company, although the seamen were not employed on the vessel at that time, but were being returned after removal from another vessel of the same company at a Chilean port with provision that their wages should continue until arrival at a United States port.

Section 4530, as amended by Section 31 of the Merchant Marine Act of June 5, 1920, provides that:

"Every seaman on a vessel of the United States shall be entitled to receive on demand from the master of the vessel to which he belongs one-half part of the balance of his wages earned and remaining unpaid at the time when such demand is made at every port where such vessel, after the voyage has commenced, shall load or deliver cargo before the voyage is ended. . . . **And provided further,** That this section shall apply to seamen on foreign vessels while in harbors of the United States, and the courts of the United States shall be open to such seamen for its enforcement."

This decision will place foreign vessels at the Panama Canal on the same basis as American vessels so far as the part payment of wages earned is concerned, and will probably increase the number of desertions from foreign vessels, now comparatively few in number, with possibly a resulting increase in wages to the American scale on foreign vessels paying less. The immigration laws of the Canal Zone provide for the maintenance and deportation of deserters at the expense of the vessel bringing them to the port, and it will probably be cheaper to increase wages to avoid desertions than to incur this charge.

American vessels have had great difficulty in controlling crews at the Canal ports on account of the "wetness" of the adjacent cities of Colon and Panama, and the fact that seamen with plenty of money stay ashore until all is spent for drink or return to the ship intoxicated and unfit for work. Foreign vessels have avoided this trouble largely by refusing advances or part payment of wages, but now they will have to face and contend with the same difficulties as American vessels.

A HELPFUL SERVICE

TAPERING off of work at the Harlan plant of the Bethlehem Shipbuilding Corporation, Ltd., would have added to Wilmington's already knotty unemployment problem had it not been for the rather unique service given the laid-off employes by the company.

General Manager Germain instructed the plant employment office to gather information of the employment requirements of every shipyard in the district as well as every Wilmington industry. When the employe came in the employment department to terminate he was shown the openings in the shipyards nearby, Chester, Penna., Maryland, New York and also the possibilities in Wilmington.

The bigness of Bethlehem permitted of no inconsiderable absorption of Harlan mechanics at the Sparrow's Point plant, Sparrow's Point, Maryland, and the Fore River yard, Quincy, Massachusetts. In many instances the workmen were never taken off the Bethlehem rolls. Their time even went on while they were en route to the other Bethlehem holding. This, with the fact that they were not obliged to go through physical examination and hiring routine at the new job, made quite a hit with the workmen.

The connection was carried a bit further. Members of the Employes' Relief and Beneficial Association at Harlan, automatically became members in good standing in the same society at the sister plant. No break occurred in their being eligible for benefits.

ALLOY RESEARCH

AN Alloys Research Association is being formed with an alloys information service as the first step. This is to be co-operative on the part of those interested in metals and their alloys. An advisory committee, composed of seventeen prominent technical men, was formed some time ago and this committee has evolved a plan, in conference with the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, whereby a service of a different scope from any now existing can be carried on for the benefit of the alloy men. It has been felt that it is time to broaden the sources of knowledge and to have a co-operative service that will critically and analytically digest the great mass of data that has been accumulated, but is now largely inaccessible. Technical men have not the time to spend in searching even all of the current literature. It is now planned to create a special scientific staff composed of a director and a corps of assistants who will give all their time to rendering a service of two distinct types—(1) current informational service, supplying information as to new results; (2) reference service, supplying as fully and promptly as practicable all existing information relating to any phase of a subject. The board of managers, appointed by three of the divisions of the National Research Council, is constituted of Mr. Alfred D. Flinn, secretary of the Engineering Foundation; Dr. R. B. Moore of the Bureau of Mines; and Mr. W. M. Corse.

The Research Extension Division of the National Research Council, Washington, D. C., which is aiding in the organization, will be glad to supply fuller details about this service.

IN THE GRAVEYARD WATCH

By THE SECOND MATE

WHEN Captain C. R. Martin retires from the sea he will have more than the usual number of vocations in prospect. The average master has only one, to-wit, raising chickens; Captain Martin, however, might become a valued member of the writing trade. He might be more than valuable: he might be unique, for he manifests the judgment and the will to stop when he has said his say.

The West Holbrook, commanded by Captain Martin, while plowing from Sydney to Honolulu in December, picked up an open boat in which were nine sailors and Mrs. James Winther, wife of the master of the schooner Inca, and her baby of eight months. The castaways had been set adrift fom the waterlogged schooner three days before and had had the unpleasant experience of seeing two steamships pass them without heeding their signals. Naturally, they were somewhat pleased to get aboard the West Holbrook.

"Already Mrs. Winther was breaking down and became hysterical when taken aboard the West Holbrook," so read Captain Martin's report. "The baby was the happy one of the party and, although nearly lost overboard at our gangway, appeared not the least worried or concerned, appearing on deck shortly afterward with a smile and showing two brand-new teeth."

Well done, Captain Martin. But Mrs. Winther's predicament is grievous. The rescue should be an important event in the youngster's existence; doubtless will be; but how can it compare with something of greater weight? Any youngster might be set adrift in an open boat 150 miles from land; how many have two brand-new teeth at eight months?

* * * * * * *

Pilikia and Hanahana

Captain William R. Foster, who acts as harbormaster of Honolulu, is having, as they say in the islands, too much pilikia. No; the oil-burning steamships of the American-Hawaiian have not been dumping ashes in the slip at Pier 19. Nor is the pilikia with the captain's ford. That still hops merrily from bump to bump of the Diamond Head road as the captain chugs toward Kahala in the afternoon. This present pilikia is something else.

For the captain has received a letter from the Russian Volunteer Fleet offices in Nagasaki, advising him that the steamship Simbrisk has come into fraudulent possession of her master, Nicholas Federoff, and requesting him to cable the Vladivostok headquaters should the vessel put into Honolulu. Furthermore, the board of trade at Vladivostok has "deprived the S. S. Simbrisk of all national registry documents and withdrawn for the time being the right of legal navigation and trade of the S. S. Simbrisk abroad."

So Captain Foster now may prepare for the recognition (or non-recognition) of the in-a-manner-of-speaking government of Vladivostok.

But, my dear captain, things might be worse. Search your latest copy of the Maritime Register for the whereabouts of the British steamship—oh, well, let us call her the Eskimo Prince. Perhaps she is bound for Honolulu for bunkers. Should she call, captain, we go aboard, eighteenth amendment or no eighteenth amendment, and we shall not need a Jacob's ladder, either.

* * * * * * *

We Watch Our Step

There is something almost startling in the report of domestic commerce through the Sault Ste. Marie canals as published in Commerce Reports. (Up in the Lakes country the people speak of those canals by the shorter if uglier name of "Soo.") But to retun to the point: Domestic freight passing through the canals during the eight months ending with November totaled no less than 63,666,440 short tons. This was transported by 13,414 vessels of a registered net tonnage of 43,348,157. The eastbound movement was 48,915,687 tons of cargo and the westbound 14,750,753. Iron ore accounted for 44,846,909 tons.

Unless New York and New Orleans and San Francisco and Seattle watch themselves, they will discover, one of these days, that the greatest port of America is the city that Poctor Knott endeavored to make ridiculous as the Zenith City of the Unsalted Seas. Lest there be misunderstanding we hasten to say that we speak of Duluth.

* * * * * * *

Is There $1000 in the World?

Trade excursions abroad are becoming popular these days. The San Francisco Chamber of Commerce recently dispatched a party to Mexico City; the Seattle and Portland chambers are arranging for trips to the Orient on the new 535's of the Pacific Steamship Company; and now comes San Francisco with the ambitious plan of chartering one of the new vessels of the Shipping Board for a voyage to Honolulu, Yokohama, Kobe, Shanghai, Sourabaya, Batavia, Singapore, Saigon, Hongkong and Manila, the trip to require ninety-seven days and to cost $1000. What the Shipping Board will say remains to be ascertained.

* * * * * * *

About Foreign Seamen

American Boys for American Ships apparently doesn't mean as much as some of us thought. Up in Seattle the shipping commissioner has discovered that of the unlicensed men signing on American ships from September 1 to December 21 or thereabouts 36 per cent were foreigners. Perhaps we have no occasion for great surprise, however: anyone who has visited the quarters of a certain maritime union has heard English spoken with curious accents, when English is used at all. To remedy this condition, says the Seattle Times, "shipping interests have been considering the advisability of appealing to Congress to pass a law preventing the employment of foreigners. They point out that when war was declared against Germany several hundred foreigners in Seattle who had expressed a desire to become American citizens forfeited their intention papers rather than serve in the United States Army or Navy." And many of these persons, as records of the Federal courts will substantiate, have the gall to seek citizenship now, only to discover, however, that Uncle Sam hasn't forgotten.

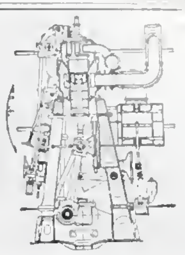
In the absence of any act of Congress, shipping companies can do a great deal to encourage American youngsters by giving them the preference in all cases.

* * * * * * *

How It Strikes a Contemporary

The Morse Drydock & Repair Company of Brooklyn is to be congratulated on the January number of the More Dry Dock Dial. In a field of high-grade house and yard publications, the Dial is unusually handsome and interesting. Bert Edward Barnes, the editor, has accomplished the difficult task of making his paper attractive to both employes of the Morse yard and to the outsider as well.

Oil Engines and Motorships



MOTOR SHIPBUILDING IN AMERICA

PROPONENTS of the Diesel engine as marine prime mover will find considerable comfort in figures recently published in the bulletin of the American Bureau of Shipping. The tables contained in that bulletin show that on January 1 there were building or contracted for in United States yards for private account fifteen motorships of an aggregate gross tonnage of 91,838, 63 turbine steamers of an aggregate gross tonnage of 463,175, and 189 steamers with reciprocating engines, these last having an aggregate gross tonnage of 1,087,291.

At first glance it would seem that this Diesel engine program covers a very small percentage of our total and that is undeniably true, but when we figure the average size of the motorships under construction and contracted for, we can find a great deal of comfort in the fact that the average motorship will show 6122 tons in this program whereas the average steamer with reciprocating steam engines shows only 5753 tons. This fact should be very interesting to the Diesel motorship engineer who has always had the argument thrown at him by shipowners that Diesel motors as built in America were well enough for small tonnage and horsepowers, but would not do in the size of ship generally used for commercial overseas work.

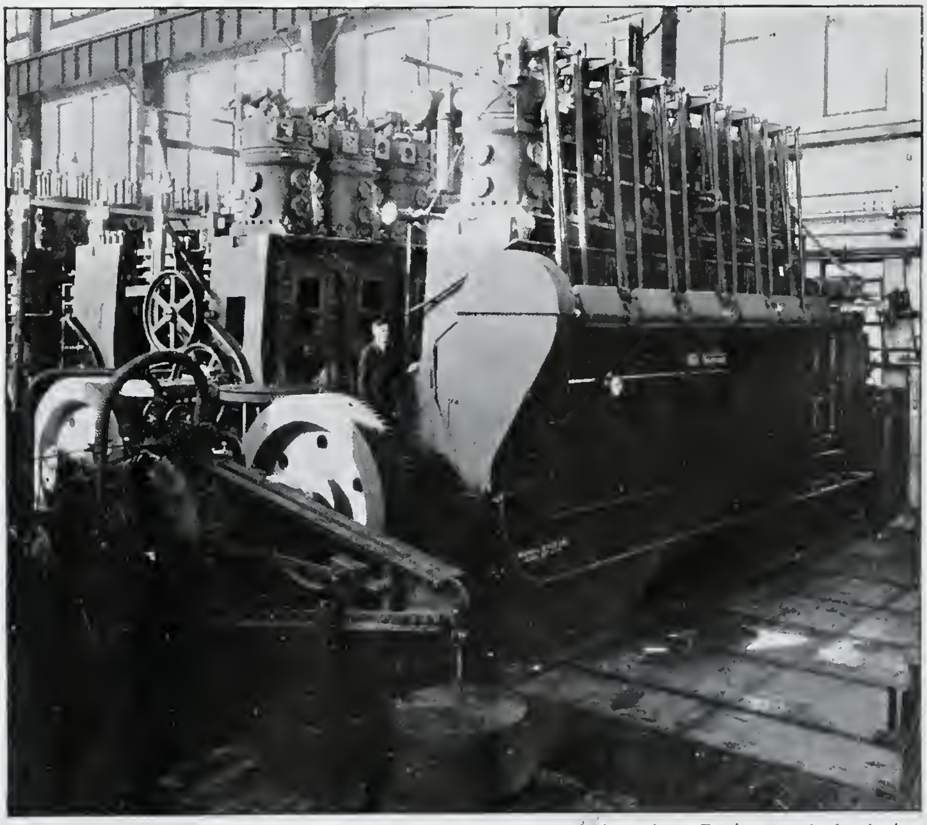
It seems to us that these figures show a tremendous advance, and that there will be in the not far distant future a wonderful opportunity for the conversion of these reciprocating steamers to Diesel engines.

Let none of our readers conclude that these fifteen motorships represent the total motorship program of America. The annual list of merchant vessels for the United States published by the Bureau of Navigation of the Department of Commerce shows that there are in America, documented as of the end of the last fiscal year, 10,711 motor vessels of an aggregate gross tonnage of 357,049. Many of these, of course, are powered with engines using the lighter distillates, but, on the other hand, an increasingly large proportion of these vessels, especially in the larger sizes, are powered with Diesel or semi-Diesel engines using heavy oil for fuel.

Work on the Kennecott, the all-steel first-class motorship now building at the Todd Dry Dock & Construction Corporation, Tacoma, for the Alaska Steamship Company, is progressing rapidly and this fine cargo and passenger vessel will soon be employed on her regular run. She is 345 feet between perpendiculars, 49 feet 6 inches molded beam, 26 feet 9 inches molded depth, with a loaded draft of 22 feet. She will be powered with two McIntosh & Seymour Diesel engines of the four-cycle type, each engine having six cylinders and developing 1200 indicated horsepower at 140 revolutions per minute. Her fuel oil tanks are arranged to provide space for 1500 barrels of fuel oil for her own consumption and 4500 barrels as cargo. The total of 6000 barrels is estimated to be enough to carry this vessel at full speed 26,000 miles. All the auxiliary machinery and equipment will be electrically driven, the power for the same being provided by two 100 horsepower McIntosh & Seymour Diesel engines driving 75 kilowatt direct current generators. The Kennecott is expected to develop a speed of better than eleven knots fully loaded.

Splendid reports are still coming in from the Bolinder-engined ships, Katherine and Tancarville. The Katherine is powered with two 320 horsepower and the Tancarville with two 500 horsepower Bolinders.

The Katherine in a trip once around the world and then from San Francisco to the Philippines and Philippines to New York made a practically non-stop run as far as her engines were concerned. During a period of 272 days in which she logged 45,396 nautical miles, the total necessary stop time for



McIntosh and Seymour Type M-6-C-44 directly reversible Marine Diesel Engines, each developing 1200 I. H. P. at 140 R. P. M. These engines are installed in the 6000-ton motorship Kennecott now rapidly nearing completion at the Tacoma Plant of the Todd Dry Dock and Construction Corporation.

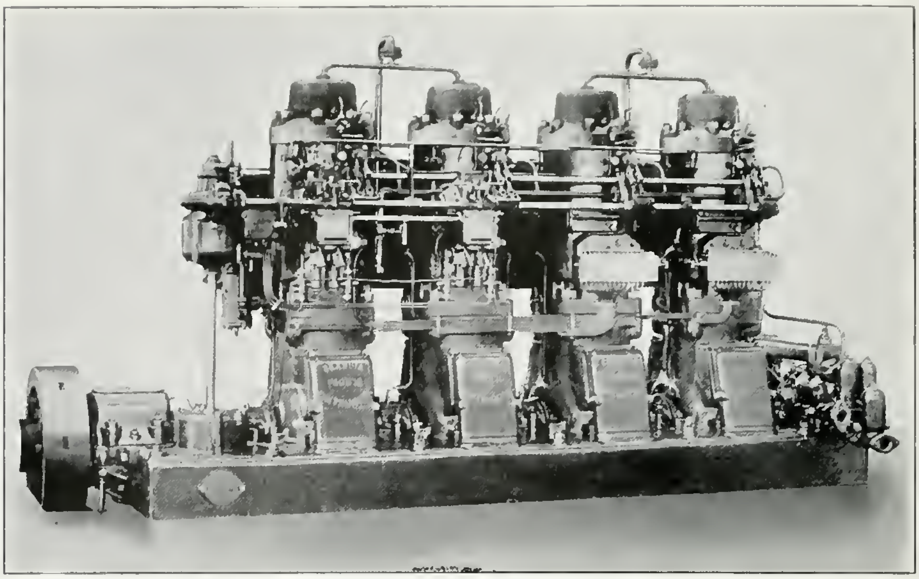
the starboard engine was only seven hours and thirty minutes and for the port engine twenty hours and twenty-seven minutes. The Katherine is now under charter to the International Oil Transport Company for the carriage of oil from Tampico to Aransas Pass, Mexico.

The Bethlehem-West two-cycle Diesel engine in the Cubore is making, according to the owners of the vessel, a remarkable record for economy and reliability, and the Diesel engineers of America are looking forward with a great deal of interest to the performance of these same engines in the 20,000-ton combination ore carriers now under construction.

We should soon hear some very interesting reports from the Shipping Board motorship William Penn, and from the new motorships now being built for the American-Hawaiian Company.

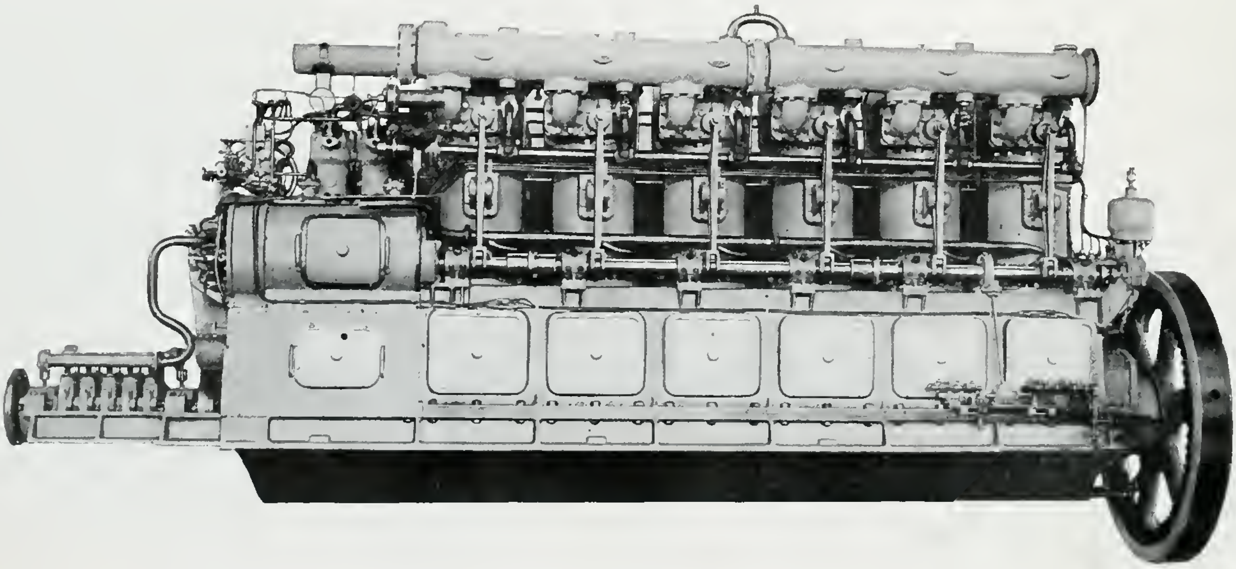
The New London Ship & Engine Company have a large number of marine installations, both in direct connected Diesel engine units and in the Diesel electric dirve, and their engines on submarines for the United States government have shown remarkable records. Notable among their installations on the Pacific Coast is the Ambassador. This vessel, built for freight, passenger and towing service in Alaskan waters, is 112 feet long, 22 feet beam, 16 feet 3 inches molded depth. She is powered with a 360-brake horsepower Nelseco direct reversible Diesel engine running 240 revolutions per minute, which drives her at a speed of eleven and one-half knots light and five knots when towing. She has demonstrated wonderful development in long tows from Seattle to the Alaskan coast and between Alaskan ports.

The Skandia Pacific Oil Engine Company has recently announced the closing of a contract for ten 150-horsepower, 4-cylinder, direct-reversible Skandia engines and for fifteen 16-horsepower, single-cylinder Skandia engines. The 150-horsepower engines in this order are to be used as twin sets for the propulsion of canal barges now being constucted by the MacDougall Duluth Shipbuilding Company for the Erie Canal Transportation Company. These barges will be used for carrying grain from Buffalo to New York. The 16-horsepower engines are for direct connection to 10-kilowatt General Electric generators, and three of these generating sets are to be used for power for auxiliary machinery and lighting on each of the barges. These barges are to be 250 feet long, 36 feet beam, 10-foot draft, with a displacement of 2150 tons, and will be driven by the Skandia engines at a speed of seven knots.


Skandia Pacific Oil Engine of 150 H. P. Ten of these engines are being installed in canal barges for the Erie Canal Transportation Company

Perhaps the most outstanding news feature of the motorship situation in America during the last month has been the publicity given to the statements made by William Denman, first chairman of the Shipping Board, before the Walsh Committee. In these statements Mr. Denman pointed out that it would have been entirely possible and practical for the United States to have had at this time a fleet of from fifty to one hundred first-class sea-going motorships; that the preliminary plans and necessary arrangements for the building and engining of such a fleet had been made by his administration, but were shelved by his successors.

It is never our policy to cry over spilt milk, nor do we wish here to open up any old sores or investigate into the reasons for this shelving, but we do unhesitatingly declare that the Shipping Board in its present and future conversions and alterations of steamers under its ownership which have been found to be uneconomical in service should bear well in mind the fact that the Diesel-engined motorship has absolutely proven itself to be a far more desirable type commercially than any steam-driven vessel.


Nelseco directly reversible Diesel Engine of 360 B. H. P. as installed on the motorship Ambassador

THE CASE FOR THE MOTORSHIP

UNDER the above heading there appeared in the issue of Fairplay for November 25 an article which treats the subject of the Diesel engine from such a commonsense marine viewpoint that we are here summarizing it for the benefit of our readers.

The writer of this article first calls attention to the fact that taking an average trial trip consumption of coal and of oil and allowing for the customary reduction of stokehold staff with the change-over to oil from coal, theoretical calculations would show at the present time that the cost of power in an oil-fired steamer should be higher than that in the coal-fired steamer so far as the actual outlay for labor and fuel is concerned. At the same time he points out that there are many considerations in practice which give the oil great advantage over coal, but when one compares the working costs of a coal-fired steamship with those of a ship driven by internal combustion engines a very considerable saving in calculated costs is apparent.

Such a comparison is given as between columns "A" and "B" of the tables reproduced herewith. The writer in Fairplay points out that the more logical comparison is between a coal-burning steamer and a Diesel engined ship designed to carry the same cargo at the same speed, in which case the motorship could be considerably smaller with the advantage of reduced hull cost and reduced interest charges, insurance and depreciation. For the purpose of comparison the figures relating to such a motor vessel are given in column "C" of the table. The tables refer to ordinary cargo ships, such as are used in trading between British ports and South American ports. The fuel prices are taken as £11 10/ per ton for Diesel engine oil, £10 7/6 per ton for boiler oil fuel, £5 5/ per ton for coal, and 5/ per gallon for lubricating oil. It will be observed that the price of coal is low in relation to the price of oil in this comparison, no allowance being made for the present extraordinarily high prices of coal at outlying ports. It is also to be noted that the speeds of the vessels in each case are taken at trial values. In considering this it must be taken into account that cargo steamers cannot run constantly at full speed, owing to the necessity of cleaning fires and sweeping tubes,, while with the motor engine chosen for these comparisons the motor vessel could maintain her actual trial speed for a full passage. It must also be borne in mind that owing to the rapidity with which the motorship can be fueled and gotten under way in comparison with a steamer, it would not be unreasonable to expect an extra round trip per annum from the motorship.

A third point to be borne in mind is that the fuel consumption taken in these tables for the motorship is at a very liberal figure and that the economy obtained in trials by Diesel engines can be maintained absolutely for long voyages. On the contrary, the steamship will burn more coal on the voyage than is estimated or than is consumed on the trial unless the human element in the stokehold can be guaranteed perfect and coal qualities maintained uniform at all points of supply. The coal consumption quoted in these tables will be recognized as being a low figure for sea-going practice under good conditions.

The tables show that by designing the ship to suit oil engines it is possible to reduce the hull weight by nearly 20 per cent for the same carrying capacity, thereby reducing the total cost in the case of the motorship to a point where it is less than 6 per cent greater than that of the ordinary steamship. As against this, the running cost, even on the conservative method of estimating which, as indicated above, is followed in these tables, would be approximately 28 per cent less in the case of the motorship, thereby leaving room for a very handsome return on the extra first cost. It should also be borne in mind that just as in practice the use of oil in steamers brings incidental but very important gains not apparent from the standpoint of academic calculations, so the motorship possesses these same advantages, and in some cases to a much greater degree than is possible with the oil-fired steamer.

In figuring wage costs the crews of these vessels outside the engine room are identical, consisting of master, three officers, four quartermasters, one carpenter, one boatswain, six deckhands, five stewards and cooks, and two wireless operators. In the engine room on the steamer there are allowed five engineers, twenty firemen and oilers, two donkeymen and two storekeepers, making a total of twenty-nine. On either motorship the figure in the table allows for seven engineers, six firemen and

	(A)	(B)	(C)
Type of Machinery.	Geared turbines. Coal fired boilers.	Vessel of same dimensions as A. Driven by Motor Engines.	Vessel to carry same amount of Cargo as A. Driven by Motor Engines.
Length of vessel B.P.	414ft. 0in.	414ft. 0in.	366ft. 0in.
Breadth moulded	54ft. 0in.	54ft. 0in.	51ft. 6in.
Depth moulded	33ft. 5in.	33ft. 5in.	31ft. 9in.
Draft fully loaded	26ft. 6in.	26ft. 6in.	25ft. 9in.
Weight of hull	3,370 tons	3,420 tons	2,710 tons
Weight of machinery	650 tons	980 tons	780 tons
Displacement loaded	12,600 tons	12,600 tons	10,190 tons
Total cost of vessel	£360,000	£475,000	£380,000
Speed loaded on service	12 knots	12 knots	12 knots
Average sea power S.H.P.	3,150	3,150	2,400
Deadweight cargo, tons	5,880	7,125	5,880
Fuel consumption per S.H.P.	1.5 lb.	.54 lb.	.54 lb.
Fuel consumption per day	50 tons	18.5 tons	13.9 tons
Fuel consumption for 50 days' round trip	2,500 tons	925 tons	605 tons
Annual cost of fuel (6 round trips)—			
Coal £5 5s. per ton	£78,750	—	—
Boiler fuel oil at £10 7s. 6d. per ton	—	£10,115	£7,470
Engine fuel oil at £11 10s. per ton	—	£52,612	£39,675
Lubricating oil consumption per day	8 gallons	20 gallons	15 gallons
Annual cost of lubricating oil	£600	£1,500	£1,125
Annual wages and provisions	£14,727	£11,202	£11,202
Annual wear and tear	£2,400	£2,400	£1,800
Annual stores	£1,440	£1,440	£1,200
Annual insurances at 6 per cent. of cost	£21,600	£28,500	£22,800
Annual total cost of running	£119,517	£107,769	£85,272
Cost per ton of cargo carried outward or homeward	33/10½d.	25/2½d.	24/2d.

oilers, two donkeymen, and one storekeeper, making a total of sixteen—a grand total for the steamer of fifty-two and for the motorship of thirty-nine. It will be observed from this crew that the motorship used for comparative purposes here is equipped with steam-driven auxiliaries and that the engineer staff is very liberal, two engineers being carried in each watch; in other words, the table is as liberal as it is possible to make it on the side of the coal-burning steamer and as conservative as it is possible to make it on the side of the motorship.

The writer in Fairplay sums up the advantages of the motorship under eleven heads as follows:

1. Less fuel cost when running.

2. No standby fuel expenditure.

3. Rapidity and cleanliness of bunkering.

4. Ability to carry surplus fuel without difficulty, thus enabling fuel to be bought in the cheapest market.

5. Reduced staff, particularly in respect to firemen and trimmers, who are a difficult class.

6. Less heat to affect cargo and living spaces.

7. Less upkeep. No large boilers or condensers to maintain. Wear and tear of floor plates, fire bars, etc., eliminated.

8. The liability of total breakdown is considerably reduced owing to the ability to put a single cylinder of the engine out of action without stopping the engine.

9. Economy and speed are maintained at trial results or even better. Efficiency of steam plant is quickly decreased by fouling of boilers, inside and out, and leaky glands, joints and piston rings.

10. More satisfactory mechanical running is experienced with the oil engine than with ordinary steam reciprocating engines, the former being of the much higher grade.

11. Lower docking and harbor dues, the ship being smaller for the same cargo tonnage.

OLD WINDJAMMERS REJUVENATED

RECORDS of the Morse Dry Dock & Repair Company abound in material that would be treasure trove to the writers of stories of the sea. Take, for instance, the case of the Chilean sailing-ship Alejandrina, reefed twenty years ago in the Straits of Magellan and left undisturbed until late in the summer of 1919, when a firm of Patagonia wool merchants, aroused by the demand for tonnage caused by the war, began her salvage, an operation that required four months.

Managing to patch her up, they loaded her with wool and she finally made New York. Berthed in the Morse drydock her hull was exposed for the first time in a quarter century and the outside shell found to be unscathed. As she lay in drydock her masts towered high above all other shipping in the vicinity, her rigging loomed fantastic and suggestive of pirates and treasure.

In her early days she had been the Andrina, built in Southampton, England, by Mondaunt & Company, to which concern the Morse inspectors give credit for sound basic construction. After being scraped and painted the resurrected old veteran sailed off vigorous as of yore.

A search of the seas would find an Italian ship known as the Spica which for forty-one years was a sailing vessel. Boarding her one would find her equipped with three Diesel engines of different types. The Spica, thus rejuvenenated and eqipped in the Morse yards, again breasts the seas vigorous and powerful, although forty-one years under sail. The San Guiseppe, also an Italian sailing ship, was fitted out in much the same manner.

Interesting, also, is the story of the Nepthis, an old Brazilian ship which parted her line while being towed from Rio de Janeiro to the port of New York. Lost at sea, she was later found by a United States revenue cutter which attempted to tow her. The task proved futile and the Nepthis again became a derelict until picked up by another steamer, the Davy Jones. After a hard struggle the Nepthis was brought to where the Morse tugs could get lines on her and she was towed to the company's yards where she was fitted from keel to masthead.

Chilean sailing ship Alejandrina on the dock of the Morse Dry Dock and Repair Company, Brooklyn, New York

MOTOR SHIPBUILDING IN EUROPE

On his return from America Lord Pirrie issued a statement very much to the same effect as that which he published in New York. He strongly emphasized the necessity for conserving the world's oil resources, remarking that the burning of oil fuel under boilers for raising steam was wrong in principle and that the internal combustion engine should be used. At the same time he advised shipowners who intended to build motorships to ascertain that Diesel oil was available at ports on the routes on which their vessels trade, otherwise they might get into difficulties in regard to supplies. Lord Pirrie's strong condemnation of the oil-fired steamer during the past few months is having a distinct effect and the result is that very few conversions from coal to oil burning are now being carried out. Although owing to the slump, orders for ships are in abeyance, all shipowners are investigating the question of the advantages of the motorship and it seems likely that when the shipping position improves there will be a multiplicity of orders for motor vessels and comparatively few steamers built except those of extremely large size, for which Diesel engines of suitable power are not yet available.

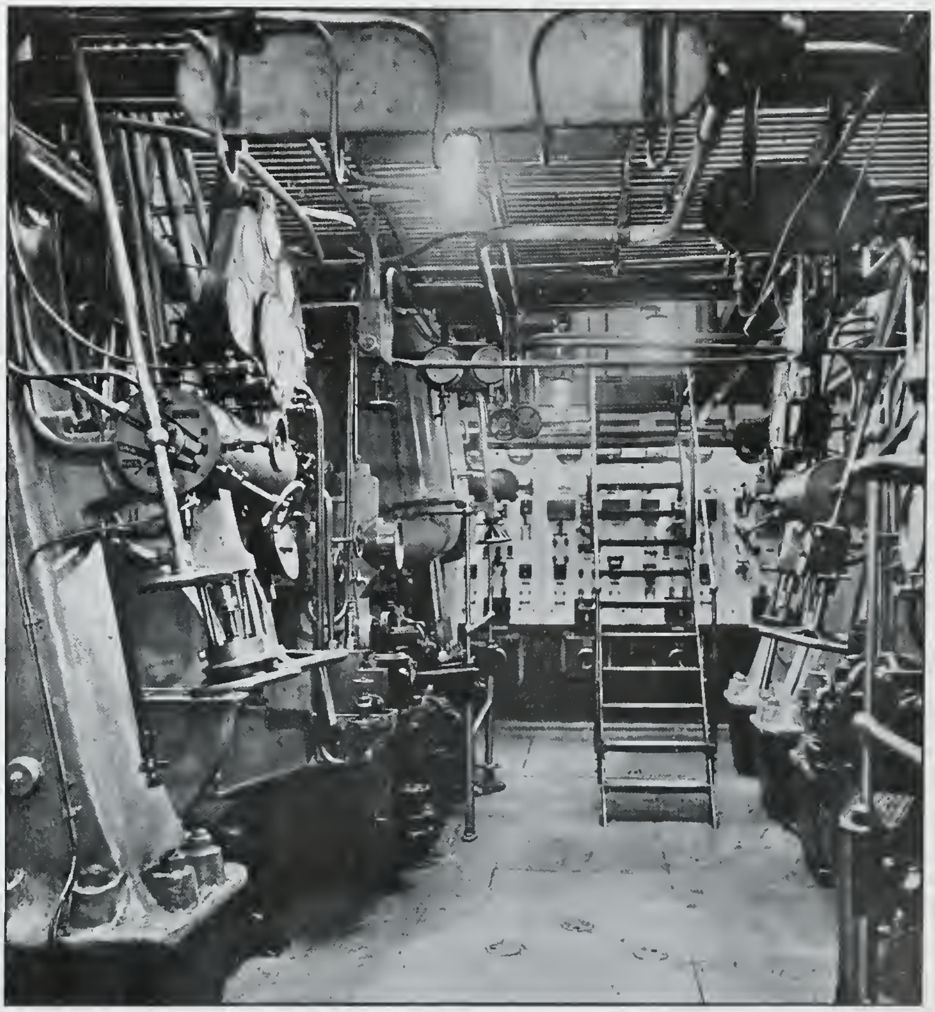
Even shipbuilders who are engaged upon both the construction of Diesel engines and oil-fired boilers are now voting whole heartedly for the oil engine. For instance, Sir James McKechnie, the famous engineer who is head of Vickers, Ltd., and was responsible for the development of the Vickers submarine Diesel engine, stated at the launch of the motorship Seminole in December that he considered it wrong to build oil-fired steamers and that shipowners should adopt only motor vessels. Such a statement coming from a man with much experience both in constructural difficulties and operating advantages of the motorship, attracted considerable attention in engineering and shipbuilding circles and especially among those shipbuilders who are still refraining from embarking upon the manufacture of marine oil engines.

Incidentally it may be remarked that the number is gradually being reduced and at the present time there remain few well known concerns who are not actually interested in marine oil engine construction. The latest marine engineering firm to commence upon oil engine building is the Wallsend Slipway & Engineering Company, whose output of marine steam engines and turbines is probably as large as that of any other firm in the world. It may be remembered that this concern constructed the machinery of the Mauretania and has produced a large proportion of the steam engines used on the Cunard passenger liners. It is understood that the Wallsend Company will develop a high-powered engine with the idea of installing it in trans-Atlantic passenger liners.

It will not be long before a good deal more is heard in connection with motor passenger boats. The first of the three passenger liners for the British India Steam Navigation Company, the Magvana, will be completed shortly, the engines being now on test at the makers' works in Glasgow. In Italy progress is being made on three big trans-Atlantic liners (with accommodation for several hundred passengers) for the Italian Transatlantic Steamship Company, and in these ships Diesel machinery of 6000 horsepower is to be installed. Still more interesting is the project of Mr. Dan Brostrom, who intends to construct a liner for the service between Scandinavia and New York which will be a faster vessel than any yet contemplated. It is proposed to build a ship 600 feet in length and equip her with 16,000 horsepower machinery on quadruple screws.

The Seminole, mentioned above as just launched by Vickers, is the second motorship for the Anglo-American Oil Company, the first being the Narragansett, which has been in commission for the past three or four months. As showing the remarkable economy effected by oil tankers of this size it has been stated by the owners that whereas the Narragansett consumes an average of 11¾ tons of oil fuel per day, a corresponding steamer fitted with oil-fired burners uses no less than thirty-five tons every twenty-four hours. The behavior of the Narragansett has been unexceptional and this is an interesting fact in view of the installation of solid injection Vickers Diesel engines. It would appear that the solid injection system is proving its reliability for mercantile work, and as Doxfords have also adopted it for their large standard opposed piston motor, it is not unlikely that it will gradually replace air injection for large slow running sets.

The Seminole, like the Narragansett, carries 10,500 tons of fuel oil and is equipped with two 1250 b. h. p. six-cylinder engines of the Vickers type. There are four other sister ships now under construction at Vickers yard. These are



Engine room of Norwegian 7000-ton motorship Tosca, showing two 1400 I.H.P. Werkspoor Diesels being built for another oil transport firm, Tankers, Ltd.

Five New Motorships

It indicates the rapid increase in the development of motor shipbuilding in Europe that during the past few weeks five new large vessels have been put into commission. The most important of these is the second of a fleet of 14,000-ton Glen liners which are now being turned out regularly at the rate of one every three months, in addition to the series of smaller vessels which are also being built. The new vessel, which is named the Glenapp, carries 14,000 tons deadweight, like her sister ship, the Glenogle, which has had a very satisfactory maiden voyage. The machinery is also of the same type, comprising twin 3200 i. h. p. Harland & Wolff four-cycle eight-cylinder engines of the ordinary design with an auxiliary equipment of four 100-kilowatt Diesel driven generating plants. Needless to say, the cost of these vessels is extremely high and the writer was recently informed that the total expenditure involved is just four times the amount required for a pre-war steamer of the same capacity and power. What would be the difference in capital expenditure at the present time between a steamer and a motor vessel is somewhat difficult to say. It may be taken that the internal combustion propelling machinery costs about 25 per cent more than the steam plant, but at the same time the hull is much cheaper, owing to the fact that a samll motor vessel carries the same cargo as a larger steamship. Probably, therefore, for the same cargo carrying capacity and the same speed, there is little to choose between the steamer and the motorship as regards capital cost. For comparative figures see tables in the article "Steamer versus Motorship" elsewhere in this issue.

Another motorship built by Harland & Wolff to sail on her maiden voyage in January to New York and the West Coast of South America via the Panama Canal is the Lobos, also a standard craft but of a different size. She is the second of six motorships for the Pacific Steam Navigation Company, all of which will be placed on the same route, and it is an open secret that this policy of motorship construction was decided upon in consequence of the excessive price of coal on the South American run. For instance, steamers of the Pacific Steam Navigation Company which are trading on this route have to take coal at ports on the West Coast of South America and pay anything up to $42 or even $45 per ton. The motorship on the other hand can obtain sufficient fuel either at New York or the Panama Canal for a round voyage probably at an average figure of about $21 per ton, and as the motorship burns only one-quarter as much oil by weight as the coal required in the steamer, the enormous saving in the fuel bill is self evident.

The Motorship Lobos

The Lobos carries about 10,500 tons of cargo at a speed of 11½ knots and is equipped with a couple of 1800 i. h. p. six-cylinder engines of the same design as those installed in the Glenapp, the only difference being in the number of cylinders and the cylinder dimensions. It is interesting, as a proof of the remarkable degree of standardization now effected in Harland & Wolff's new enormous engine building shops at Glasgow, that although they probably have orders on hand for motorship machinery totaling somewhere in the neighborhood of 70,000 or 80,0000 horsepower, they are only building two classes of motor, one of 1800 horsepower and the other of 3200 i. h. p., with an occasional set developing 2250 i. h. p. But it should be noted that this latter type has cylinders of the same size as the eight-cylinder, 3200-horsepower, so that standardization is carried out to a remarkable extent. In fact, this feature is to be noted in every successful Diesel engine building works in Europe and the manufacturers state that only by this means is it possible to cater for the present requirements of shipowners. The difference in this respect between oil engines and steam engines or steam turbines is very pronounced.

More Standard Ships

Norwegian shipowners have accepted this principle of standardization in motorships and it is curious that even different firms are building vessels of exactly the same size and type. For instance, the motorship Tosca, which was completed a short time ago for Winge & Company of Christiania, is almost an exact duplicate of the Salerno, which was put into commission last spring for the Thoresen Line. The Tosca is the first of four sister vessels for the same concern, and as Norwegian shipowners usually prefer smaller standard vessels than their British confreres, it is interesting to note the size of this ship in comparison with the British standard motorship. The Tosca carries approximately 7000 tons of cargo at a speed of eleven knots, and to attain this speed a couple of 1400 i. h. p. Diesel engines of the Werkspoor type are fitted.

This design, which is, of course, well known on the Pacific Coast (as the same type of engine is built by the Skandia Pacific Oil Engine Company), has gained much popularity among Scandinavian and Dutch shipowners. It is perhaps one of the simplest of all engines in general construction and manufacture, the cylinders being arranged in units of three, with a common water jacket in which the cylinder liners are inserted, the jacket being supported on cast iron framework and strengthened by means of diagonal and vertical stay rods. The 1400 i. h. p. sets in the Tosca have six cylinders 560 m.m. diameter and 1000 m.m. stroke and run at 120 r. p. m. for full power. It is notable that in these engines a slight modification has been carried out from the original design

New motorship Athene, 7000 tons deadweight, equipped with two 1400 I.H.P. Werkspoor 4-cycle Diesel engines by which part of the operation for reversing is now effected by hand instead of by compressed air. The reason no doubt is that shipowners look upon this as the more direct method and with such relatively low powers where the effort required is not considerable, there are advantages in the adoption of manual control.

A third ship practically similar to the Tosca and the Salerno has recently been completed, named the Athene. She has also been built in Holland, equipped with Werkspoor machinery, and is owned by another Norwegian firm, Messrs. Salvesen & Company.

All the three shipowners mentioned have not previously ordered motor vessels and another shipowning firm which has just become the possessor of a motorship for the first time is the Orient Company, a large Danish concern for whom the 10,500-ton motorship Indien has been built. This vessel was constructed at the Nakskov Shipyard in Denmark because Burmeister & Wain had too many orders on hand to carry out the work, but the latter firm installed the machinery, which is of their usual type, the two sets each developing about 1550 i. h. p.

The history of the Indien is interesting. The Orient Company was formed some time ago when the East Asiatic Company decided to sell its steamers and concentrate upon motorships. The results achieved, however, with these motor vessels inspired the Orient Company to investigate the problem of motor shipowning, and it is not unlikely that they will ultimately dispose of their steamers to some other conservative firm and adopt a policy of exclusive motor shipbuilding. Perhaps no greater proof of the advantages of internal combustion engined vessels could be given than the fact that practically all the shipowners who have had a considerable experience in their operation have abandoned steam propulsion entirely, or are doing so as rapidly as they can.

DIESEL ELECTRIC TANKER

Considered in Connection With Section XI of the Merchant Marine Bill

II

By D. W. & R. Z. Dickie

IN the first part of this article, which appeared on page fifteen of the current volume of Pacific Marine Review, we made a general comparison between the Diesel electric drive for a tanker of the type of the La Brea and the Los Angeles and the reciprocating engine and turbo-gear reduction drives which are at present installed in those vessels. It was shown that even with six main engine generator units the Diesel electric drive had less individual operating units to contend with than had either of the other drives or than had the turbo-electric drive. It was also shown that there were less thermo-dynamic and mechanical principles involved in the Diesel electric drive than there were in either of the other three. The Diesel electric drive can, therefore, be said to be the most simple. It was also shown that the elimination of the boiler room was a great step toward lowering expense of maintenance.

We now propose to compare the performance of the La Brea and the Los Angeles with that of an identical vessel fitted with Diesel electric drive.

MERCHANT MARINE BILL

Sec. 11. That during a period of five years from the enactment of this Act the board may annually set aside out of the revenues from sales and operations a sum not exceeding $25,000,000, to be known as its construction loan fund, to be used in aid of the construction of vessels of the best and most efficient type for the establishment and maintenance of service on steamship lines deemed desirable and necessary by the board, and such vessels shall be equipped with the most modern, most efficient, and the most economical machinery and commercial appliances. The board shall use such fund to the extent required upon such terms as the board may prescribe to aid persons, citizens of the United States, in the construction by them in private shipyards in the United States of the foregoing class of vessels.

Legal opinion:

The Shipping Board is here prohibited by the Merchant Marine Bill from aiding any steamship company unless the vessel is of the most modern, the most efficient and most economical type.

To illustrate the performance of the various types, the attached table was made from the logs of the La Brea and the Los Angeles and estimated for the Diesel electric drive vessel.

	Gear Turbine	Reciprocating Engine	Diesel Electric Drive
Distance in knots	78,900	74,600	78,900
Average speed per hour	10.72	9.95	10.72
Barrels delivered	1,203,000	1,314,000	1,344,650
Fuel used at sea, barrels	59,100	66,200	29,550
Fuel used per knot steaming	.748	.887	.374
Fuel used in port	2,200	3,100	1,100
Fuel used per knot steaming and in port	.776	.928	.388
Total oil used, barrels	61,300	69.300	30,650
Time in port discharging, days	25.8	35.1	25.8
Time in port blowing down and cleaning, etc., days	32.7	17.3	20
Cargo discharged per hour, barrels	2,418	1,556	2,418

This table averages the long and short voyages and with fuel oil at $2 per barrel, and assuming .51 of a barrel per horsepower per hour instead of .4 as the Diesel engines indicate they will do, the saving of 30,650 barrels would represent a saving of $61,300 per year in this item alone, so that taking into account the extra lubricating oil that would be required for the Diesel engine, $55,000 would be saved, not taking into account the saving in firemen's wages and their food and housing.

The Diesel electric drive is heavier than the turbine, but the saving of 120 tons of make-up feed water required for the boiler, leaves the Diesel and turbine installation about the same in weight, the Diesel a little lighter, if anything, than the turbine. The reciprocating engine is heavier than the turbine.

The Winton Diesel engine is four-cycle in principle—that is, on the first stroke downward the fresh air is drawn into the cylinder at atmospheric pressure, through the inlet valve; on the upstroke the air is compressed to 480 pounds, running the temperature up to 800 degrees to 900 degrees Fahrenheit.

The fuel is pumped into a nozzle in the cylinder head against the pressure of the air from the air bottles and just before the piston reaches the top of the stroke, the fuel valve is opened momentarily and injects the fuel into the superheated air in the cylinder.

The fuel ignites, burns, and the gases of combustion expand, pushing the piston down.

On the next upstroke the exhaust valve opens and discharges the burned gases into the exhaust manifold.

Air for atomizing the fuel comes from the air bottles which are charged by the steeple compound air compressor on the engine.

Each engine is fitted with generator at 125 volts and they are stepped up in series for six engines, giving a total voltage of 750 volts.

The motor is of the double armature type, and is the real reason why the Diesel electric drive has lain dormant so long. The idea was started in 1913, but at that time the electrical companies did not have a satisfactory motor to offer. It operates from 30 to 100 r. p. m. to give a wide range for maneuvering. Control, starting, stopping and reversing are accomplished by changing the excitation of the fields so that the main Diesel engines need not be disturbed, and is led to the pilothouse to be under the jurisdiction of the captain.

The 30-kilowatt Diesel auxiliary in the motor room will be sufficient to take care of the auxiliaries, ice machine, steering engine, lights, etc., at sea and in port, and will operate very much cheaper than the turbo-electric set, as the stand by losses of the boilers constitute a major part of the operating cost of those units.

The cargo pumps and winches will be operated by the current from part of the main engines in port, allowing the others to be shut down for cleaning, etc.

Cargo heating for pumping is done by either of two systems, depending on the nature of the cargo and the trade.

The exhaust from the engines may be carried through a steam boiler in the stack or the circulating water may be pumped throughout the cargo heating system, which is of special design to utilize this method. The latter is preferable for all cargoes with the possible exception of cocoanut oil.

The circulating water for the engines is handled by duplicate motor-driven, two or three-stage centrifugal pumps, delivering water into a general system to be kept under pressure at all times with an air chamber of sufficient size to equalize variations in pressure and with an overflow through a relief valve to take care of the excess water. This takes care of the ice machine, circulating water for the main engines, sanitary line, fire line, and, in fact, all the lines that use salt water.

The Diesel engines are shown on the tween deck to facilitate removing the crank shafts in case of necessity and to make all the units accessible.

The facts in the case prove conclusively that with proper installation the Diesel electric drive is more reliable, the upkeep is less, is more economical, and is simpler than the steam installations. In other words, the great legal ideal has been aimed at of getting a vessel equipped with the most modern, the most efficient and the most economical machinery and commercial appliances as outlined in Section 11 of the Merchant Marine bill.

THE MOTORSHIP PROJECT

Statement of William Denman, First Chairman of the United States Shipping Board, to the Walsh Committee

THE purpose of my appearance before this committee is to urge the revival of my administration's project to build a large fleet of Diesel motorships.

When I put the word "Emergency" into the title of the Fleet Corporation, it was to indicate the war emergency which compelled us to build so many oil-fuel steam engines, as well as our wooden hulls.

The obsolete character of the wooden hull required no explanation. The wasteful use of oil under the steam boilers, consuming nearly three times the fuel of the many existing motorships of the Danish East Asiatic and other fleets, was well known. For years these large motorships had sailed under my window over the Golden Gate. Admiral Lord Fisher had already pointed out the approaching obsolescence of the marine steam engine.

When I became chairman of the Shipping Board, the East Asiatic Company and other Scandinavian owners, in scores of voyages, some over a year in length and all around the world, had established the paramount commercial value of the Diesel motorship. It was then beyond either practical or scientific question or doubt. Lord Pirrie, British director of shipping in the British yards, was building large motorships before and during the war.

I hand the committee the photograph of twenty-one of these Scandinavian vessels, all then in successful commercial use, some for years before my administration. They range from 6500 to 10,000 tons' carrying capacity at over ten knots speed. There were many more besides these.

The project for building them, the necessary license, the plant, the Cramps shipyard and the skilled workmen were all procured under my administration. A contract was offered us, and we were debating whether we would commandeer and make it a national project or accept the contract. It was my administration's contribution to the commercial future of the American mercantile marine. It would have taken no more time for the Cramps to complete the Diesel plant than to construct any one of the new plants for steam engines. The contract was for 9600 deadweight tonners with 11.6 knots' speed. They were of the type Lord Pirrie was building before and during the war.

At the present rate of consumption it has been estimated by geologists and practical oil men that the American oil supply will be consumed inside of twenty-five years. This is the occasion of Secretary Colby's note to the British on their mandate over the Mesopotamian oil fields. Can we waste two-thirds of our marine fuel oil, through steam boiler tubes and up the smoke stack, in view of this world oil condition? The Diesel can burn coal tar products if we ever exhaust our oil.

Our wasteful steamships built for the war emergency are hopeless in competition with these Diesel vessels. Motorships carry no boilers or condensers, and but one-third the fuel. As a consequence they have over 12 per cent more cargo capacity. This in itself means a handsome profit in ship operation. Their initial cost is no more per ton carried.

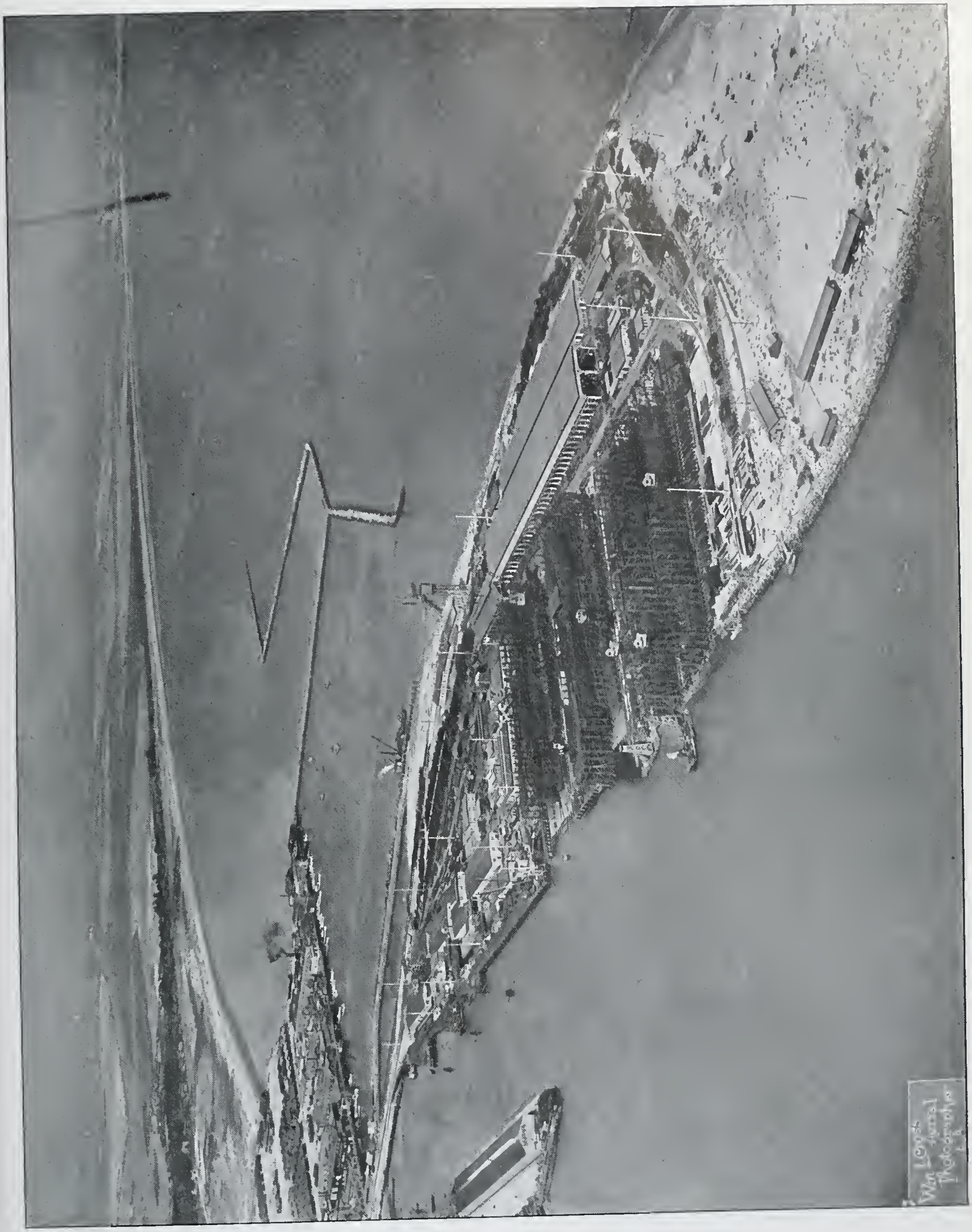
The English and Scandinavians created their engineers. We could. We did for our submarine Diesels. Over 60 per cent of the new cargo vessels ordered in Great Britain during the last six months are motorships. Norway, Denmark, Sweden and Holland build nothing else when they can get engines. Lloyd's agents are now inspecting the construction of 300 sets of oil engines. These aggregate 600,000 horsepower, which, in terms of 11-knot cargo carriers, is a million and a half tons. The largest is a British passenger and cargo ship of 15,760 tons deadweight, and 14 knots' speed. Six are of 14,000 tons deadweight and over.

This is active construction. The orders double this. There are fifteen marine Diesel engine factories in Great Britain alone. Lord Pirrie controls four of them, using the same license we procured for the board's program in 1917. There are many more in Holland, Denmark, Sweden and Norway. They are just beginning to operate plants for large size Diesels in this country. In all the billions the government has spent not a dollar has gone to build a Diesel engine, of any type, large enough for a 10,000-ton freighter.

Our wasteful steam engines are dependent on British bunkers. We cannot carry enough fuel to pay the loss up the smoke stack, and complete our long voyages. We must stop and beg fuel supply at the British and other bunkering stations on the China Coast, in Japan, in the East Indies, at Aden, at Suez, in the Mediterranean and in the South Atlantic.

The sailing radius of a 10,000-ton Diesel ship is 28,000 miles on the oil in her ballast tanks. This is once around the world, past all the British and other bunkering stations, and "then some," as shipping men put it.

The United States can balance its fleet only by adding, or converting from steam, at least a million tons of motorships. We should stimulate the building of Diesel factories and produce more than our British and Scandinavian competitors. If we do not, we have lost the battle for maritime supremacy, and will not have even a fair minor share in the world's sea carriage.



Interesting aeroplane view showing the shipyard and shops of the Southwestern Shipbuilding Company, East San Pedro, California. Note the location on sandspit with water on all sides. The interesting story of the manner in which this sandspit was transformed in ninety days into a modern shipyard was told in Pacific Marine Review for December, 1918. Notwithstanding its mushroom growth, the Southwestern yard has proven to be exceptionally economical in the construction and outfitting of hulls, and it is very evident that this yard is going to stay in business.

NOBLESSE OBLIGE

By PIERRE E. HAYNES

THE art of the agitator consists largely of the explanation of the obvious, ponderous, historical narration and the quotation of relevant or irrelevant statistics as a means of impressing his auditors, who, being duly impressed, are usually given their fill of doubtful material, used as a basis for more or less imperfect conclusions.

Persistence in public expression must not be construed as an evidence of authority or fitness. The best authorities on scientific subjects know full well the danger of false leadership arising out of self-deception. They guard their public utterances with great care that none but the proven truths may gather weight or popularity because of the scientists' own reputations. It was ever thus that the clamor and clatter of earth-borne feet should be heard above the gentle sough of celestial wings.

An apple falling from the hand seems to obey laws so simple as to require no explanation at all, yet a careful analysis shows that the resistance of the air alone, in such a case, is made up of such elements as ordinary friction, viscosity and translational movements of the air, all of which are subject to some variation in quantitative value on account of the changes of temperature or barometric pressure. In addition to this, the force of gravity varies with the position of the apple relative to the surface and to the center of the earth, and is affected by the rotational and revolutionary forces of the earth. If the fall be from a great height, the surface of the apple could possibly gather an electrical charge which might modify its velocity as well as prove a deciding factor with respect to the exact nature of the spot on the earth's surface upon which the apple might strike.

Discriminating readers must closely scan any argument on any scientific subject which insists that the question is a simple one. The human mind loves to assume—it is the path of least resistance and the method of least effort. To assume that a problem is simple involves the danger of insufficient comprehension and conclusions imperfectly evolved.

The art of severing metal by oxidation is not yet twenty years old, and it has been averred that our knowledge of the subject is quite complete and comprehensible. Its companion, the art of welding, is several thousand years old and its first practice has marked the birth of every civilization on the face of this planet. Who will venture that with all this ancient development and modern research the world's knowledge of welding is complete and comprehensible, not to say simple!

The art of severing metal by oxidation is in its infancy. We know we can cut some metals because it is being done, but the exact mechanism of cutting is not yet well understood.

Only a year ago the published word of erstwhile authorities contained statements that cast iron could not be severed by the oxidation process. Three and one-half per cent of carbon, the self-same material that furnishes the artificial heat of the world, prevented oxidation of iron. Why couldn't iron be oxidized in the presence of carbon when carbon is more easily combustible than the iron itself? It seemed so simple that a simple answer was required. Cast iron, they said, melted below its temperature of ignition and freezing slag prevented the raising of the iron above its melting point. This explanation was so generally accepted that with a few exceptions no attempts were made to develop the art of cast iron cutting.

Witness today the effective cutting of cast iron with standard equipment. Popular authorities are falling over themselves to whisper the reason in the ear of the public. As a matter of fact, men who are devoting their lives to the study of flame-cutting are not yet sure of the complete explanation. They cut and know they cut because they cut. If they loved anything better than the truth, theories far more rational than many popularly promulgated might be presented.

Because it constitutes one of the major elements of the cost of steel cutting and because it is one of the materials not prepared by the consumer himself, commercial cutters are prone to assign all variations in cutting cost or quality to the oxygen and in support of this contention, present cost determination and other data which indicate the undesirability of nitrogen as an impurity. A recent writer points dramatically to the overwhelming cataclysm which would result if nitrogen were combustible. "A lightning stroke," sezze, "would explode the beneficent atmosphere surrounding the earth." While not recommending nitrogen as a commercial fuel, one must remark that every lightning stroke does form nitric acid; and deposits of nitrates, at favored spots on the earth's surface, indicate that in the aggregate large amounts of nitrogen are being burned. Not to be outdone by nature, our Norwegian friends draw lightning strokes from waterfalls for the purpose of burning nitrogen to form the world's most valuable acid.

With respect to burning or conbustibility, nitrogen differs from iron in measure only, and, as a matter of fact, the difference is the same for practically all substances. Some substances burst into flame immediately upon exposure to air or oxygen, while others, like wood, usually require a flame for kindling. Iron kindles in oxygen at red heat, while a mixture of acetylene and oxygen may be ignited by allowing it to impinge on iron below its temperature of incandescence. The kindling temperature of nitrogen is high, but what careful observer has failed to detect the odor of nitric acid where steel cutting is being performed?

Oxygen is not satisfied with its ability to successfully attack its plebeian neighbors and form new substances. This aristocratic gas combines with itself and forms ozone, king of oxidizers. That it combines with itself is proven by the fact that three volumes of oxygen form only two volumes of ozone. The unmistakable odor is usually present wherever oxy-acetylene cutting is being performed. Whether it enters into the actual process of cutting has never been determined. The fact remains that oxygen combines with itself with a negative heat of combustion.

Stripped to known facts, the process of flame cutting of steel consists of the elevation of some spot to the kindling temperature, the application of oxygen and the progressive direction of the oxidizing jet along the desired path. The requirements are:

1. A preheating flame hot enough to bring the iron to its ignition point without delay.
2. The intelligent adjustment and direction of the cutting appliances to maintain highest efficiency and results of desirable quality.
3. Oxygen of suitable quality and at the correct pressure and jet velocity.

A wide range of fuels may be found to meet the first requirement, although the use of poorer fuels usually results in a greater expense for oxygen and labor.

The personal element is by far the most important in the determination of the cost of cutting. A 12 per cent variation in cutting cost, with all other conditions constant, would be considered excellent from the standpoint of reproductibility; and a 20 per cent variation is not at all uncommon for workers under ordinary observation.

The pressure and jet velocity of the oxygen are important because they determine the amount of iron oxidized and the cleanliness and dispatch with which the molten oxides are removed. They are matters of torch design and adjustment. Authorities seem to agree fairly well regarding these points but disagree with regard to the effect of the various impurities found in the commercial oxygen. Proponents of the use of electrolytic oxygen insist that regardless of the nature of the impurities the small difference in the quality of commercial oxygen is an effective element in the cost of cutting steel and that at even purity electrolytic oxygen is superior to "liquid air" oxygen because of the combustibility of hydrogen and certain alleged villainous qualities of nitrogen. We have certain specific allegations made in a recently published article, the accuracy of which it would be distinctly improper to question without having observed the test. It is correct, however, to question the assumption that the variation in results is due to the quality of the oxygen if the method of test is incapable of detecting this fact.

It is stated that tests were made "with each oxygen adjusted at its own best pressure and working conditions." Long and bitter experience has taught that comparable results are never possible unless all conditions of cutting are reproduced with the exception of time for each individual determination. While it is reasonably safe to assume that each operator will adjust his appliance to the best possible conditions as they appear to him, there is no assurance that any of the operators are competent to judge this condition absolutely with the crude means at their disposal and any variation in results may as well be assigned to the difference in adjustment as to variation in oxygen purity. Scientific practice demands that all variations except the one to be measured be eliminated or considered in judging the final result. Results such as these recently published cannot be considered more than qualitative.

It has been stated that the impurities in "liquid air" oxygen suffer a much greater quantitative variation than those in electrolytic gas. While not able to speak for the whole oxygen industry, I believe that I am safe in saying that there is nothing inherent in any of the so-called liquefaction processes that would prevent the limit of variations to much smaller values than those referred to. It is quite possible that the author of the recent paper is referring to commercial oxygen of several years ago. The purity of all commercial oxygen has been improved greatly in the last few years, electrolytic oxygen manufacturers being forced to increase their purity because of the inherent risk in the compression of oxygen containing hydrogen. This risk is still present, and although in much lesser degree, is always a potential one until machines and men are rendered perfect. The cost of producing a reliably safe product is reflected in the greater cost of production of electrolytic oxygen, to which attention has been frequently called.

In one of the recent articles considerable stress is laid on the advantage of electrolytic oxygen over "liquid air" oxygen because of the absence of nitrogen. The total absence of any impurity other than hydrogen is accounted for by the fact that electrolytic oxygen is made from distilled water. It would be impossible to state the total amount of electrolytic oxygen made by the use of distilled water, but inasmuch as good filtered water has been found satisfactory, it is doubtful if the use of distilled water is general. The statement that electrolytic oxygen is made from distilled water is, however, in error, since it is necessary to add some substance to make the water conduct the electric current. Commercial caustic soda is usually used for this purpose, and unless the soda is fairly pure there is some danger of pollution of the products. Impurities originating from the water or electrolyte are of relatively no importance, however, except for gases dissolved in the water which are sure to appear in the oxygen.

Careful analyses of electrolytic oxygen always disclose from 0.1 per cent to 0.3 per cent of nitrogen which may come from the gases dissolved in the electrolyte or may diffuse into the cylinder which stands empty with the valve open. Regardless of the source, this small amount of nitrogen seems always to be present. On the other hand, the impurity of "liquid air" oxygen consists of nitrogen and argon—not nitrogen alone.

If oxygen impurities are to be considered in the light of cooling agents, we must consider them from the standpoint of their percentage by weight and not volume. On this basis nitrogen is approximately 50 per cent by weight of the impurity of electrolytic oxygen and 60 per cent by weight of the impurity of "liquid air" oxygen. Argon, because of its low specific heat, is much more desirable than either hydrogen or nitrogen. As a cooling agent hydrogen stands out as a notorious offender, its specific capacity for the conduction of heat being approximately six times that of any other gases in the flame.

As proof of these statements, theoretical calculations of the temperatures of the inner cones of oxy-acetylene flames have been made using electrolytic and "liquid air" oxygen at various concentrations.

Flame Temperature—Degrees Centigrade Absolute

	98%	99%	99.5%
Liquid air oxygen....	5040	5050	5060
Electrolytic oxygen	5035	5048	5060

In the calculation of the above the nitrogen impurity of electrolytic oxygen was maintained constant at 0.2 per cent (an average experimental value) in order to indicate that as hydrogen was eliminated the flame temperature of "liquid air" oxygen was approached. The percentages of the argon and nitrogen in "liquid air" oxygen were the amounts found in actual practice. The above values do not include the effect of the higher heat conductivity of hydrogen.

In practice the above differences in flame temperatures would never be detected. They are given for the purpose of showing that small as the effect may be they are unfavorable to the electrolytic oxygen.

If we argue that the heat yielded by the combustion of hydrogen is of value, we again find ourselves up against a similar condition. If we try to find the effect in the preheating flame, we learn that acetylene has at least four times the net or low heating value of an equal volume of hydrogen so that the heat added to the flame by 1 per cent of hydrogen impurity is:

.01 x .25 — .0025 — ¼ of 1%

In addition to this it has been determined that the preheating flame supplies less than 30 per cent of the total heat available in cutting, the balance coming from the combustion of the iron. The effect of the hydrogen impurity is therefore further reduced to at least:

$$.30\times.0025=.00075 \text{ or } \frac{75}{1000} \text{ of } 1\%$$

What reputable engineer will risk his good name by assigning commercial advantage in a technical process to the addition of less than 1/10 of 1 per cent of the available heat?

Let us then turn to the contention that the nitrogen expands and dilutes the oxygen. In the first place all gases have the same co-efficient of expansion with heat and it is absolutely impossible to change the oxygen percentage in a mixture by heating it. The oxygen expands at the same rate as the impurities and no change in the constituency is possible. On the other hand, expansion (or dilution) of the oxygen would take place if the gas were perfectly pure because any gas expands to larger volume when heated at constant pressure.

And what, pray tell, becomes of the much to be desired hydrogen impurity as it passes through the flame and kerf to be burned in the outer envelope? Has it not also expanded with heat; does it not also occupy space; has it not absorbed heat? In fact, is there any undesirable attribute that nitrogen has which is not also possessed by hydrogen in the same or greater degree? Only one real advantage is claimed and that is the fuel value of the hydrogen, but this quantity is ridiculously small and negligible for all purposes.

Certain peculiar properties claimed for nitrogen by a recent writer include that of being expanded by heat in such a way that cooling of the nitrogen results. A student observing experiments with liquid air for the first time and being much impressed by the evolution of vapor at such low temperatures, exclaimed: "It's so hot it's cold." So with our friend's nitrogen impurity—it is hot because it is cold and vice versa.

It seems almost impossible that claims for surface hardening on account of a nitrogen impurity in the oxygen will be accepted generally. In the first place the hardening of steel is controlled almost entirely by its carbon content and rate of cooling. If, as is claimed, oxygen containing nitrogen cuts slower than that containing hydrogen, it appears reasonable to expect that the slower operation will give the slower cooling and result in softer surfaces. In addition we must not forget that the oxygen jet aspirates large amounts of air into the kerf and that the hot surface of the metal almost invariably cools in a bath of air, so that the nitrogen in the flame from the "liquid air" oxygen is a small per cent of the total nitrogen. This same set of conditions will also be found with the use of electrolytic oxygen. The preponderance of atmospheric nitrogen renders the fractional effect of the oxygen impurity negligible.

The question of surface hardness has not been raised previously except in connection with the use of hydrogen as a fuel instead of a hydro-carbon gas. It was claimed that hydrogen used as a fuel produced a steel surface free from carbonization. At first glance the statement appeared logical, but a casual analysis showed that the steel burned in the process of separation yielded sufficient carbon to account for the maximum carbonization found. A microscopic examination of surfaces cut with acetylene and hydrogen used separately as fuels failed to discover any appreciable difference in the amount of carbonization.

The carbon content of the samples before cutting was less than 0.2 per cent and after cutting it was found that a thin layer of metal on the cut surfaces had had its carbon content increased to 0.9 per cent or greater. Carbon had been added in the case of the oxy-hydrogen cut as well as that of oxy-acetylene. In the case of the oxy-hydrogen cut, the only source of carbon was the steel and the amount of carbon added was fully as great as in the case of the oxy-acetylene cut. It would be grossly unfair to insist that acetylene is a source of carbonization when the use of a "no-carbon" fuel results in carbonization. The carbonization was a result of the avidity of molten steel for the carbon in adjacent burning steel—the origin was the same in both cases.

The cutting of steel is approximately 70 per cent efficient, or, in other words, the oxygen required to burn all the iron removed to oxide is about 70 per cent of that usually used. It is physically impossible to obtain complete mixing of iron and oxygen in the small time allowed in the kerf so that there will always be some oxygen and some iron uncombined. It is quite improbable that the conditions of theoretically perfect cutting will be approached closely and the possible increase in cutting efficiency is less than the advantages extravagantly claimed for some apparatus and materials. As competition grows keener and materials and apparatus approach perfection, differences will be smaller and more difficult to detect. The inability to disprove extravagant claims must not be confused with absolute proof that they are bona fide. Not only must experimental data be carefully studied, but must be considered in a rational, reasonable manner, free from bias and devoid of that amateurish enthusiasm which is generally present where new and interesting lines of investigation are being opened up. The fear of the spinster that she will find a man under her bed is probably her subconscious hope that she may ultimately land one in that way. One can always find technical differences because they are always present and we should always question ourselves as to their relevance and measurable effect.

Upon the shoulders of the engineering profession is a great responsibility. The great complication of our industrial life demands interpreters who not only comprehend facts but sense the value of a true and accurate translation of them into terms generally understood. This is one of the functions of the engineer—the rational interpretation of technical information in the light of fundamental scientific principles.

A marine pastoral on the east side of San Francisco Bay Photo by Helene Wright

THE TRANSFER OF THE COAST GUARD TO THE NAVY

By JOHN W. KEAN

SINCE Alexander Hamilton first drew up a sort of government family tree there has been no rearrangement of governmental activities. As a result there is a great deal of overlapping of work and in many cases an illogical grouping of government bureaus. For years it has been contended that the Patent Office should be a branch of the Department of Justice or Commerce instead of the Interior Department. A more recent case is the proper location of the Prohibition Bureau now under the Treasury. It is contended that this bureau should be under the Department of Justice. The Coast Guard controversy, however, is the patriarch of the flock.

On the recommendation of the first Secretary of the Treasury, Alexander Hamilton, the second session of the First Congress, in 1790, passed a law creating the Revenue Cutter Service. In 1796, when little Revenue Cutter was only six years old, the argument was first advanced that the congressional stork had made a mistake and delivered the infant to the wrong family. The contention was that the boy was a sailor and belonged to the Navy. Congress, however, no doubt due to the fact that the Secretary of the Treasury was responsible for the child, refused to transfer little Revenue Cutter.

In all fifteen attempts have been made since 1796 to induce Congress to admit that it made a mistake. One of these attempts originated in the House and two in the Senate Committee on Naval Affairs. Three originated in the House and one in the Senate. Twice the Secretary of the Treasury urged the transfer and four times it was urged by the Secretary of the Navy. President Taft appointed a Commission on Efficiency and Economy and the transfer of the Coast Guard from the Treasury to the Navy was one of the strongest recommendations made by this commission. When he forwarded the report of this commission to Congress President Taft made the following comments on the recommendations covering the Revenue Cutter Service:

"The report of the commission on the Revenue Cutter Service represents a detailed investigation of the history, organization, and activities of this branch of the government service and its relation to other services. The conclusion is reached that all of the duties now being performed by this service can be performed with equal efficiency by other services and that a great economy will result by having these duties so performed. The commission accordingly recommends that the service be abolished as a distinct organization; that its equipment be distributed among other services requiring the use of marine craft; and that provision be made for the performance of the work now being done by it by such other services.

"With these recommendations of the commission I am in full accord, and I recommend that the necessary legislation be enacted to put them into effect.

"At the present time the Revenue Cutter Service is organized as a naval establishment. The country is, in effect, maintaining two navies, and is using one of these navies for the performance of duties of a civil character. The maintenance of two separate naval establishments entails unnecessary expense and is not in the interest of either efficiency or economy. In so far as the duties of the Revenue Cutter Service are of a naval character, or are such as can readily be performed by the regular Naval establishment, they should be performed by such establishment; in so far as they are of a purely civil character, use should be made of services organized and conducted upon a civil basis."

These arguments in favor of the transfer were submitted at the hearings in May which were on H. R. bill 5516, introduced by the Hon. Guy E. Campbell of Pennsylvania.

Mr. Campbell also presented to the committee letters from Mr. Beekman Winthrop, Mr. R. O. Bailey and Mr. Charles D. Norton, former Assistant Secretaries of the Treasury, who had been in charge of the Coast Guard. Mr. Winthrop had also been Assistant Secretary of the Navy. Each man expressed himself as strongly in favor of the transfer as a move toward more efficiency and economy in government operation. Mr. Bailey also stated, "With the Navy Department in control of the wireless, efficiency in emergent service would be important to life and property. The mentioned objection that the Coast Guard is needed in customs administration might be answered by the fact that a commissioned officer of the government would execute the order in either case and that at present in the Treasury the customs administration is separate from the Coast Guard administration."

Several of the large shipping associations arranged for a personal representative, Mr. Winthrop L. Marvin, vice-president and general manager of the American Steamship Owners' Association, New York, to appear before the committee. Mr. Marvin not only spoke for his association but by request for the Pacific-American Steamship Association of San Francisco. He stated that his colleague, Mr. Duff, attorney for his association, would appear later and speak for the Lake Carriers' Association. These three associations cover practically our entire merchant marine of approximately 15,000,000 gross tons.

Mr. Marvin stated that American shipping was in imminent peril last winter because of the enforced reduction in the number of cutters afloat; that there had been some very lamentable losses of entire crews and vessels; and that American shipowners were viewing the coming winter with alarm because of the impairment of the resources of the Coast Guard.

Captain Harrison of the Coast Guard informed the committee that 86.5 per cent of the Coast Guard officers were in favor of the Campbell bill and gave the committee a very complete history of the efforts made to induce Congress

The United States Coast Guard Cutter Seneca, typical of the more modern vessels of the U. S. Coast Guard to transfer the Coast Guard from the Treasury to the Navy.

Indicating the attitude of the Navy toward the proposed transfer, Secretary Daniels, Assistant Secretary Roosevelt, Admiral Robert E. Coontz, chief of Naval Operations; Rear Admiral Thomas Washington, chief of the Bureau of Navigation; Rear Admiral J. C. Peoples of the Bureau of Supplies and Accounts, appeared before the committee in support of Mr. Campbell's bill. These gentlemen stated that, in their opinion, the transfer would reduce overhead charges for the government. Illustrating what was meant by overhead charges in this instance it was pointed out that the Coast Guard maintains a school at New London, Connecticut, to train officers. If the Coast Guard and the Navy were combined the New London school could be abolished and all officers trained at Annapolis. There was a similar duplication in connection with the recruiting and training of men, the repair of ships and the purchase of supplies.

Captain J. C. Cantwell, retired, of the Coast Guard also appeared before the committee. Following is an interesting portion of the hearings covering captain Cantwell's opinions on the bill:

"I want to tell the committee that those duties (collection of the customs revenue) can and perhaps will be performed by the Navy equally as efficiently as we have performed them. The Revenue Cutter Service has gradually drawn away from duties in connection with the collection of the customs revenue by reason of changed conditions in the whole world of commerce. A hundred years ago it was probably necessary to guard our coast. Today it is absolutely not necessary. If it is necessary how is it that after four months of active winter cruising of our larger cutters on the coast that they are practically laid up for eight months of the year with orders to remain in port unless called out to render aid? What becomes of the customs revenue collections during the eight months of practical inactivity? There is no necessity for it. There is practically no smuggling in bulk into the United States at this time except, perhaps, through false appraisals and incorrect invoices, with regard to which we can not have any possible cognizance in the performance of our duty.

Mr. Montague: You have nothing to do with that?

Capt. Cantwell: We have nothing at all to do with that. There is a special department of the government called the customs inspection service, and the appraisers who attend to all that business. We would not have a chance to exist as a service if we stopped a vessel on the high seas and searched her as we did 100 years ago. It would be considered by the public as an unwarranted interference with commerce.

Mr. Campbell, as a concluding argument in favor of his bill, submitted to the committee a letter written by Dr. W. F. Willoughby. Dr. Willoughby referred to the fact that he was a member of President Taft's Commission on Efficiency and Economy and that he had direct charge of the preparation of the report covering the U. S. Coast Guard recommendations. In his letter to Mr. Campbell Dr. Willoughby summed up his conclusions as follows:

"The President's commission was 'emphatic that all of the duties performed by the revenue cutter branch of the Coast Guard could be performed by the Navy Department as a part of its current work.' "

Opposition Arguments

The opposition to the transfer of the Coast Guard from the Treasury to the Navy is embodied in communications addressed to the Committee on Interstate and Foreign Commerce by former Secretary of the Treasury Glass and by Secretary Houston.

In a letter addressed to the committee January 7, 1919, Secretary Glass stated:

"The subject (transfer of the Coast Guard to the Navy) is by no means a new one—indeed, it is almost as old as the Treasury Department itself. The general proposition of transfer, embodied in this bill, was first suggested in 1796, and again in 1840, and since then it has been presented to Congress in one form or another many times. The reasons and arguments advanced in support of these measures do not appear to have been convincing and Congress has uniformly declined to act."

Secretary Glass next quoted the following memorandum prepared by the chief of the Division of Customs in 1914 dealing with this question:

"In my opinion the transfer of the Revenue Cutter Service (now the Coast Guard) from the Treasury Department to another department would be a serious error for the following reasons:

(a) Inasmuch as more than 90 per cent of all commerce is by sea, the maintenance of boats to assist the Customs Service in the prevention of smuggling and the violation of the laws relating to the navigation of vessels is absolutely essential.

(b) The Revenue Cutter Service was intended to be, and is, the boat service of the customs.

(c) The fact that the revenue cutters are useful in rendering assistance to vessels in distress and make suitable auxiliary naval vessels in time of war, does not detract from the fact that they are in fact, as well as in law, closely associated with the collection of the customs and the incidental control of vessels imposed by law upon the customs officers.

(d) The Revenue Cutter Service operates and maintains the boats used for boarding vessels by customs officers at most of the ports having a boarding boat. It furnishes boats for the enforcement of the anchorage laws. It also furnishes boats for the use of customs officers in the enforcement of the motor boat laws. It is called upon whenever information is received of an attempted violation of our revenue laws and a boat is necessary for the prevention of such violation. This is of frequent occurrence.

(e) Section 2747 of the Revised Statutes provides for the organization of the Revenue Cutter Service "for better securing the collection of import or tonnage duties."

Section 2760 provides that officers of the Revenue Cutters shall be deemed officers of the Customs.

Section 2762 provides that the officers of Revenue cutters shall perform such other duties for the collection and security of the revenue as shall be directed by the Secretary of the Treasury.

(f) In my opinion, if the Revenue Cutter Service were placed under another department, it would no longer be the Revenue Cutter Service.

(g) If the Customs Service were deprived of the assistance of the Revenue Cutter Service it would mean that a great many Revenue Cutters that are now operated by enlisted men would have to be duplicated in the Customs Service and operated by civil employes on a per diem or per annum basis at a greatly increased cost—probably $1,000,000 per annum.

Attention is invited to the close connection between the Revenue Cutter Service and the Life Saving Service, which is also under the Treasury Department, the officers of which latter service are also ex-officio inspectors of the Customs. These three services, Customs, Revenue Cutter Service and Life Saving Service, are of mutual assistance to one another. They come into close contact in many of their operations, and while I am personally of the opinion that the Revenue Cutter Service and the Life Saving Service might be more closely co-ordinated, I state as a fact that the separation of the Revenue Cutter Service from the same department as controls the Customs Service would be a severe blow to the latter service."

The Revenue Cutter Service and the Life Saving Service were combined in 1915, the combined service being legally designated the Coast Guard. The bill under consideration—not the Campbell bill, but a similar measure—provided that the administration of the navigation laws was not to be the duty of the Navy and that, "In consequence the Department of Commerce would be obliged to find not only the personnel, but the vessels to continue the work." A statement submitted with the Secretary's letter demonstrated that the cost of operating five vessels of the same type and size during the fiscal years 1909, 1910 and 1911 was 53.17 per cent greater in the Navy than in the Coast Guard.

In the next paragraph of his letter Secretary Glass gave what he believed to be one of the ends sought by the proposed transfer in the following language:

"In the foregoing particulars at least it is patent that the transfer proposed in Section 1 of the bill does not commend itself on the score of either economy or efficiency, and the question at once presents itself, "What is the end sought by the proposed transfer?" I think the answer may be found in Section 2 of the bill. Upon the declaration of war it was necessary to greatly expand the Navy and in consequence promotion in the commissioned personnel became very rapid. New officers were obtained from every available source, but the demand for experienced officers was very great. The Coast Guard contributed to this demand to the limit of its personnel because under the law the Coast Guard operates as a part of the Navy in time of war. The commissioned personnel of the Coast Guard was not increased and promotions remained as slow as in time of peace, and, although the Coast Guard brought to the Navy a corps of experienced officers, many of these officers held rank far below that of naval officers of much less experience. As a result the Navy Department found itself unable to utilize many of the Coast Guard officers in positions of responsibility commensurate with their experience, because of their lack of rank. This anomalous situation was remedied by legislation which provides for the temporary promotion of Coast Guard officers below the rank of captain with running mates in the Navy on the basis of the length of total service. Under the law these temporary promotions will expire within six months after the termination of the war and naturally, I presume, these officers do not contemplate with complacency the prospective return to former rank. Hence, in Section 2 of the bill we find the provision which will have the effect of making most of these temporary promotions permanent."

In connection with the telegrams sent by the West Coast business men to the President requesting that he transfer the Coast Guard to the Navy, the following section of the law of January 28, 1915, which combined the Revenue Cutter Service and the Life Saving Service and formed the Coast Guard, is of interest:

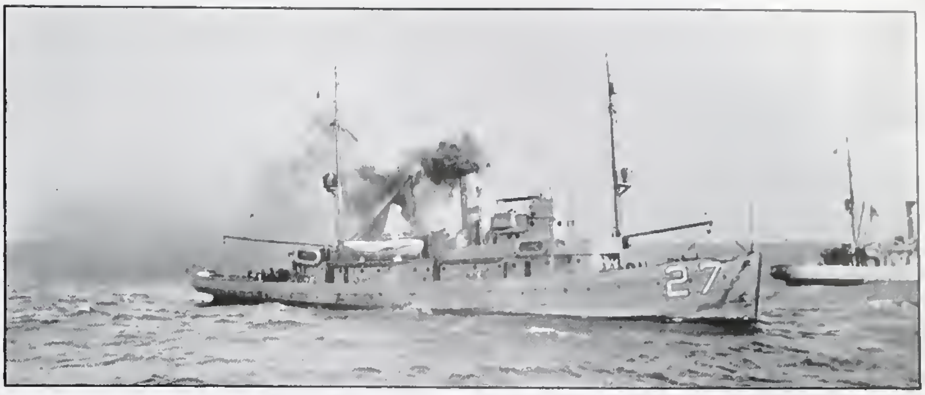
" . . . Shall operate under the Treasury Department in time of peace and operate as a part of the Navy, subject to the orders of the Secretary of the Navy, in time of war, or when the President shall so dictate."

There has been some discussion of the legality of a transfer to the Navy in time of peace by the President's order. While the first part of the sentence quoted says that the Coast Guard "Shall operate under the Treasury Department in time of peace," yet the concluding part states that it is to operate under the Navy in time of war, "or when the President shall so dictate."

Secretary Glass concluded his argument against the proposed transfer in the following language:

"In time of peace the Coast Guard pays its way and saves to the public many times the cost of its maintenance. In this war, as well as in all other maritime wars, the service has reason to be proud of its record. The Coast Guard, I firmly believe, deserves well of our people and our government, and whatever promotion may be proper and expedient for its personnel should be provided within the service itself.

"Whatever may have been the consideration in the past leading to the various proposals to transfer this service to the Navy, Congress has uniformly declined to act during the period of 125 years, and I cannot find any reason for entertaining the proposition anew. On the contrary, for the reasons hereinbefore presented, I am strongly impressed with the necessity of permitting the service to remain under the Treasury Department, with whose interests and activities it is so intimately associated and concerned. I therefore feel constrained to recommend against the passage of the bill."

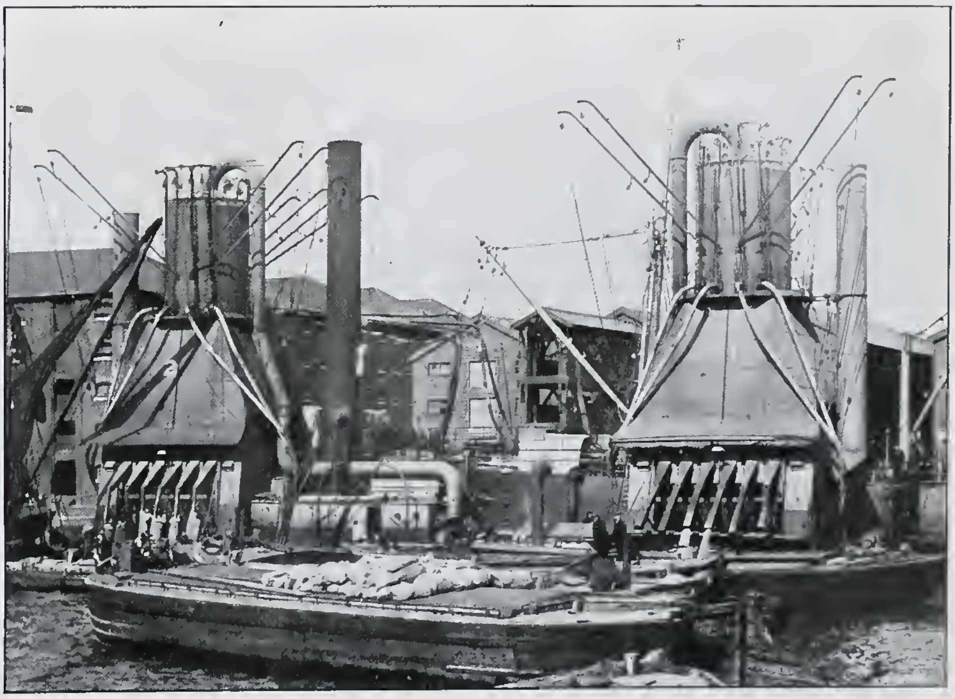

United States Navy mine sweeper Pelican. This is the type of vessel which the Navy proposes to use in Coast Guard service if that department is turned over to its keeping

In the final paragraph of his letter Secretary Glass called attention to the fact that the war on the water had practically ceased and he requested the return of the Coast Guard to the Treasury without waiting for the formal declaration of peace. This request of the Secretary was later complied with and the Coast Guard returned to the Treasury by executive order.

On January 8, 1920, Secretary Glass again addressed a letter to the Committee on Interstate and Foreign Commerce, this time in reference to H. R. bill No. 11230. The previous letter was in reference to H. R. bill No. 13392. The Campbell bill is a still later bill and is No. H. R. 5516. These later bills appear to have been framed so as to remove many of the objections urged by Secretary Glass in his letter of January 7, 1919. After referring to some of the provisions of bill H. R. No. 11230 Secretary Glass concluded his letter of January 8, 1920, as follows:

"I believe that the proposed legislation under consideration is more destructive and less meritorious than its predecessors, and I, therefore, earnestly recommend that it be not passed."

The hearings on the Campbell bill were held May 27 and 28. During the summer, with the exception of the newspaper reports of the telegrams from the West Coast business organizations, there was very little public discussion of the question. That the controversy is still very much alive, however, is indicated by the space given to arguments for and against the transfer in the annual reports of the Secretary of the Navy and the Secretary of the Treasury. In our next month's issue we shall summarize these reports which show very interesting points of view and arguments pro and con on this subject.


Pneumatic grain handling apparatus in an European port

EUROPEAN MARINE DEVELOPMENTS

Exclusive Correspondence of Pacific Marine Review

ALL our shipping concerns continue day by day without exception to report to their annual meetings of shareholders tremendous profits secured on last year's trading, but they all speak gloomily of the future. Fortunately, enormous reseves have been put away out of past profits. Very often 75 per cent of the net profits, after allowing for everything, have been allocated to various reserves, while at the same time shareholders have had dividends of from 10 to 15 per cent. That these reserves will be abundantly needed seems very certain. Freights are in a most distressful state, we are notified of lower rates week by week. It is declared here that United States steamers have been prominent in accepting these lower rates but British shipowners with cargoes scarce have certainly been just as active.

The Oil Fuel Question

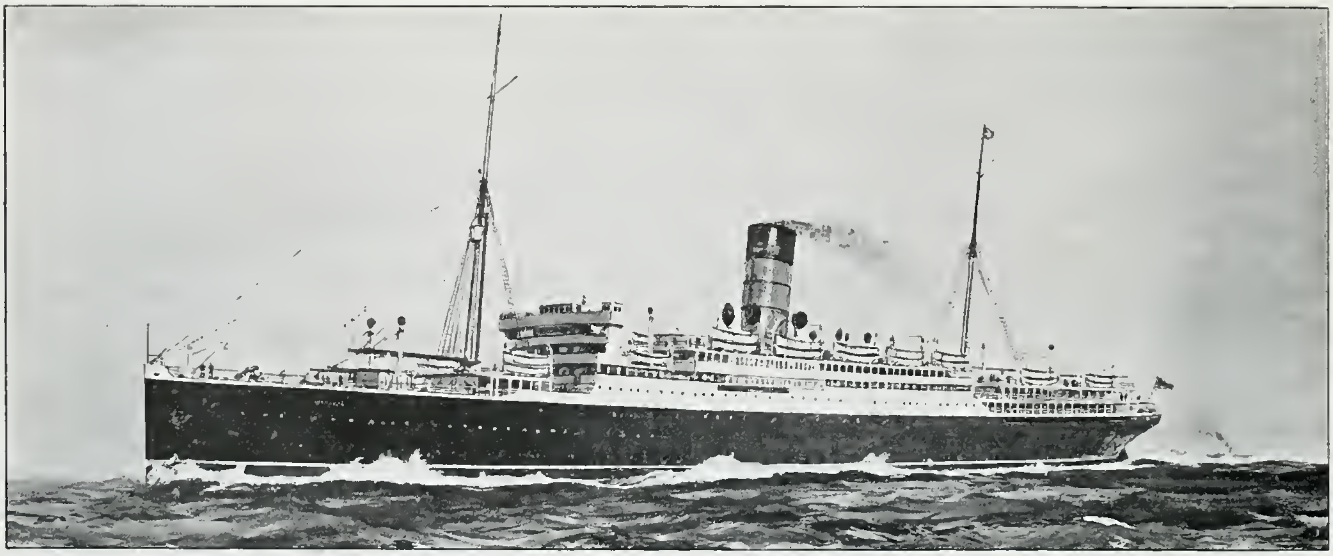
People with little knowledge of the matter were talking not so long ago of oil fuel becoming paramount in shipping for all and any vessel. Now there has descended upon them a flood of censure, criticism and controversial argument. This, perhaps, is best condensed for these columns in what Lord Pirrie, of Harland & Wolff, said when he came from America recently in the Olympic. In America he had intimate conversations with prominent business men; in Mexico, the great oil producing country, he had every facility for getting first-hand information of the somewhat critical position in which the comparatively new industry, so far as ocean-going ships are concerned, finds itself. He said:

"I have held strong views for the last ten or fifteen years that although oil was destined to take an important place as fuel for ships, it is a wrong principle to burn oil merely for the purpose of raising steam. At the same time the Diesel engine will require great care in manufacture, and its introduction must develop slowly. Personally, I feel concerned, after having recommended so many of my ship-owning friends to convert from coal to oil fuel consumption, which undoubtedly is a most extravagant way of using such a valuable commodity, and I feel that only such vessels as the White Star, Cunard, Royal Mail, Union Castle and other companies' express passenger liners will be secure for future oil supplies, and I am therefore advising friends to go slowly in converting ordinary cargo vessels. Any shipowner or shipbuilder proceeding without careful consideration may find himself in difficulties.

"Until Mexico gets into a more settled state and its government decides to protect foreign capital invested in the country," continued Lord Pirrie, there is a risk in going in for too large a program of vessels built for oil fuel consumption, more particularly as at the present time we are relying to a very large extent on the production of the Mexican oil fields. Every step should be taken to prevent wasteful use, and the consequent exhaustion of supplies. This can best be done by the adoption of the internal combustion engine, provided supplies of Diesel oil are obtainable on the routes in which such vessels will trade; but today it would be a great responsibility for any shipbuilder to advocate the installation of Diesel engines until supplies of Diesel oil are assured."

Shipbuilding Contracts and Shipowners

The passing of war conditions is becoming increasingly apparent in the shipbuilding industry despite the large amount of tonnage which is building at the present time. The war placed the shipowner very much at the mercy of the builder, and the custom ultimately became general that contracts of new vessels should be on the "time and lime" system. From the shipowner's standpoint, the disadvantages attaching to the system are fairly obvious, but they have been rendered the more conspicuous by the growing tendency for the final cost of ships contracted for on this system to show a large increase on the original estimates. Serious enough for cargo owners, this shouldering of the risks of rising shipbuilding costs has placed liner owners in a very difficult position, for the necessity of having vessels turned out with perfect finish and in every way equal to the usually high standard demanded for liners was one from which the latter could not escape. Signs are not wanting, however, that the relative positions of owner and builder are now undergoing considerable change. As a writer in the Times says, in place of the former wishing to assure himself that the next vacant berth in a yard would be placed at his disposal, the shipbuilder is now inclined to seek orders and is in some instances displaying a readiness to accept contracts at fixed prices. This in itself is a favorable development for owners, and if it may be taken as denoting that the cost of new ships has probably reached its zenith it will be extremely welcome, for the general rise in the expenses of shipowners during the last twelve or eighteen months has been extraordinarily rapid. It has indeed reached a point where in the case of large liners, vessels have to be booked up to the last berth if they are to show a



New passenger liner Samaria recently launched at the Bitkenhead yard of Cammell Laird and Company for the Cunard Steamship Company.

profit on running, and with the great arrears of travel occasioned by the war cleared off the ability to ensure full passenger loads on every voyage has become appreciably lessened.

Regulation of Seamen's Hours

British shipowners appear to be pretty generally against the international proposal to reduce seamen's hours to eight per day, and every shipping chairman in addressing his shareholders raises this question in a very firm and antagonistic direction. The British government supports the shipowners in this matter. It will be known that since the Genoa International Labor Conference last June and July steady progress has been made with the settlement of questions affecting the world's mercantile marine. It will be remembered that the Genoa conference decided to set up, in co-operation with the International Labor Office, a joint commission of shipowners and seamen from all the principal maritime countries, and the first meeting of the commission was held lately at Geneva—M. Arthur Fontaine (France) presiding. Perhaps the principal matter out of the many before the commission came up on the third day's session, and it concerned the regulation of the hours of work on board ship. On this difficult question no definite agreement was reached, but it was announced that, following private discussions which had been held between the shipowners and the seamen, another conference of the two parties had been arranged in principle. It remained, therefore, for the commission to fix the place and the date of the proposed conference. It was suggested that the International Shipping Federation, consisting as it did of the representatives of six countries, should endeavor to secure the attendance of shipowners and seamen from other nations so that any agreement reached might have a wider application. Hence the date of the conference was postponed till the third week in January, 1921. The meeting will probably be held at Brussels, and by general agreement of masters and men M. Albert Thomas, the director of the International Labor Office, is to preside.

A New Cunarder

In 1868 an iron brig-rigged vessel, called the Samaria, was built on the Clyde for the Cunard Company. Now there has been launched by the same company a second Samaria, eight and a half times as big in tonnage and ten times as great in horsepower. After the launch W. L. H. Hitchens, chairman of Cammell, Laird, the builders, remarked that the vessel just launched represented four times the Cunard fleet's total tonnage in 1840. Whether bigger merchant ships would again be bult, he added, he could not say, but the necessities of the world might require that we should have to have smaller and more economical ships. Sir William Forwood charged against labor's ca' canny methods a six months' delay in the launching of the Samaria and an additional cost of $1,000,000. The reason for that, he declared, was that the men had taken pay for a day of eight hours and had only worked five and a half or six. The Samaria will have accommodation for 2600 passengers, with features which are said hitherto not to have been introduced into a vessel of her size—garden lounges for saloon passengers and a verandah cafe for second-class passengers. The total length of the vessel is 623 feet, her gross tonnage 21,000, and her speed 16 knots. The Samaria, by the way, is the largest liner to be designed and built on the Mersey for the burning of oil fuel.

Royal Mail to Germany

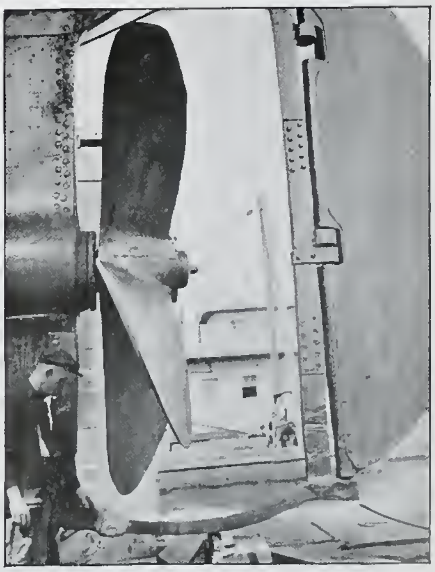
As a result of a decision reached by the directors of the Royal Mail Steam Packet Company, a direct service by that undertaking will be established early in the new year between New York and Hamburg. The company and its associated enterprises intimated some time ago that they had under serious consideration which of the trades formerly carried on by the German lines it was their duty, in the interests alike of national and international welfare, to develop. It was then stated that the announcement of future policy would be postponed in view of the fact that no fewer than 130 of the company's vessels were sunk by the enemy during the war, while many of the remaining vessels were being reconditioned, and therefore not at the time available. The acquisition of additional tonnage and the completion of reconditioning now enable them to establish the New York-Hamburg services mentioned, with calls at Southampton and Cherbourg. Among the vessels allocated to this service are three modern passenger steamers of the "O" class—the Orduna, Orbita and Oropesa. A fourth vessel of this class, the Orca, will later be added on completion of her passenger accommodation by Harland & Wolff.

Dutch Shipping

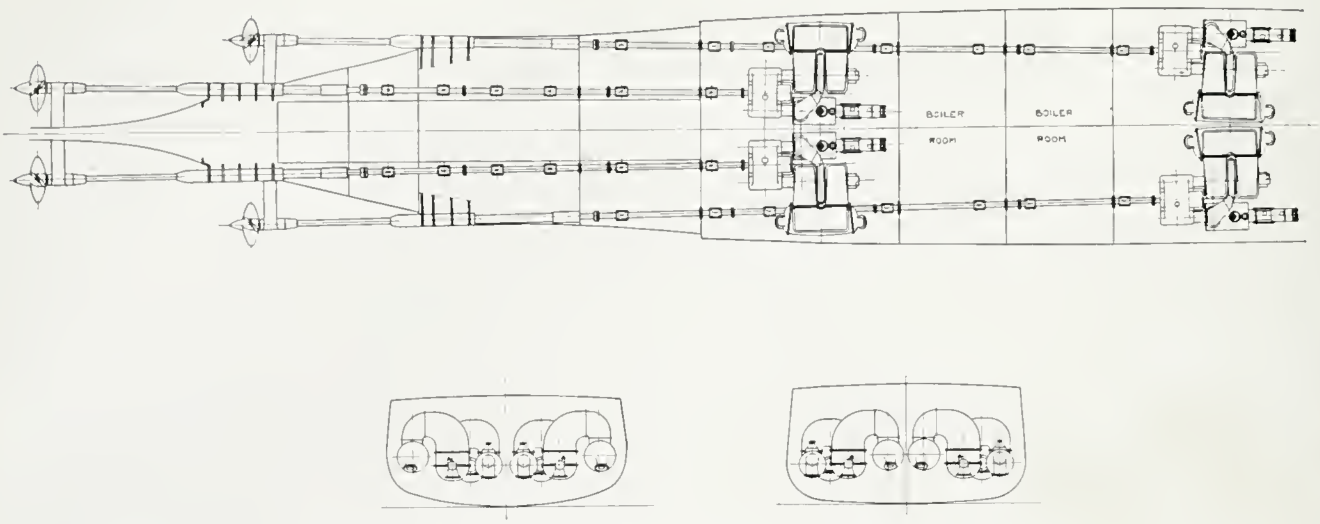
News from Amsterdam comes to the effect that since the armistice Dutch shipping has developed considerable importance. As soon as the seas were open again and the danger of submarines had disappeared, the Dutch shipping companies began to take their place in the commercial work of the world. Freights were high and products of different kinds were wanted. The various steamship companies which had been founded during the later part of the war mostly disappeared, being amalgamated with existing concerns of greater importance, with the idea of opening new lines to different parts of the world. This unity has been of the greatest importance, because it has now become possible for Dutch shipping concerns to do business all over the world, and at the same time to maintain their regular services. As soon as possible the companies began to increase the number of their ships, giving orders for new vessels anywhere where the work could be accomplished in the shortest possible time.

The Dutch - Lloyd Company, which within a few years had become one of the leading shipping companies, obtained two of her finest 20,000-ton steamers, the Limburgia and Brabantia, from Germany, where they had been bought ready for immediate traffic; the two big companies, Netherland and Rotterdam-Lloyd, got their new steamers Caen, Johan de Witt and Patria, besides some new cargo steamers; the Zeeland Company, which had lost two of its finest passenger steamers during the war, within a few months after peace had been concluded secured a new Princess Juliana, and many more new ships can be seen in the shipyards of Amsterdam, Rotterdam and Flushing. As a result of this great development it has been found necessary to replace not only the Amsterdam shipbuilding yard, but also to build better docking accommodation for ships of much bigger tonnage.

A few weeks ago a new company was formed to increase the dock accommodation on a large scale. It is expected that when completed these new docks will be able to compete with the largest in England, Bremen and elsewhere, and to receive the biggest liners. Up-to-date workshops will be opened in the vicinity of these docks for repairing and overhauling.


Thermit weld made on stern shoe of tugboat Westmoreland

THE NEW SCOUT CRUISERS



Diagrammatic plan and elevations showing arrangement of turbines in the scout cruiser Omaha, now building at the Tacoma yard of the Todd Dry Dock and Construction Corporation

IN Pacific Marine Review for January appeared an article describing the launching of the scout cruiser Omaha at the Tacoma yard of the Todd Dry Dock & Construction Corporation. We are glad here to present some further details of the power plant which is being built and supplied by the Westinghouse Manufacturing Company. These details should be of great interest, as these marine power plants have a higher power than has ever been installed in so small a space, and they are by far the most powerful marine turbines installed on the Pacific Coast.

Each ship has four 22,500-horsepower cross-compound Westinghouse turbines, and each turbine is geared to a propeller. The turbines for the two center propellers are placed together in an engine room located well aft, and the turbines for the wing propellers are placed in a second engine room farther forward, with the boiler rooms between the two engine rooms.

Each turbine consists of a high pressure and a low pressure element which drive the propeller through a common gear. The high-pressure element consists of two rows of impulse blading followed by reaction blading. A special belt of this reaction blading is used only when running at low speeds and is by-passed for operation at higher speeds. The low-pressure element, which normally receives steam from the high-pressure element and discharges it into the condenser, has reaction blading only. Both elements are rated at 11,250 horse power each, and either can be used independently in case the other is out of service for any reason.

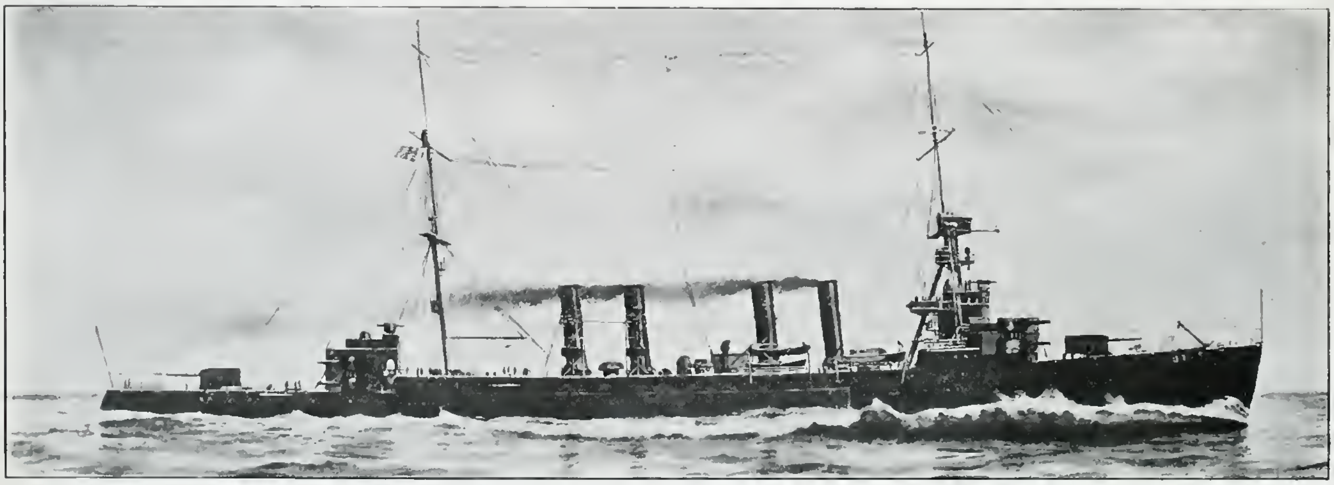
An astern turbine, consisting of two rows of impulse blading, is incorporated in each low-pressure element. When supplied with the same amount of steam as for full ahead operation, the astern turbines can develop 30 per cent of the full ahead power and can drive the ship at about twenty knots.

Main Gears

The reduction gears are of the Westinghouse floating-frame type. Each has two pinions, one for the high-pressure and one for the low-pressure rotors, and a single gear wheel connected to the propeller shaft. The speed reduction ratio is about 7 to 1 and is effected in a single step.

The Cruising Turbines

The main turbines can propel the ship at speeds ranging from twelve to thirty-five knots, but as only a relatively small amount of power is needed for low speeds, small auxiliary turbines are used for cruising purposes. There are four of these cruising turbines per ship and each consists of a single-row impulse wheel and can develop 420 S. H. P. at 6000 R. P. M. Each cruising turbine is mounted on an extension of the case of a main high-pressure element and can be coupled to the high-pressure rotor through a gear giving a speed reduction of about 6 to 1. The mechanical line-up is, therefore: cruising turbine; cruising gear; coupling; main high-pressure rotor; main low-pressure rotor; main gear; propeller shaft. The steam first passes through the impulse blades of the cruising turbine, then through the reaction blades of the cruising belt of the main high-pressure element, then through the re-



Artist's sketch showing scout cruiser Omaha as she will appear when completed maining reaction blading of both elements, and finally into the condenser. With this arrangement a maximum power of 1000 horsepower can be obtained from each of the four turbines. The cruising speeds range from twelve to fifteen knots with excellent steam economy over the entire range.

The coupling that connects the cruising turbine with the rotor of the main turbine is operated by means of a hand lever. To connect a cruising turbine when the main turbine is in operation, the former is brought up to speed and the latter slowed down, until a synchronizing device indicates that the two are operating at the same speed, when the connection can be made with safety.

Special care is taken to prevent the cruising turbines from over-speeding either when operating under their own power or when accidentally left connected to the main turbines and driven by them. A fly-ball governor controls the throttle to each cruising turbine and also, through a relay, the governor valve of the main turbine. If the cruising turbine operates at 10 per cent over speed, this governor cuts off the steam to both turbines. If this governor should fail to operate at 12 per cent over speed, an emergency stop cuts off the steam to the cruising turbine, and disconnects the coupling.

Auxiliaries

Westinghouse air ejectors and air separators are used to maintain vacua of over twenty-nine inches specified for these turbines. The condensate is handled by four Westinghouse turbine-driven centrifugal pumps, each with a maximum capacity of 500,000 pounds of condensate per hour at a head of sixty-five feet.

FORTY FREIGHTERS FINISHED

WITH the launching on December 23 of the steamship Arden, the Emergency Fleet Corporation of the United States Shipping Board saw the last of its steel cargo vessels built at the Merchant Shipbuilding Corporation's yard at Harriman, Pennsylvania, leave the ways.

The final work in the wet dock on the Arden will be finished, it is expected, within six weeks of the date of launching, marking the successful completion of the building program of the Emergency Fleet Corporation at this agency yard. In all forty cargo vessels have been built here for the government since February 19, 1918, when the first keel was laid.

These forty vessels are of a special type designed by the Merchant Corporation, which has a yard at Chester, Pennsylvania, and of which Mr. W. A. Harriman is chairman of the board. The following data is descriptive of the type of the Arden: deadweight, 8800 tons; length over-all, 417 feet 8½ inches; between perpendiculars, 401 feet; beam molded, 54 feet; depth molded, 32 feet 10 inches. The vessels are fitted with cross compound geared turbines and B. & W. watertube boilers, and constructed to burn either oil or coal with a designed speed of 11 knots. The fuel oil capacity is 1919 tons with an estimated steaming radius of 12,460 miles oil fuel, and 3955 miles coal. The Arden has five cargo holds with a total actual carrying capacity of about 7400 tons. The first twenty of the vessels of this type were built to carry general cargo, but from No. 21 on to 40 the holds have been designed for combination general cargo and oil tanks.

Satisfactory reports have been received by the special representative of the Emergency Fleet Corporation at the Harriman yard from vessels of this type now being operated. These reports express the satisfaction of the operators in regard to seaworthiness, speed and economy of the ships.

United States Shipping Board freighter Arden, last of forty built by the Merchant Shipbuilding Corporation at Harriman, Pennsylvania

The forty vessels built at the Merchant Corporation's yard at Harriman for the Emergency Fleet Corporation are the following: Cabegon, Wathena, Watonwan, Waubesa, Wauconda, Waukau, Waxahachie, Mercer Victory, Winyah, Nashaminy, Intan, Wynooche, Costigan, Kittegana, Epitroic Vesson, Auditor, Benzalem, Lycoming, Kayseeka, Bavington, Mitchell, City of Alma, Delanson, Davenport, Evergreen City, Waterbury, Arizpa, Salean, Algie, Gateway City, Yaka, Bunnie Breek, Yapalaga, Yalza, Emergency Aid, Waccata, Nacata, Naamcom, Ala, Arden.

Electrical Deck Machinery in the Navy

THE United States Navy for a number of years has adopted the policy in all of its ships of electrical power for all auxiliaries. In this connection the following information recently received from the S. Flory Manufacturing Company of Bangor, Pennsylvania, is of interest.

They have recently completed a contract for forty-five electrically driven all-steel deck winches for battleships. These winches are of both simple and compound geared types and range in capacity from 3000 to 20,000 pounds rope pull on a single whip. In addition to these they have constructed four compound geared electrically driven similar winches for the Brazilian battleship Sao Paulo and four for the new battleship California now being finished at Mare Island. Their contracts on hand include four electrically driven heavy duty deck capstans for the battleships South Dakota, Indiana and North Carolina now under construction at the New York and Norfolk Navy yards, and for the battleship Montana now building at the Mare Island Navy yard. They are bulding also an electrically driven anchor windlass weighing about 250,000 pounds which will be installed on the new battleship Massachusetts to handle three and one-half inch stud link chain.

The foregoing described winches, windlasses and capstans are only a small part of the naval program, and they are cited to show that shipowners of the merchant marine need have no fear about the possibility of acquiring proper electrical equipment for their deck machinery and no nervousness about the reliability of that machinery after it is properly installed aboard ship.

OPERATING COSTS

An Interesting Comparison Between United States Shipping Board and Canadian Government Marine Practice

By T. ALFRED PORTER

THE last of the freighters ordered by the Shipping Board, to-wit, the Hanley, is completed at the Union Iron Works and, excepting for the final touches of paint, is ready to proceed to sea; but instead of that she is to join her sisters up at Benicia to await a more favorable time when the cost of running can be met by the freight returns.

The Hanley and her sisters, the Pomona and Hannawa, are freighters par excellence, cargo vessels with passenger liners' engine rooms, ships that should prove their quality on any trade route, with a speed not equalled, let alone excelled, by any other nationality, and yet there is a fly in the ointment which prevents their successful operation.

In the first place, the wage question is a stumbling block, and there is no reason that can be brought forward which will allow the American mariner, whether he be captain or Jimmy Ducks, chief engineer or wiper, a matter of 75 per cent increase in wages over and above any other nationality sailing salt water.

The Canadian government are still building ships of 8800 tons and operating them from Vancouver with full cargoes. Curiously enough, a large percentage of goods made in the U. S. A. is being sent to Australia via Vancouver. Cases by the dozen of Caillers chocolate, each tablet marked "Made in the U. S. A.," were carried to Sydney and Melbourne by the Canadian Prospector, and thousands of feet of hardwood were brought back to Vancouver to be reshipped to Seattle.

The wages of the American vessels are too well known to need repetition here, and the staffing of the vessels is similarly known; but I do not think that many shipping men are aware of the facts concerning the personnel and wages of the crew now being carried in the largest type of vessel run by the Canadian government merchant marine, namely, the Canadian Exporter, Canadian Importer, Canadian Inventor, and Canadian Prospector. They are of the following dimensions: between perpendiculars 400 feet, beam 52 feet, depth 31 feet, with propelling power as follows: three boilers 15 feet 6 inches diameter by 11 feet 6 inches length, having three furnaces 46 inches inside diameter and 7743 square feet heating surface; engines triple, 27 inches, 44 inches, 73 inches by 4 feet stroke, with propeller of 17 feet 6 inches diameter and 18 feet pitch, 95 square feet expanded area. The trial trip of the Canadian Prospector was run June 11, 1920, when a mean speed of 12.63 knots was made over six runs on the mile.

These ships carry the following personnel: captain, $250 (Canadian dollars); chief officer, $150; second officer, $130; third officer, $110; boatswain, $85; carpenter, $90; crew, $75; chief engineer, $225; second engineer, $170; third engineer, $140; fourth engineer, $125; donkeyman, $80; two oilers, $77.50 each; six firemen, $75 each; four trimmers, $75 each. Coal consumption on her maiden trip was 35½ tons a day with an average of 45 buckets of ash a watch, no patent ejector or anything of that nature, but each bucket to be heaved to the deck, dragged to the rail and dumped; no overtime paid at sea for this service, only overtime in port, to be paid for at 30 cents an hour week day and 50 cents on Sunday, donkeyman included. The average speed from Victoria, B. C., to Sydney was 9.56 knots for the 6300 miles. The steward's department pays $120 to chief stewart, $60 to second steward, $50 to messroom boy, $20 to pantry boy, $100 to chief cook, and $60 to second cook. The steward has printed instructions from headquarters signed by the general manager, A. Teakle, Esq., 230 St. James Street, Montreal, to the effect that the following bill of fare and nothing more is to be observed, and that the victualling costs are not to exceed 28 cents per meal: Breakfast—one cereal, one hot dish, tea or coffee, bread and butter, marmalade. Dinner—soup, one hot dish, one vegetable, one sweet, bread, cheese, coffee. Supper—one hot dish, one cold dish, stewed fruit or canned, tea, bread and butter (cake occasional). All hands have the same, no distinction being made between the saloon and forecastle.

The Canadian government has more cargo waiting in Vancouver than the ships can handle, and they have more men awaiting berths than they know what to do with. On the arrival of the Canadian Prospector, three officers and four engineers left over a difference with the steward, but within twelve hours a brand new crew had arrived, were signed on, and had the vessel going toward Esquimalt drydock.

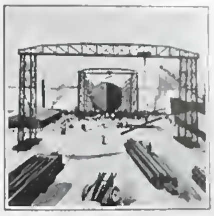
I do not advocate the United States Shipping Board's using such a cuisine because in Australia these Canadian ships are earning a fearful reputation for niggardliness, the customary pot of tea to the shipping clerks being denied them, but a cut in wages could easily be made all around without damaging the prestige of the American mariner now sailing the seven seas. If the vessels now lying at Benicia were employed even taking lumber to Australia (and there is a big demand there for building timber and cement) with their crews on a reduced wage from present scales, it would at least help to keep the American flag showing in ports more often than at present, and in addition would help along the repair shops now standing idle on account of the lack of moving ships.

American seagoers have to face the problem of competition with British tramps, and unless some radical cut is made, the proposed American merchant marine will die as it died in years past, leaving only a remnant of ships to carry the flag. Compare the wages paid by the Standard Oil Company to their British engineers out of San Francisco with those paid to the engineers on American ships. The Tahchee, Tamaha and Tascalusa (British) are almost identical with the Richmond and J. A. Moffett, or very slightly smaller in engine power than the Arrows, yet the chief on the British ships receives in American dollars exactly one-half the wages of his American brother, and the others are the same. Three hundred and twenty-five dollars are paid on the American ship, £31-10/- a month on the British, and the Standard Oil Company allow $4.50 to the pound.

Canada will not recognize any form of sea-farers' union or association, although they conform in a measure to the rules adopted by the Merchant Service Guild of Canada and the Marine Engineers' Association of Vancouver, but I may say that these two guilds make their demands of such a strength that they come within the possibilities held out by the employer. Engineers receive 60 cents per hour overtime, officers none at all, and the two associations demand no more because they know that to do so is a waste of time. In spite of immigration laws and unemployment rampant in Canada, the Canadian government merchant marine is bringing over from England a number of officers and engineers to Montreal and as soon as a man already on the ships expresses dissatisfaction, his place is promptly filled and the ship still keeps going.

Perhaps some day in the near future the Shipping Board may be able to dictate its own terms and keep the flag on the sea rather than as at present being dictated to and having its ships bottled up, losing freights, losing prestige, and, worst of all, having its crews walking around filling the ranks of the already crowded army of unemployed.

Material Handling



PORT DEVELOPMENT AT PORTLAND

THE completion of Pier No. 5 of the Portland Municipal Terminal No. 4 will have occurred by the time this article is off the press, or shortly thereafter. Terminal No. 4 is Portland's latest and largest port development, and will consist of five piers, as shown in the illustration. A description of Pier No. 1, of this terminal will serve to illustrate the other piers, which will be identical with the exception of Pier No. 5.

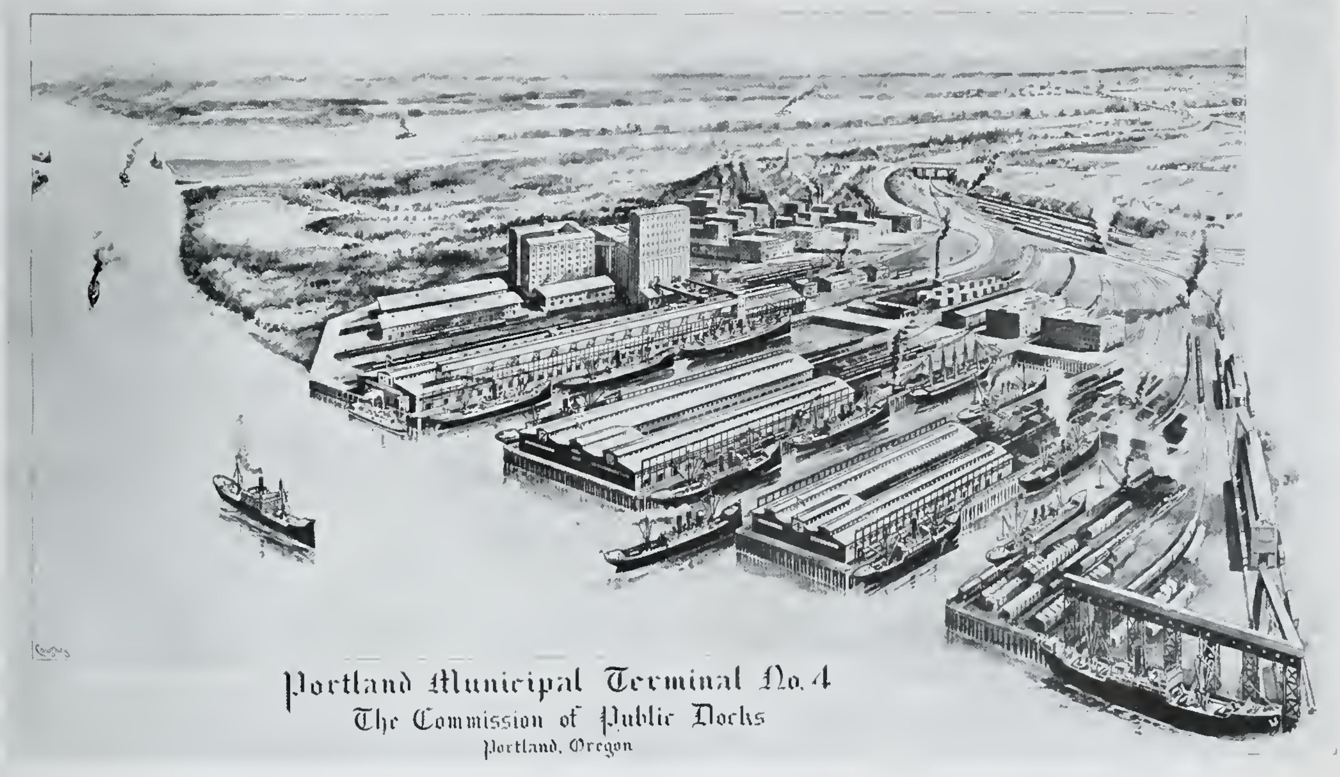
Pier No. 1 is 1500 feet in length, 600 feet of which is a two-level structure, covered with a transit shed, 500 feet in length and 180 feet in width, divided by concrete fire walls into four sections, and fully protected by automatic sprinkler system. The ship-side face of the pier is provided with rail facilities and the rear of the pier has three parallel tracks, with frequent cross-overs. This pier has capacity for 35,000 tons of general cargo and if used exclusively for grain and flour, for 56,000 tons. Pier No. 1, being nearest the port's grain elevator, is used for loading bulk grain into vessels, for which purpose belt conveyor galleries are carried along the face of the pier, with necessary spouting to vessels.

The grain elevator, which is of fire-proof construction, consists of the usual track shed, operating house and storage annex. The capacity is 1,053,800 bushels, and connections have been made for an additional storage of 1,000,000 bushels, the operating house having been designed and the machinery arranged to handle this increased capacity. The entire mechanism of the elevator and its facilities is electrically operated.

Pier No. 5, now nearing completion, will be used for handling bulk cargoes of all kinds, phosphate rock, sand, coal, etc. It will have a total berthing space of 1565 feet, and a very complete mechanical equipment for handling bulk cargoes with despatch and efficiency. Two loading towers, seventy-six feet in height, equipped with hoppers, travel down the face of the pier, delivering material from ship to conveyor belts, or from belts to ship. Two heavy rubber 6-ply belts operate above and below the pier bunkers, carrying cargoes from the loading towers to the pier's storage hoppers, or from hopper to car or ship, in loading. Two Merrick weightometers automatically weigh the material being conveyed by the belts. These weightometers are manufactured by the Merrick Scales Company, Passaic, N. J., and are developed to a very high degree of accuracy.

There are eight storage hoppers in the pier, with a storage capacity of 2000 tons each, giving the pier a total bunker storage capacity of 16,000 tons. In addition, there is open storage capacity of 20,000 tons. Convenient and efficient trackage connections have been provided, a double track traveling directly along the face of the pier, and also ample trackage in the rear thereof.

One distinct feature in this connection is the automatic box-car loader and unloader. This is manufactured by the Ottumwa Box-car Loader Company, Ottumwa, Iowa, and is capable of hand-



Portland Municipal Terminal No. 4
The Commission of Public Docks
Portland, Oregon

Portland Municipal Terminal No. 4

ling any standard box-car. This equipment is now installed, complete, and is very unique in operation. Situated adjacent to the hoppers, it unloads a box-car through a series of automatic operations, thoroughly and with mechanical precision, eliminating manual labor almost entirely and saving an immense amount of time. The device is illustrative of the extent of the pier's planned construction in the matter of installing the most modern and efficient equipment.

The whole plant is electrically operated, fourteen motors varying in size from seven to one hundred horsepower, being installed. The pier is fully equipped with mechanical trippers and unloaders, to and from conveyor belts. All of the conveying machinery has been constructed and installed by the Hesse-Martin Iron Works, Portland, and is probably the largest construction and installation work ever done in Portland. This company handles also a large line of auxiliary ship machinery, including a telemotor steering gear of special design. A detailed article bearing upon the technical features of the conveying machinery constructed for this pier will appear in a later issue of this magazine.

The plan has been, in addition to providing elevator and other shipping facilities for the handling of grain in bulk, to concentrate as far as practicable at this terminal the main facilities for the port's principal import and export business, obtaining for that purpose a site of sufficient area to permit also of future expansion requirements, a site possessing the greatest advantages with reference to location, channel conditions, bridges, rail connections and railroad service in relation to present railroad terminal yards, with the view of avoiding congestion and insuring best possible train and car switching facilities at the terminal in the handling of a large shipping business. The present site is below all bridges, where the channel has a width of 1600 feet between harbor lines, allowing for ample room in the fairway for easy access to the piers and slips, besides furnishing large anchorage ground for vessels. The great depth of the site also makes it possible to provide there cheap and convenient sites for such industries as more particularly require the combination of rail and water shipping facilities for the assembling of raw material and the economical production and distribution of manufactured articles. There are approximately fifty acres available for this purpose, so located as to furnish a well co-ordinated plan for most convenient transfer between the piers and storage areas and warehouses by means of convenient trackage and streets to the industries.

Portland has three other municipal terminals in operation. No. 1, with dock 955 feet in length, 300 feet of which has two levels. This dock is covered with a transit shed 935 feet in length and 100 feet in width. Total general cargo capacity of this terminal is 20,500 tons. This terminal is very compact, having rail trackage accommodating at one time seventy cars, and located in the main railroad terminal district of the city.

Terminal No. 2 has a two-level quay dock 526 feet in length, covered with transit shed 100 feet in width the full length of the dock, and trackage for the placement of twenty cars. The mechanical equipment consists of cargo hoists, five-ton derrick, electric elevators and freight piling machines.

The facilities of Terminal No. 3 include ample trackage and large storage capacity. This terminal serves principally as a storage terminal, with full mechanical equipment including electric freight piling machines. All of these terminals are conveniently located, have adequate rail connections, and are protected by automatic sprinkler systems.

A great deal of development by private enterprise of the port's waterfrontage has taken place, and the harbor is lined with general cargo docks, grain docks, lumber docks, fuel docks, and industrial docks of all kinds.

A large and unusually well-built dock has been constructed by the American Marine Iron Works. Additions have recently been made at this dock by the American Marine Iron Works, and trackage laid for direct rail connections, the spur traveling for some distance along the face of the dock.

The Willamette Iron & Steel Works has a harbor frontage of approximately 300 feet. A slip 87 feet wide and 275 feet long is served by a 15-ton derrick on one side, and by a five-ton gantry crane on the other, with rail facilities on both sides of the slip. The face of the dock is 200 feet in length, and is equipped with another 15-ton derrick besides the one mentioned, and one 75-ton derrick. This company is equipped with complete plant and dockage to handle any seagoing vessel which comes to port, having outfitted a large number of 8800-ton vessels following the war period.

The port owns and operates a sectional floating dry dock, capable of handling vessels of 10,000 tons deadweight, and has under construction a second dock capable of handling vessels of 15,000 tons deadweight. This dry dock will consist of five pontoons, with adequate shop and derrick facilities for ship repair work. These pontoons are being built by the Albina Engine & Machine Works of Portland at their plant in Portland. Four have been completed, and the fifth is approaching completion.

Channel improvement and maintenance have received a large share of attention, so that at the present time the channel can safely be navigated at any point even at low water by ships drawing thirty feet. In 1917 the Federal government completed the construction of two rock jetties at a cost of nearly $16,000,000 at the mouth of the Columbia River, not only removing the handicap of the old Columbia River Bar, but producing a constantly increasing depth by natural scour. In the improvement of the channel it has been necessary to dredge in only about one-fourth of its length of 110 miles. Between the dredged portions of the ship channel there exist long stretches of much deeper water—35 to 100 feet—having a width of 1000 to 2000 feet, which afford frequent and convenient anchorage grounds for vessels to swing with the tide, without interference with navigation.

A very efficient dredging plant is maintained by the Federal government and the Port of Portland for ship channel and harbor work, consisting of six pipe line dredges and one hopper dredge. In addition, there is under construction for the port another 30-inch dredge, "Columbia," the steel construction of which is being done by the Pacific Marine Iron Works of Portland. This dredge is to be of exceptionally strong build, with hull, deck and lower house of steel. This company, in addition to their complete plant for handling ship and engine repairs and construction, also operates a completely outfitted floating repair shop which is a distinct asset to the port.

The extensive program of construction has been conducted under the supervision of the Commission of Public Docks, of which Mr. G. B. Hegardt is engineer and secretary and Mr. F. I. Randall, assistant secretary.

Portland's progress has been due in large measure to the progressive policies of her two port commissions—the Commission of Public Docks, and the Port of Portland, in the Spalding building, of which last-named body Mr. F. M. Warren is chairman. These commissions are in position to give comprehensive and detailed information regarding the port and its facilities—the Port of Portland Commission for tariff schedules, towage, pilotage, dry-docking, etc.; and the Commission of Public Docks for wharfage, storage, docking schedules, etc. Acting jointly with both these commissions is the traffic department, Spalding building. Mr. H. L. Hudson, traffic manager of the port, is in charge of this very active department, and his work has been a most important and essential factor in the promotion of Portland's shipping.

The present import and export figures indicate very clearly a steady growth for the city, both as a shipping and a manufacturing center, and the easy accessibility to the port officials, as well as the frank and friendly welcome the visitor is accorded, explains something of the cause of this growth, attesting as it does the spirit of the Port of Portland.

Municipal Terminal No. 2, Portland

ELECTRIC AUXILIARIES ON SHIPBOARD

It is a curious fact that, though no one would today dream of using steam engines to operate a number of small machines scattered throughout a hotel, a warehouse, or a factory, precisely this very thing is being done on practically all American merchant steamships. On land, the electric motor is used for every possible power purpose, from the one-twentieth of a horsepower sewing machine to the 20,000 horsepower rolling mill, because of its convenience of installation, efficiency of operation, ease of control, safety, quietness, cleanliness, and absence of heat and moisture; but on sea, the steam engine is still the standard drive for winch, capstan, windlass, steering gear, pump, fan, and refrigerating machine.

A study of the situation shows that this adherence, to what can truly be termed an obsolete form of drive, is due almost entirely to the conservatism of marine men. This conservatism is entirely natural and proper, for no rule has a higher justification than the universally accepted dictum that "no machine must be placed on a ship until its utility and its reliability have been proven beyond question." But the time has come when the veteran donkey-engine must yield to the electric motor; for the greater utility of the electric motor as compared to the steam engine is proved by hundreds of thousands of land installations, while its reliability on shipboard is shown by its record of many years of service on naval vessels, motorships, and other types.

Consider for a moment the thousands of feet of steam and exhaust piping that run through a ship with steam-driven auxiliaries. These pipes are awkward and expensive to install and very much in the way wherever they run. They are apt to leak, liable to break, sometimes freeze up in cold weather, and often cause undesirably high temperatures in holds and living quarters. Furthermore, because of the waste of steam in the pipes due to condensation and leakage and the poor economy of the small engine, the entire system is woefully inefficient, which is a matter of considerable importance in these days of high fuel costs.

But when motor-drive is used, all of these disadvantages are eliminated. The cables that carry the current can be easily laid, occupy no valuable space, and when properly installed cannot be damaged in ordinary service. The motors are quite as reliable as the engines; they are automatically protected against overloads; they can be made absolutely waterproof; and if an accident should occur, all parts are light, easily accessible, and can be readily repaired on board ship. The fuel consumption of the ship is reduced because the motors operate with high efficiency; the transmission losses are small; and there are no stand-by losses whatever. Nor does the use of motors involve any special change in the ship's organization, for she is already equipped with an electric system, which merely needs enlarging, and she almost always carries a competent electrician.

Consequently motors will in almost all cases prove more economical than steam engines, but there is a still more important reason for their use—and one that must especially interest the progressive American shipping man—and that is, that the introduction of electricity for power purposes on shipboard will unquestionably in time greatly increase the all-around operating efficiency of the ship.

Ten years ago, this last statement would not have been justified, for it must be frankly admitted that the motor-driven winch of today (in which the motor merely takes the place of the steam engines) is only slightly superior to the steam-driven winch because of its somewhat easier control and rather greater agility.

But to believe that the present electric winch represents the last possible word on the subject is to ignore the history of electrical development in every branch of human activity to which it has been applied.

Take illumination, for example. At first the sole purpose of the electric lamp was to take the place of the gas jet or the oil lamp, and no one suspected it could do more. Indeed, there is a story to the effect that a prominent electrical official resigned and went into another business in 1888 because he felt that there was no further future in electric lighting. But as we all know, electricity began where the other illuminants left off; and today we have a science and an art of illumination undreamed of thirty years ago.

In the same way, the electric motor took the place of the horse on the street car and gave us the subway; it took the place of the main steam engine in the factory, and developed into a thousand highly specialized drives that are responsible for astonishing increases in production; it began as the simple telegraph and has given us the miraculous wireless; it entered the home in the shape of a flat-iron and it is now revolutionizing housekeeping.

Electricity can therefore be relied upon to solve problems that are far beyond the reach of other powers; and that it has ample opportunity to increase the all-around efficiency of a ship is evident from the following considerations:

The earning capacity of a cargo vessel depends upon the time required between cargoes. This time can be decreased (and the ship's earning power increased) by reducing either the time at sea or the time at port. The first can be accomplished by increasing the speed of the ship, but as pointed out recently by an eminent ship operator, a speed of from ten to twelve knots must be considered the average maximum for a long time to come because of the large amount of fuel needed to increase this speed. But to reduce the time in port is advantage in every respect so that the attention of the shipping world must be directed here. Of course, the value of more ample docking facilities and more efficient cargo-handling apparatus in our major ports is obvious; but since a ship may spend much of her time at ports with crude facilities, or none at all, the more rapidly she can handle cargo with her own equipment the better investment she is going to be.

Steam-driven auxiliaries have obviously about reached the limit of their development. Electricity must therefore step in, and though what it will accomplish cannot be foretold at present, it will in time undeniably revolutionize our present cargo-handling methods.

MESTA CHANGES

The Mesta Machine Company of Pittsburgh, Pennsylvania, announces the opening of a branch office at Chicago, Illinois. The offices are temporarily located in the Railway Exchange Building, but will be moved to permanent quarters in the McCormick Building after April 1. The Chicago office will be in charge of Mr. C. J. Mesta, second vice-president of the company. Messrs. W. R. Dawson and R. W. Schutte will be transferred from the Pittsburgh offices to Chicago.

The Mesta Machine Company has recently opened offices in the Singer Building, New York City. The offices are in charge of Mr. M. M. Moore, who was formerly export sales manager, located at Pittsburgh. Mr. Frank A. Mesta will also be transferred from the Pittsburgh office to the New York office as assistant to Mr. Moore.

The company will retain its offices in the Munsey Building, Washington, D. C.

Marine Insurance

DEVELOPMENTS IN MARINE INSURANCE

By CHARLES F. HOWELL

IT is generally recognized that 1920 developed into one of the most important years ever known in marine insurance history in this country. It was natural enough that this should be so, because the movements that were inaugurated in 1919, as an outgrowth of post-war reconstruction, had their flower in 1920. Now that this crucial period is at an end, it is safe to weigh the more outstanding conditions; with the result, in the judgment of most of the more experienced marine insurance experts, of faith that the worst is at an end and that, with careful management for the next year or two, the business will reach a broader and safer basis than ever before in the United States. Among some of the conspicuous improvements may be noted the final passing into limbo of those overnight companies of mushroom growth that sprang into existence on the hope of a long harvest of rich war risk profits; the successful launching of the American Marine Insurance Syndicates; the steady elimination of theft and pilferage—those twin sources of mounting losses; the better control of the moral hazard growing out of the disinclination of consignees to accept delivery of goods on a falling market; the gradual return to normalcy in general business conditions; the improvement in the type of American-built vessels that are continuing in the ocean carrying trade; and a better co-operation among underwriters.

True, there is still much to be desired in the way of improvement—but that will doubtless come with time. For one thing, there should be a higher valuation of hulls in view of the excessive charges for repairs; as matters stand now, the underwriters receive a diminishing premium income to balance against an increasing average liability. Another serious problem of the new year is the small volume of merchandise to be transported; Europe is all but bankrupt and that great market is withdrawn from our exporters, to a considerable degree, with a corresponding diminution in demand for marine insurance coverage.

Now that the annual statements of the insurance companies are getting into print, interest is at white heat in the condition of the weaker sisters. Several have retired from active business, and there is a decided drawing-in of the horns on the part of prominent factors. Fire insurance companies, for example, have betrayed a decided disposition to retire from the marine field, and a number of notable underwriting agencies have closed out their businesses and given it up as a bad job. Several foreign direct-writing and reinsurance companies have withdrawn from the American field. These are regrettable changes, because the business needed this additional capital and facility. Decidedly, the tendency is to transfer the management of marine insurance interests to experienced hands. And that, perhaps, is the great lesson of 1920—that marine insurance is a highly specialized and intricate business and calls for expert control, and nothing less.

Use of Electric Drive

The successful voyage of the United States Shipping Board's steamer Eclipse has profoundly interested marine underwriters, because of the fact of its being equipped with electricity as a motive power in ocean-going transportation. The introduction of the electric drive naturally brings forward a vast number of problems as to classification, rates and conditions; all of which will require the most careful consideration at the hands of underwriters and classification societies. It is authoritatively stated that the work of the machinery was fully up to expectations. Inquiries as to how the underwriters look upon the introduction of this new hazard are generally met with an obvious reservation of judgment; there is much to be looked into before adequate conclusions can be reached.

Bunker Fires

Proper care of the stowage and watching of bunker coal is being stressed by marine insurance men, as they are obliged to charge this hazard with a considerable volume of loss from marine casualties. The attention of ship operators is being directed to this source of damage. It is claimed that one reason why this unfortunate condition has arisen is that new varieties of coal are being used to fill out British shortages, for example, and that some of these come from even South Africa and have never been properly tested. Spontaneous combustion has frequently developed in bunkers. Excessive heat has been generated, extending to coal in permanent reserve bunkers, and thus releasing gases which become ignited. While there are American marine insurance companies to be found who protest that their experience shows little reason for alarm over bunker fires, the general concensus of judgment is to the contrary. Much of this danger could be eliminated if the bunkers were regularly and thoroughly cleaned out, as the accumulation of coal dust forms pockets and leads sooner or later to disaster from fires.

Foreign Hull Conditions

Attention has frequently been called, in this department, to the unsatisfactory state of hull conditions throughout the world, so far as the marine insurance angle is concerned. In Great Britain they have been having quite as much trouble over the matter as we have here—if not more of it. The outlook is good for a rate war in hull insurance over there. The hull agreement, designed to meet this menace, was saved at the eleventh hour by a compromise arrangement, but this soon after went to pieces through the defection of prominent subscribers. London has been filled with startling rumors of double-dealing on the part of firms of the first importance in Lloyds, who gave their word to conform to the agreement drawn up by dominating insurance companies, only to double-cross their confreres. Lines were to be limited to 3 per cent on steamers whose values lie between £30,000 and £250,000, and to 5 per cent on those up to £500,000. Under this minimum and over this maximum they were to be unrestrained. There was a further arrangement by which a basis was obtainable for action should experience demonstrate the need for further reductions in value. Intense in-

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME
JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON
E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.
FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

terest is being taken in the next move, as it is realized that after this jar to mutual faith anything like an acceptable working plan will be extremely difficult to secure.

Marine Syndicate Participation

It is now possible to announce with definiteness the identity of the companies subscribing to the American Marine Insurance Syndicates, as also the percentage of the participation of each. Syndicates B and C began issuing their policies just before the close of the year; prior to that they had been accepting business but had not been in position to get the policies out. It had been a matter of much embarrassment and annoyance to the Syndicate managers, as the insured very naturally wanted to know what insurance companies were carrying the business. It is a pleasure to be able to announce that Syndicate B, the All-American pool for government hulls, is made up of the following forty-four companies, the participation percentage of each being indicated after the name:

Aetna	3.
Agricultural	.50
Alliance	1.
American Eagle	.80
American Equitable	.50
American of Newark	1.50
Atlantic Mutual	5.
Automobile	1.50
Boston	1.75
Camden	1.
Concordia	1.
Continental	1.80
Federal, of Jersey City	2.50
Fidelity Phenix	1.80
Fire Association	.50
Fireman's Fund	4.
Firemen's of Newark	1.50
Franklin Fire	5.
Glens Falls	1.80
Globe & Rutgers	10.
Great American	2.
Hanover	.80
Hartford	2.50
Home F. & M.	2.
Home of New York	2.
Importers & Exporters	.50
Insurance Company of No. Ame.	7.50
Merchants & Shippers	.25
Milwaukee Mechanics	.50
National Liberty	.50
National Union	1.
New Hampshire	.50
Niagara	2.
North River	.50
Old Colony	.50
Peninsular	1.
Phoenix, of Hartford	2.
Providence Washington	1.
St. Paul F. & M.	2.
Security of New Haven	1.
Springfield F. & M.	2.
United States	.50
United States Lloyds	1.
Westchester	1.

About 80 per cent of the whole is represented by this participation; the remaining 20 per cent is being carried temporarily by the following five companies, each assuming 20 per cent of that 20 per cent: Aetna, Atlantic Mutual, Continental, Federal, and St. Paul Fire & Marine.

Privately owned hulls are written in Syndicate C, which is made up of American and foreign admitted or foreign controlled companies, with the participation of the latter two groups limited to about one-third of the acceptances. The same forty-four American companies are subscribers to Syndicate C, and in the same relative proportion of percentages. The thirty-six foreign admitted or foreign controlled companies of Syndicate C are as follows, the figures representing their proportionate participation being as related to the basis sum of $500,000:

Alliance of London	$18,750
American and Foreign, N. Y.	20,000
British and Foreign	35,000
Commercial Union	25,000
Commonwealth, of New York	5,000
Liverpool & London & Globe	2,500
London & Scottish	10,000
London Assurance	18,750
Marine of London	18,750
Maritime, of Liverpool	6,750
Mercantile of New York	5,000
Newark Fire	4,500
New Zealand, of Auckland	10,000
North British & Mercantile	10,000
North China	2,500
Norwegian Atlas	40,000
Norwich Union	7,500
Ocean Marine, of London	7,500
Queen of America	13,500
Queensland, of Sydney	10,000
Reliance Marine, of Liverpool	7,500
Rossia, of Hartford	10,000
Royal	15,750
Scandinav'n-Am'n, Christiania	30,000
Sea, of Liverpool	18,750
Second Russian	20,000
Skandinavia, of Copenhagen	5,000
Standard Marine, Liverpool	12,500
Star, of New York	4,500
Thames & Mersey	17,500
Tokyo Marine & Fire	10,000
Union Hispano, Havana	25,000
Union, of Canton	12,500
Union Marine, Liverpool	20,000
Western Assurance, Toronto	10,000
Yang-Tsze, of Shanghai	10,000

Pilferage Defined by the Courts

A court interpretation of the distinction between theft and pilferage has been given by the Appellate Division of the New York Supreme Court, in the case of the Charles Goldman Company v. The Insurance Company of North America. The decision reversed the municipal court and also the appellate term. It is a matter of much importance to shippers, and for that reason we give here the decision in full. It was a unanimous opinion:

The action is upon an insurance policy. The policy, after including theft as one of the risks thereby covered, states "except as hereinafter specified," and there was then provided "this policy covers theft of an entire shipping package, but all pilferage is expressly excluded." The shipment was of twelve pieces of woolen cloth, each piece wrapped in a separate piece of paper, but all included in one wooden case, which was closed, nailed up, marked and addressed to the consignee. When it reached the comsignee five pieces were missing from one of the cases of the value of $611.10. There is a single question in the case and that is whether the theft of these five pieces of woolen cloth from the package constituted pilferage as the word is used in this contract. A number of definitions are given indicating that pilferage generally means petty theft. It is claimed, therefore, that this not being a petty theft was not pilferage and was covered by the policy. This was so held by the municipal court, as matter of law, and by the appellate term. The intent of the policy as I read it simply covered the theft of an entire package and did not cover the theft of any part of a package where the package itself was not stolen.

I recognize that an insurance contract must be construed strictly against the insurer, because the insurer wrote the contract. The intention of the insurer, however, was plainly expressed to cover only the theft of the entire package and the words "excluding pilferage" were

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA
W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING
F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK
AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

intended to exclude any theft from the package small or great where the package itself was not stolen.

In the case of Tamarin vs. Insurance Company of North America, 68 Pa. Superior Court Rep. 614, this was expressly held, in the Superior Court of Pennsylvania. The same clause was there for consideration: The opinion in part reads:

"The purpose of this clause is obvious. The company would undertake responsibility for the trunk. That was the thing that was checked. A record was presumably kept of its transfer from place to place. It was an object under the eye of baggage agents, station agents and other persons into whose custody it came. Its movements could be traced by the records of the transporting company or by the knowledge of agents and employes into whose care it came. But this could not be said of the contents of the trunk. They were not observable. In case of disappearance there would be no record by which they could be traced. While the insurer, therefore, might be willing to take the risk of a trunk he might for manifest reasons decline to assume the risk of the abstraction of articles therefrom.

"This intention is further made apparent by the exception of all pilferage. This as contended by the plaintiff could only apply to articles of trifling value and appeal is made to the definition of the term in support of that view. But when read with the context, we regard the word as being used in the sense of filching; to take a small part only rather than the whole; of stealing privily. There could be no reasonable explanation of the use of the term if it was to apply to trifling things only rather than the articles of greater value. It has force, however, when construed to mean an exception from the risk of the abstraction of a part of the contents of a shipping package. The difficulty of guarding against larcenies of the latter kind is an apparent reason for the insertion of such a clause in the policy."

In that case a fur coat of the value of $300 was stolen from a trunk. To this reasoning might be added the further consideration that the construction as thus claimed would require in almost every case a submission to the jury of the fact as to whether the article stolen from the entire package was of trifling value within the meaning of the policy. This would render the policy indefinite and uncertain and would cause the necessity of a law suit substantially upon every theft in order that the court might determine whether the theft was of such an amount as constituted a petty theft or whether it was a theft of a sufficient amount as not to come within the meaning of the word pilferage.

In construing a contract the court should lean to a construction which makes the contract definite and certain and not to a construction which leaves in substantially every case a question which must be submitted to a court for determination. It would seem clear that the policy never was intended to have such an indefinite and uncertain meaning. The plaintiff admits if the word "only" had been inserted after the words "entire package," so that the clause should read "this policy covers the theft of an entire package 'only,' but does not include pilferage." That he would have no cause of action. Such an interpretation in my judgment should should be put upon this clause, and I think the judgment of the municipal court and the determination of the appellate term should be reversed with costs, and the complaint dismissed with costs.

Model Bill Introduced

The model marine insurance bill has been introduced into the House by Representative George W. Edmonds of Philadelphia, and while it is intended for the District of Columbia alone it is designed to represent to the country at large what ought to be done along this line by the states in order to relieve the business of its present handicaps and enable Americans to compete with foreign rivals on a nearer basis of equality. The multiple line proposition, which was vetoed by the insurance commissioners at New York in December, is included. Approval by both houses seems likely.

Big Loss at New Orleans

A disaster, frequently warned against of late, and one that may occur at any of our prominent ports under prevailing careless conditions, befell New Orleans a short time ago, and involved marine underwriters in a loss estimated at quite $1,500,000. We refer to the fire that destroyed the Jahnecke Dry Docks, and which entailed a property loss of some $3,500,000. The disaster is credited to the dropping of a red-hot rivet by a workman in wharf water thoroughly impregnated with waste oil. The flames spread so quickly that the fire-fighting facilities were unable to cope with them, particularly as the wharves were built on wooden supports and the oil floated the flames under them and into inaccessible quarters. Three ships of the United States Shipping Board were destroyed, along with the fine dry docks, and about 1200 feet of wharfage. It was one of the heaviest losses of the year. But the important feature is the grave menace that lies in permitting waste oil to be dumped in harbor waters. This nuisance has grown sensationally with the extended introduction of oil as motive fuel. Every community that has a port should lose no time in passing adequate laws against this oil-dumping evil. Every hour they postpone this remedial action further exposes them to such a disaster as overtook New Orleans.

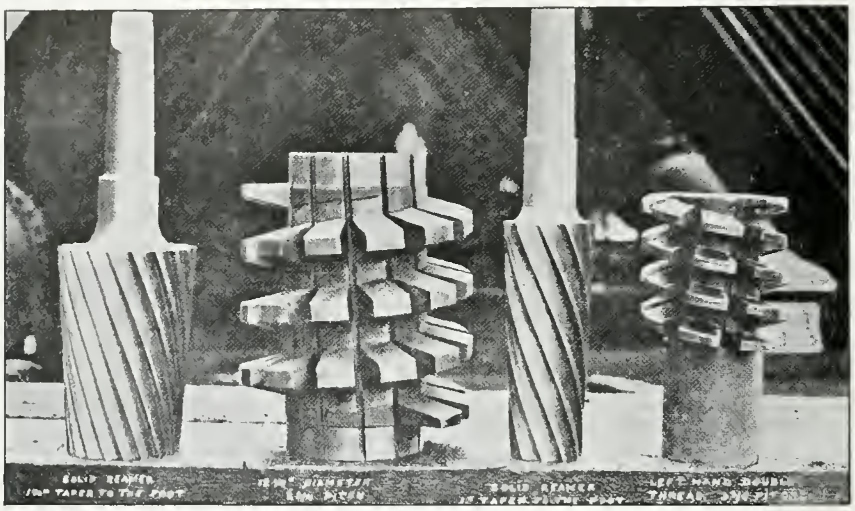
Proof of Pilferage Demanded

It is impossible to refer too often to the gravity of the theft and pilferage hazard. Practically every marine insurance company is finding this source of loss equal in claims to everything else put together. So great has it become many of the strongest and most conservative companies are declining to write it at any rate whatsoever. The latest development is the requirement of proof of loss. In the past, claims were frequently paid on the representation of the insured, but the demand now is for proof. The insured must prove beyond doubt that the case was stolen, or else he does not recover. Companies are continually urging their policyholders to protect themselves by the payment of an additional premium and thus save probable trouble when claims for short deliveries come in. The amazing pilferage disclosures on the Poznan astounded the operating company, who had eighteen watchmen on duty to protect their interests.

PACIFIC MACHINERY

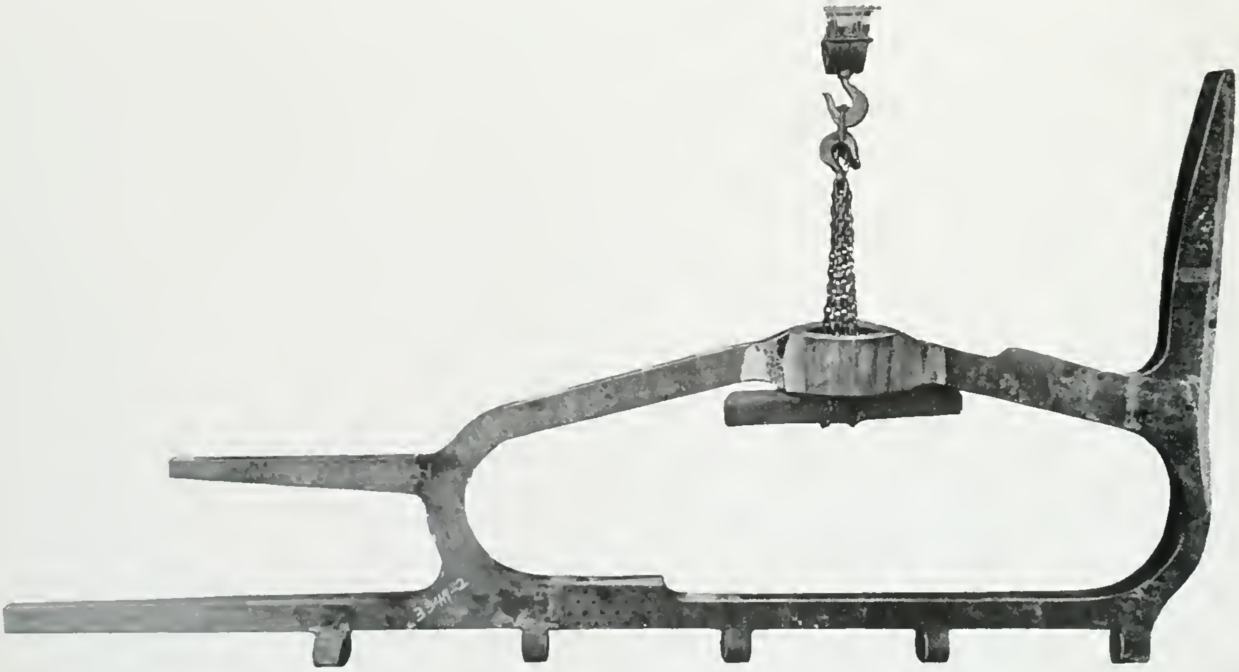
FROM A SHIPYARD TOOLROOM

OUR illustration shows four rather remarkable tools produced in the toolroom of the Tacoma yard of the Todd Dry Dock & Construction Corporation. The second tool from the left of the picture is believed to be the largest milling hob yet used in the shipbuilding industry. It is made of open hearth steel hardened by the pack hardening process and is used for machining large worm gears, these gears being 46.546 inches outside diameter with 42 teeth of 3.25-inch circular pitch and 6.75-inch face. The smaller milling hob, also made from mild steel and hardened, is used for machining turning gears on the scout cruisers. It is 7.194 inches outside diameter, 7.5 inches long with a 3.75-inch pitch, left-hand double thread. It has a helical angle of 11 degrees 16 minutes and a tooth angle of 29 degrees.



Milling Hobs and Reamers made in the tool room of the Todd Yard at Tacoma

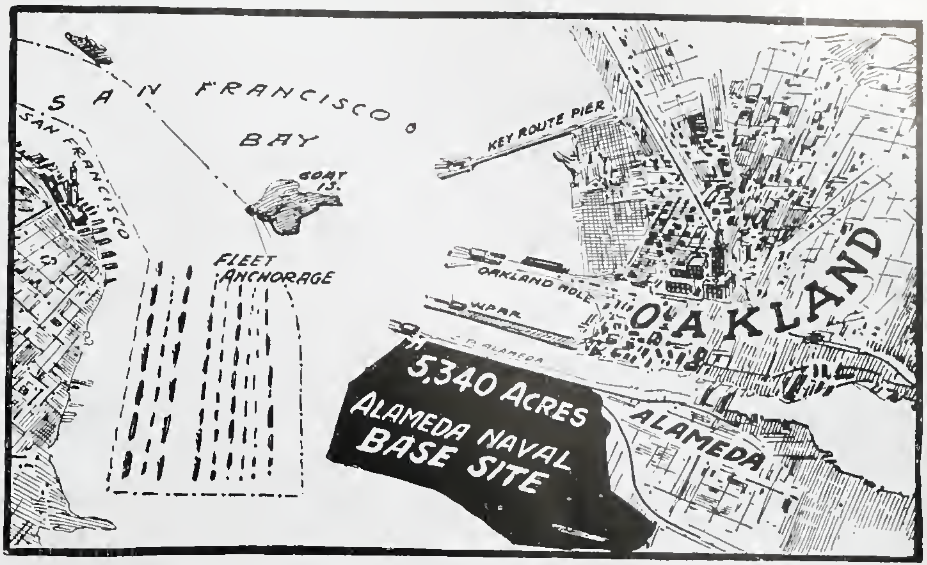
The large reamer is used for a plug valve manifold. It has 19 spiral cut flutes. It is 5.75 inches in diameter on the small end and 7.062 inches on the large end, with a No. 6 Morse taper shank. The smaller reamer is used on rudder pintle holes and also has a No. 6 Morse shank. These reamers are made from carbon steel hardened and ground all over to finished dimensions.



Large Stern Frame forged by the Edwin Forrest Forge Company, Oakland, for a 12,000-ton tanker building at the Standifer Yard, Vancouver, Washington

THE NAVAL BASE

THE recently announced final decision of Congress to award the site of the San Francisco Bay naval base to Alameda brings to mind the fact that the building of this naval base and the equipment of its shops will provide a very considerable outlet for the machine tool business of the Pacific Coast. The original report of the Helm commission planned for an expenditure of $36,307,000. This amount was based on prices of material and labor as at pre-war figures. The McKean commission and the General Naval Board in a recent revision of the Helm report have recommended an expenditure of $100,000,000, covering a period of several years.



Sketch map of central San Francisco Bay, showing the site ot the proposed Naval Base

The plans for the naval base include a shape shop 600 by 100 feet with a mold loft of the same dimensions above and a plate shop 600 by 100 feet alongside. The forge shop will be 400 by 100 feet; the boiler shop 400 by 100 feet; and the sheet metal and pipe shops 600 by 100 feet. The machine and electric shops will be housed together in a building 600 by 280 feet. The foundry will be 600 by 180 feet; the power plant 250 by 200 feet. It is planned to furnish all of these shops with the very finest up-to-date crane equipment and machine tools of all kinds, and the total cost is estimated at between fifteen and twenty mlilions at present prices.

In addition to these shops there will be very large provision for wood-working shops, including boat shop 300 by 100 feet with a storage room of similar size alongside; shipwright shops 600 by 80 feet; joiner shop 600 by 80 feet; light wood-working shop 600 by 80 feet; flag, sail and rigging shop 600 by 80 feet; pattern shop 600 by 80 feet; and pattern storage 600 by 80 feet, all to be equipped with the best wood-working machinery at a total cost of between five and six millions. Numerous other buildings are planned for storage purposes, administration, dispensary, and general warehouse, which will cost approximately an aggregate of twelve millions. It is estimated that the plant when complete will provide work for 15,000 men and will be when finished the largest and most complete naval base in the world.

It is very probable that for repair and construction work on the heavier naval vessels there will be installed in this plant more massive machinery than has yet been seen on the Pacific Coast in the way of forging presses, shears, plate-bending rolls, cranes, boring mills, planers, and turning lathes.

All Pacific Coast distributors for large machinery houses and Pacific Coast manufacturers of machine tools should be alive to the opportunity that is here presented for marketing their goods.

NEW BUNKERING FACILITIES

THE Wellman-Seaver-Morgan Company report the receipt of an order from the Western Maryland Railway Company for an improved boat loading plant for cargoing and bunkering all sizes of vessels from bay schooners and tugs to 20,000-ton ships.

This equipment will be installed at Port Covington, Baltimore, at an expense of over a quarter of a million dollars exclusive of the supporting pier and furnishes another evidence that the railroads are doing everything possible to increase their efficiency.

FORGED STEEL STERN FRAMES

TWO forged steel stern frames have been completed at the plant of the Edwin Forrest Forge Company in Oakland for the G. M. Standifer Construction Corporation of Vancouver, Washington. These frames will be used on 12,000-ton shelter-deck tank steamers building for the Imperial Oil, Limited. The stern frames, one of which is illustrated herewith, weigh 36,000 pounds each, and were forged under a 1200-ton hydraulic press at the Forrest plant. The hugeness of these forgings will be noted from the following dimensions: 32 feet 6 inches from tip of after top horn to lower rudder gudgeon; from the tip of the lower horn to rudder gudgeon is 15 feet 1 inch. The stern frame has a 24-inch bore for stern tube, and the outside diameter of the stern tube boss is 33¼ inches. The stern frame is forged in two pieces, scarphed and riveted below the second rudder gudgeon and stern tube boss.

The forged steel stern frames, although having a higher first cost, are considered more advantageous on account of being more homogeneous and freer from defects than those made of cast steel. The forged stern frames are made subject to a test of tensile strength between limits of 49,000 and 56,000 pounds, and the elongations are not to be less than 35 per cent at 49,000 nor 32 per cent at 56,000 pounds.

The forging of one of these 18-ton frames is a difficult problem to the average forgeman, and the Edwin Forrest Forge Company is to be congratulated upon the ease and efficiency with which their recent order was handled. Naval architects who inspected the Forrest stern frames were of the opinion that the forgings were very fine examples of heavy forge work, and a credit to the manufacturers.

MECHANICAL ENGINEERS ON MATERIAL HANDLING

THE American Society of Mechanical Engineers has formed a Material Handling section. About 700 members of the society have been enrolled, although only a small part of the society's membership has been formally notified of this professional section.

The executive committee of the section, consisting of R. M. Gates, chairman; H. V. Coes, Kern Dodge, Nathan C. Johnson and F. A. Wardenberg, has issued a statement saying that great potential interest has been aroused in the bringing together of individuals who desire to help in solving the handling problems of mining, transporting, manufacturing and distributing of all materials.

"It is the desire of the executive committee of the Material Handling section," the statement says, "before proceeding with a definite program, to consider all major phases of the subject in order that the work of the section can be made of the greatest possible benefit to the engineering profession, to industry and to the general public.

"Our members have expressed their great transportation problem which confronts industry: 1, how the mechanical engineers can improve machinery and equipment for the handling of materials; 2, how our great material handling costs can be reduced if the whole subject of transportation is analyzed and co-ordinated from the viewpoint of making economies over our present methods.

"The executive committee in its preliminary study of the proposed activities of this section, is considering the advisability of organizing committees, as required by the amount of work in the province of each, along two entirely separate lines: 1, according to types of material handling equipment, such as conveyors, cableways, cranes and the like; 2, according to industries which have material handling problems, such as steel manufacturers, storage warehouses, commodity distribution centers, construction work, automobile or tire industries and the like.

"It is the intent of the section to so thoroughly discuss the controlling factors in each line by meetings held by these various committees as to develop better methods of handling materials and to standardize equipment and methods where the same are desirable.

"Other important work along research lines could be undertaken to build up through the formation of specialized committees certain classes of data and of information of general interest to others. The actual cost of handling materials at terminals, for example, the relation of the cost of handling material to the general costs in factory operation, the percentage of cost of commodities which merely represents transportation in its various phases.

"There is a wonderful opportunity for such research committees to be placed on subjects of national importance, such as the distribution of commodities. Such research would undoubtedly get at the heart of certain of our economic problems. Men could be found for these committees, in the judgment of the executive committee, who are the biggest men in the field, providing it was understood that the work of investigation would be of a non-political, non-commercial character and undertaken by engineers in the spirit of research for the benefit of the public, the industries and the engineering profession."

AMERICAN CABLE PROJECT IN SWEDEN

SOMEWHERE out on the Atlantic at the present time, the Swedish steamer Stureholm is plunging ahead towards Stockholm bearing the first installment of what is probably one of the most important electrical shipments ever made from this country to Europe. Twenty-four carloads of underground cable apparatus is now on its way to the other side.

The shipment is part of the gigantic underground cable system which the Swedish government intends to install between Stockholm and Goteborg. It will be 320 miles long. When it is completed it will be the greatest underground cable line in Europe, and second in the world only to the 450-mile line now operating between Boston and Washington. It will be capable of carrying two hundred conversations simultaneously from Stockholm to its other terminus.

To complete the big Swedish project it will be necessary to manufacture a total of 425,000,000 conductor feet of cable, 25,000 loading coils and 8 repeater stations with 300 repeaters. If this all were connected in series it would give an amplification sufficient to enable one to talk over a cable circuit 15,000 miles long, or a non-loaded open wire circuit 125,000 miles long, or a loaded open wire circuit 300,000 miles long, or about twelve times around the earth.

Mr. A. H. Griswold, assistant chief engineer of the International Western Electric Company, has just returned from Sweden, where he has been making arrangements for the installation of the big cable line. When interviewed recently he said that it would require about a year and a half to put the system into operating condition. The work will require about a thousand workmen in addition to a large staff of engineers.

An idea of the magnitude of the new Swedish line of communication can be gleaned from the fact that 6,500,000 pounds of lead and 3,350,000 of copper are being used in its manufacture.

The shipment of the apparatus from the works of the Western Electric Company at Hawthorne, Illinois, where it is being rushed to completion, will consist in all of 1861 reels of cable, 260 loading coil cases and other miscellaneous material totalling about 7200 tons.

NEW APPOINTMENTS

THE Chicago Pneumatic Tool Company announces the appointment, January 1, 1921, of R. F. Eissler as assistant to the vice-president with headquarters in the company's new building at 6 East Forty-fourth Street, New York. W. C. Straub, formerly district manager of the New Orleans branch, has been appointed district manager of the Pittsburgh branch to succeed Mr. Eissler, and Ross Wyeth, formerly attached to the Pittsburgh branch, has been appointed district manager of the New Orleans branch to succeed Mr. Straub.

WHITING REORGANIZATION

THE Whiting Foundry Equipment Company, Harvey, Illinois, announces that it has changed its name to Whiting Corporation, increasing its authorized capital stock from $700,000 to $3,000,000.

The Whiting corporation remains under the same management and will continue the manufacture of cranes, foundry equipment and railway specialties as heretofore.

BOOK REVIEWS

Building the Emergency Fleet, by W. C. Mattox; 279 pages, with numerous illustrations, attractively bound in green buckram with leather corners and back and gold stampings; the Penton Publishing Company, Cleveland.

This volume sets forth the history of the problems and achievements of the Emergency Fleet Corporation of the United States Shipping Board. Its author was formerly head of the publication section of the Emergency Fleet Corporation and had access in that position to all the records of the corporation.

Written in narrative style, this history has been put forth in a very interesting way by the author, and he deserves the gratitude of his readers in that, having such a tremendous volume of statistics at his command, he has refrained from using them statistically. While we are perhaps as yet a little too close to the events described by Mr. Mattox to get any proper historical perspective, this simple narrative from one who was on the inside, studied in connection with correlated facts as divulged at the various congressional hearings which have been held since the book was written, will certainly help many of the citizens of America to understand the scope and nature of the work of the Emergency Fleet Corporation and the difficulties under which it was accomplished.

America's Merchant Marine; 257 pages, bound in attractive buff board with tan stampings, compiled and published by the Bankers Trust Company.

This very comprehensive volume gathers into a compact, convenient form the entire history of shipbuilding and ship operating in America, beginning with the launching of the Kennebec in 1607 by the Popham Colony.

Interested parties can obtain copies of this booklet by writing to the Bankers Trust Company, New York. Some authorities in the East have pronounced this treatise "the best and most comprehensive handling of the subject" that has yet appeared. The great bulk of the book is given over to a description of present conditions, principles of operation, government aid for shipping and shipbuilding, foreign trading, and American marine legislation. Exporters and importers and shipping men generally will find this book a very handy volume.

Straight Business in South America, by James H. Collins; 305 pages, attractively bound in red buckram with black stampings; published by D. Appleton & Company, New York.

In this volume, to quote the author, an effort has been made to "tell the truth as our business men see it when they investigate for themselves." The material is drawn from Argentina, Brazil, Chile, Uruguay, and Peru, and is the summing up of articles written by the author for the Philadelphia Public Ledger during an eight months' tour of these South American countries. During this tour the author's wife acted as his secretary, and it is pointed out by the author that the viewpoint of a woman given by this circumstance to the work is for many reasons very valuable from the business man's standpoint.

James Collins certainly puts the matter of foreign trading in South America squarely up to the American business man in his first chapter, which is entitled "Wanted—Business Imagination for Export," and tells the tale of a young man sent by an American business house to Brazil. After a great sendoff with a Spanish-American dinner, he finds himself three months later cooling his heels in Rio de Janeiro "with the status of a Legal Nobody." He had found customers and made deals, but the Home Office in the United States had forgotten him. He could get no orders confirmed, no information, no necessary documents. The only message he received was to the effect that owing to shortages no goods could be spared for South America that year. This story, says the author, illustrates the outstanding feature of the new commercial interest in Latin America. The chapter closes with two sentences which should be full of meat for the Latin American trader. "Over many an executive desk in this country hangs the familiar motto, 'Do It Now.' In every business office having relations with South America and world trade generally, a homely English saying should be substituted, 'It's Dogged as Does It.' "

"Straight Business in South America" is a delightful book to read, full of correct information presented in a very engaging manner, and we heartily recommend it to our readers both for the home and office library. We shall have occasion a little later to use some of its chapters in the foreign trading section of Pacific Marine Review. From our point of view we can pay it no higher compliment.

Steamship Coefficients, Speeds and Powers, by Charles F. A. Fyfe, M. Inst. N. A.; F'cap 8vo., 68 plates, 400 pages; bound in blue with gold stampings; published by E. & F. N. Spon, Ltd., London, England.

This is a second new and up to date edition of the author's well known work. Its purpose is to enable the naval architect to estimate quickly and with accuracy the horsepower required to drive a ship at specified speeds and to determine suitable dimensions for propellers. Full data are given upon which estimates can be based, and the various calculations and governing factors which enter into the problem are clearly stated and many practical examples are given. Perhaps the book is best described by giving its full title, which is "Steamship Coefficients, Speeds and Powers, Containing the Dimensions and Performances of Vessels and Many Progressive Trials of Ships and Models; With Notes on Froude's Law of Comparison, Skin Friction Correction, Engine Efficiency, the Admiralty 'Constant' System of Notation, Taylor's Methods, the Admiralty Formula, Thrust Horsepower, Tables for Wake Values, Wake Notations Reduced to One Basis, Propeller Blade Strength, Propeller Efficiency Curves, Pitch Correction Factors, etc., etc., for the Use of Engineers, Shipbuilders, Naval Architects, Superintendents and Draughtsmen."

Marine Pictures

JAMES BROWN AND SON, Glasgow, have recently added to their already extensive list of marine pictures two very worthy of note. The first of these is by J. Allcot and is entitled "Outward Bound—A Clyde Clipper." It shows a three-masted clipper under full sail broadside and running pretty well before the wind. The sea is alive with white caps, the day sunny, with a few light clouds in the offing, just enough to give life to the sky. The reproduction is in exquisite taste as to coloring and makes a very pretty picture for framing.

The second addition to this gallery of pictures is, "Shortening Sail for a Squall," by Charles Pears, R. O. I. This depicts a clipper ship at sea head on, a dark green angry ocean with threatening sky overhead, and the tars busy in the yards taking in the flying canvas. The work is fully up to the standard which is always looked for in marine painting by Pears and is notably realistic in that it faithfully portrays the repairs on sails, the red lead stains on the bow due to the painting of anchor chains, and all the other little touches that go to make up a real ship.

FULL SPEED AHEAD

Pacific Shipbuilding

STEEL merchant vessels under construction in Pacific Coast yards of the United States January 1 numbered 57 of an aggregate deadweight tonnage of 598,500, according to returns compiled by Pacific Marine Review. This does not fairly portray the work, however, because two large yards, the Bethlehem Shipbuilding Company's Potrero works and the Todd Drydock & Construction Corporation's Tacoma plant, are kept busy on naval building, each having only one merchant vessel under way. In Canadian yards work was proceeding on seven vessels of 50,870 deadweight tons. The total for American and Canadian yards was 64 vessels of 649,370 tons, as compared with 75 of 751,640 tons December 1.

A tabulated statement of Pacific Coast building as of January 1 follows:

American Yards:	Number Vessels	Aggregate Deadweight
Freighters U.S.S.B.	11	106,150
Tankers U.S.S.B.....	7	*67,800
Tankers private......	27	307,770
Freighters private..	3	34,500
Tankers foreign......	9	82,280
Total.....................	57	598,500
Canadian Yards:		
Freighters gov't......	6	50,270
Freighters private..	1	600
Total.....................	7	50,870

* Includes a 7500-ton concrete tanker.

December deliveries were as follows: freighters for Shipping Board, 5 of 44,150 deadweight tons; tankers for Shipping Board, none; tankers for private account, 4 of 30,390 tons; freighters for private account, none; tankers for foreign private account, none. In Canadian yards December deliveries reported were: freighters for Canadian government, 1 of 8400 tons; freighters for private account, 1 of 8800 tons. Corrections made in the deadweight tonnage of Canadian government vessels have caused a discrepancy between the totals of December and January.

No announcements have been made of new contracts. The report that credited the Todd Drydock & Construction Corporation, Tacoma, with a transport for the United States Navy is either incorrect or premature, as the Todd yard has no advices confirming it. Rumors continue to crop up in Canada that vessels will be constructed for various South and Central American interests. The latest of this tenor concerns the Harbor Marine Company, Victoria, which is represented as about to build four 8800-ton tankers for the Peruvian government. This report is not confirmed by the company. There are indications, however, that more tankers will be constructed in American Pacific Coast yards.

Six Vessels Short

The report of the Bureau of Navigation showing steel merchant vessels under construction in American yards for private owners on December 1 fails to list all building. The bureau's report credits the Pacific Coast with six vessels less than were under construction. Bethlehem is credited with five instead of eight; Moore with eight instead of nine; Southwestern with six instead of seven; Standifer with four instead of five; and Union Construction with four instead of six. Schaw-Batcher, which has closed, is listed as building two vessels.

Kinds.	Atlantic and Gulf.		Pacific.		Great Lakes.		Western rivers.		Total.	
	Number.	Gross tons.	Number.	Gross tons.	Number.	Gross tons.	Number.	Gross tons.	Number.	Gross tons.
WOOD.										
Sailing..................	72	73,629	18	37,067	1	2,051	......	....	91	112,747
Steam..................	52	12,122	20	39,011	20	1,963	11	1,039	103	54,135
Gas..................	313	12,049	280	19,003	50	1,019	62	1,024	705	33,095
Unrigged..................	164	65,816	35	5,626	18	2,274	25	618	242	74,334
Total............	601	163,616	353	100,707	89	7,307	98	2,681	1,141	274,311
METAL.										
Sailing..................	1	1,189	......	....	......	....	......	....	1	1,189
Steam..................	[a] 337	1,627,744	[b] 120	700,039	67	169,811	4	3,802	528	2,501,396
Gas..................	14	21,200	6	3,863	1	55	8	156	29	25,274
Unrigged..................	39	20,459	1	165	[c] 9	3,271	10	5,278	59	29,173
Total............	391	1,670,592	127	704,067	77	173,137	22	9,236	617	2,557,032
TOTALS.										
Sailing..................	73	74,818	18	37,067	1	2,051	......	....	92	113,936
Steam..................	389	1,639,866	140	739,050	87	171,774	15	4,841	631	2,555,531
Gas..................	327	33,249	286	22,866	51	1,074	70	1,180	734	58,369
Unrigged..................	203	80,275	36	5,791	27	5,545	35	5,896	301	103,507
Grand total......	992	1,834,208	480	801,774	166	180,444	120	11,917	1.758	2,831,343

[a] Includes 4 vessels of 25,940 gross tons built of reinforced concrete.
[b] Includes 3 vessels of 19,116 gross tons built of reinforced concrete.
[c] Includes 4 vessels of 1,221 gross tons built of reinforced concrete.

Output of American shipyards in 1920 as compiled by the Bureau of Navigation

1920 Shipbuilding

The bureau of navigation, Department of Commerce, reports that during the calendar year 1920 private American shipyards built 1758 merchant vessels of 2,831,343 gross tons, which have been officially numbered for American shipowners, and accordingly are now in trade or about to engage in trade. American shipbuilders also built 25 vessels of 29,382 gross tons for foreign owners, making a total output of 1783 vessels of 2,860,725 gross tons for the 12 months. During the calendar year 1919 the corresponding output was 2338 vessels of 4,213,891 gross tons for American and 25 vessels of 44,250 gross tons for foreign owners, a total of 2363 vessels of 4,258,141 gross tons. Of the 1920 output, 617 vessels of 2,557,032 gross tons were built of steel, a decrease of 299 vessels and 1,012,792 gross tons compared with 1919.

The 1920 output by months was: January, 253,680. February, 267,231. March, 279,709. April, 251,442. May, 185,145. June, 267,076. July, 217,239. August, 259,210. September, 261,962. October, 227,162. November, 213,966. December, 175,903. Total, 2,860,725.

For purposes of comparison, some details of the 1919 work follow: Wood vessels, Atlantic and Gulf, 360,439 gross tons; Pacific, 266,124 tons; Lakes, 13,614; Western rivers, 1422; total, 644,067 gross tons, 1422 vessels, considerably more than the tonnage built during 1920. Metal vessels, Atlantic and Gulf, 1,871,902 gross tons; Pacific, 1,175,091 tons; Lakes, 519,617 tons; Western rivers, 3214 tons; total, 3,569,824 gross tons, 916 vessels. The totals for 1919 were given above.

Vessels built in 1918, all classes, including non-seagoing, were 1882 of 2,721,281 gross tons.

Tanker Construction

Tankers under construction in the world at the beginning of 1921 aggregated 1,169,000 tons, of which 637,100 tons were building in the United States, 422,500 in the United Kingdom, and 109,400 in other countries. This compares with total of 795,000 tons building at end of September, 1920, of which 545,000 were building in the United States, 232,000 in the United Kingdom, and 18,000 in other countries, according to statistics compiled by Lloyd's Register.

How Great Britain has been resuming place as shipbuilder for other nations is indicated by the fact that of 3,709,000 tons now under construction in that country, 1,257,000 tons, or more than a third, is for purchasers abroad.

U. S. S. B. Building

Vessels under construction in Pacific Coast yards for the United States Shipping Board on January 1 totaled 18 of an aggregate deadweight tonnage of 173,950, as compared with 23 of 218,100 December 1, 26 of 248,700 November 1, and 32 of 316,750 October 1. The 7500-ton concrete tanker Peralta remains the only non-steel vessel under construction. The tanker tonnage remains unchanged from November 1 and December 1, being seven vessels of 67,800 tons, as all deliveries of November and December were of freighters.

On January 1 the status of work was as follows: sixteen keels laid, one, that of the West Lubrico, Moore, to be laid in January, and the second, that of the West Chopaka, Los Angeles, to be laid in February; six vessels in the water and twelve to be launched up to September; deliveries to be made in every month except April and October up to November, the last vessel, the West Chopaka, being scheduled for delivery November 20.

In the following table T indicates tanker and C cargo; the figures are of deadweight tonnage and the dates those of estimated delivery:

Bethlehem Shipbuilding Corporation, San Francisco: Hambro, T, 10,100, May 15; Hamer, T, 10,100, June 30;; Hammac, T, 10,100, May 15.

Moore Shipbuilding Company, Oakland: West Bohemian, T, 10,000, July 14; West Tustem, T, 10,000, August 25; West Lubrico, T, 10,000, September 29.

Hanlon Drydock & Shipbuilding Company, Oakland: Memnon, C, 5350, January 25.

Pacific Coast Shipbuilding Company, Bay Point: Namasket, C, 9400, January 15; Meanticut, C, 9400, March 15; Nashaba, C, 9400, June 10.

Los Angeles Shipbuilding & Drydock Company, San Pedro: West Cusseta, C, 8800, January 15; West O'Rowa, C, 8800, February 26; West Lewark, C, 11,000, May 12; West Faralon, C, 11,000, June 21; West Greylock, C, 11,000, August 9; West Prospect, C, 11,000, September 14; West Chopaka, C, 11,000, November 20.

San Francisco Shipbuilding Company, Oakland: Peralta, T, 7500, January 31.

Pacific Yard Returns

Shipbuilding

B. C. MARINE ENGINEERS & SHIPBUILDERS, LTD., VANCOUVER, B. C.

Auxiliary power schooner for Hudson Bay Company; delivery in spring, date uncertain; vessel de-ayed by non-arrival of engines, ordered in England.

BETHLEHEM SHIPBUILDING CORP'N, LTD.

Potrero Works

Purchasing Agent: O. W. Street

Hanley, hull 5276, freighter for USSB; keel laid une 26/19; launching Oct./20; delivery Dec. 30/20; 40 LBP; 56 beam; 28-6 loaded draft; 10½ loaded peed; 11,800 DWT; rec. eng., 2600 IHP; three Scotch boilers, 15x11-9.

Hammac, hull 5274, tanker for USSB; keel Nov. 0/20; launching Mar. 30/21, est; delivery May/21, st.; 435 LBP; 56 beam; 26 loaded draft; 11 loaded peed; 10,100 DWT; rec. engines, 2600 IHP; three Scotch marine boilers, 15x11-9.

Alameda Works

Hambro, hull 5272, tanker for USSB; keel laying Sept. 8/20; launching Mar. 5/21, estimated; delivry May 15/21, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15 x 11-9.

Hamer, hull 5273, tanker for USSB; keel laying Nov. 1/20; launch Apr. 30/21, est.; del. June 30/21, st.; sister to Hambro.

Crampton Anderson, hull 5303, tanker for Pan Amer. Pet. Co.; keel laid June 11/20; launching Nov. 30/20; delivery Jan. 30/21, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 0,100 DWT; rec. engines, 2700 IHP; three Scotch oilers, 15x11-9.

E. R. Kingsbury, hull 5306, tanker for Stand. Oil o. of Cal.; keel laid July 2/20; launching Jan. 15/1, estimated delivery Mar. 20/21, estimated; 440 BP; 58 beam; 28 loaded draft; 11 loaded speed; 1,600 DWT; rec. engines, 3200 IHP; three Scotch oilers, 15-6 x 12-1.

Yorba Linda, hull 5307, tanker for Gen. Pet. Co.; keel laid May 17/20; launching Nov. 22/20; delivery an. 20/21, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15x11-9.

Frank G. Drum, hull 5308, tanker for Ass'd Oil Co.; keel laid Nov. 5/20; launching Feb. 15/21, estimated; delivery Apr. 1/21, estimated; sister to Yorba Linda.

No name, hull 5311, tanker for Standard Oil of Calif.; keel laid January 11/21; launching May 5/21, estimated; delivery Aug. 15/21, estimated; 500 LBP; 68 beam; 25-11 loaded draft; 11 loaded speed; 15,000 DWT; rec. engines, 4000 IHP; three Scotch marine boilers, 16-4 x 12-9.

No name, hull 5312, tanker for Standard Oil of Calif.; keel laid Jan. 25/21, estimated; launching June 1/21, estimated; delivery Sept. 1/21, estimated; sister to hull 5311.

No name, hull 5313, tanker for Standard Oil of Calif.; keel laid Feb. 1/21, estimated; launching June 15/21, estimated; delivery Sept. 15/21, estimated; sister to hull 5311.

BETHLEHEM SHIPBUILDING CORPORATION

Potrero Works

Naval Work

Destroyers for U. S. Navy; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1308 tons; turbine engines, 27,000 IHP; four Yarrows boilers, as follows: Wood, hull 317, keel laying January 23/19, launching May 28/19; Shirk, hull 318, keel laying February 13/19, launching June 20/19; Kidder, hull 319, keel laying May 15/19, launching July 15/19; Sloat, hull 316, keel laying Jan. 18/19, launching May 14/19; Wood, hull 317, keel laying Jan. 23/19, launching May 28/19; Shirk, hull 318, keel laying Feb. 13/19, launching June 20/19; Kidder, hull 319, keel laying May 15/19, launching July 10/19; Selfridge, hull 320, keel laying Apr. 28/19, launching July 25/19; Marcus, hull 321, keel laving May 20/19, launching Aug. 22/19; Mervine, hull 322, keel laying Apr. 28/19, launching Aug. 11/19; Chase, hull 323, keel laying May 5/19, launching Sept. 2/19; Robert Smith, hull 324, keel laying May 13/19, launching Sept. 19/19; Mullany, hull 325, keel laying June 3/19, launching July 9/20; Coghlan, hull 326, keel laying June 25/19 launching June 16/20; Preston, hull 327, keel laying July 18/19, launching Aug. 7/20; Lamson, hull 328, keel laying Aug. 13/19, launching Sept. 1/20; Hull, hull 330, keel laying Sept. 13/20; MacDonough, hull 331, keel laying May 24/20, launch Dec. 15/20; Farenholt, hull 332, keel laying Sept. 13/20; Sumner, hull 333, keel laying Aug. 27/19, launch Nov. 24/20; no name, hull 334, keel laying Sept. 15/20; no name, hull 335, keel laying Sept. 15/20.

Submarines for U. S. Navy: S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145, launch Jan. 5/21; S-41, hull 146.

RALPH J. CHANDLER COMPANY, WILMINGTON

Purchasing Agent: G. R. Crofut.

Building sixth and last section floating drydock for Los Angeles Shipbuilding & Drydock Company.

CHOLBERG SHIPYARD, VANCOUVER, B. C.

Purchasing Agent: W. Meed.

S. F. Tolmie, hull 4, four-masted barkentine for Victoria (B. C.) Shipowners, Ltd.; keel laying May 1/20; launching December 28/20; delivery January 15/21, estimated; 250 OA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel, shaft logs fitted for auxiliary but no machinery installed.

Sir Henry Drayton, hull 5, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying May 15/20; launching Jan. 15/21, estimated; delivery Feb. 15/21, estimated; sister to S. F. Tolmie.

No name, hull 6, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying June 4/20; launching Feb. 25/21, estimated; delivery Mar. 25/21, estimated; sister to S. F. Tolmie.

No name, hull 7, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying Dec. 20/20, estimated; launching Apr. 30/21, estimated; delivery May 30/21, estimated; sister to S. F. Tolmie.

J. COUGHLAN & SONS, LTD., VANCOUVER, BRITISH COLUMBIA

Purchasing Agent: J. Joseph.

Canadian Transporter, hull 20, steel freighter for Canadian government; keel laying January 6/21; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; triple expansion engine, 3000 IHP; three Scotch boilers, 15-6 x 11-6.

Canadian Freighter, hull 21, steel freighter for Canadian government; keel laying January 6/21; dim., etc., same as Canadian Transporter.

CROWLEY LAUNCH & TUGBOAT COMPANY, SAN FRANCISCO EAST OAKLAND

Purchasing Agent: John L. Crowley.

Four launches, 36 LBP; one equipped with 30 HP Frisco Standard engine; one, 25 HP Acme; one, 20 HP Acme; one, 25 HP Frisco Standard.

HANLON DRYDOCK & SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: C. H. Brown.

Memnon, hull 88, freighter for USSB; launching Sept. 28/20; delivery Jan. 25/21, est.; 305 LBP; 46 beam; 23-5 loaded draft; 10½ loaded speed; 5350 DWT; 1800 IHP engines.

HARBOR MARINE COMPANY, VICTORIA

Purchasing Agent: B. L. Robertson

Canadian Traveller, steel freighter for Canadian government merchant marine; keel Aug. 9/19; launch Sept. 29/20; 400 LBP; 52 beam; 25-2 loaded draft; 11½ loaded speed; 8390 DWT; TE eng.; three Scotch boilers, 15-6x11-6; 2 deck.

Car ferry for Canadian Pacific; Jan. 20 launching, estimated.

KRUSE & BANKS, NORTH BEND, OREGON

North Bend, 4-masted schr., launch Dec. 27/20; del. Jan./21.

LONG BEACH SHIPBUILDING COMPANY, LONG BEACH

Edythe, hull 142, motor yacht for J. F. Craig; 105-3 LBP; 21 beam; 8-10 loaded draft; 12 loaded speed; New London engines, 360 BHP; delivery Dec. 15/20.

LOS ANGELES SHIPBUILDING & DRYDOCK COMPANY, SAN PEDRO

Purchasing Agent: L. R. McFie.

West Cusseta, hull 29, steel cargo for USSB; keel laid Apr. 19/20; launching Nov. 10/20; 410 LBP; 54 beam; 24-2 loaded draft; 10¼ loaded speed; 8800 DWT; TE eng., 3500 IHP; three WT boilers; delivery Jan. 14/21.

West O'Rowa, hull 30, steel cargo for USSB; keel laid June 14/20; dim. etc., same as West Cusseta; launch Dec. 30/20; delivery Feb. 26/21, est.

West Lewark, hull 31, steel cargo for USSB; keel laid July 30/20; 430 LBP; 54 beam; 2802 loaded draft; 10½ loaded speed; 11,000 DWT; TE engines, 3500 IHP; three Scotch single end, 15-9; launch Feb. 25/21, est.; delivery May 12/21, est.

West Faralon, hull 32, steel cargo for USSB; keel laying Sept. 27/20; dim., etc., same as West Lewark; launch Apr. 10/21, est.; delivery June 21/21, est.

West Greylock, hull 33, steel cargo for USSB; keel laying Nov. 10/20; dim., etc., same as West Lewark; launch May 24/21, est.; delivery August 9/21, estimated.

West Prospect, hull 34, steel cargo for USSB; keel laying Dec. 31/20; launch July 2/21, est.; delivery Sept. 14/21, est.; sister to West Lewark.

West Chopaka, hull 35, steel cargo for USSB; keel laying Feb. 26/21, est.; launch Sept. 6/21, est.; delivery Nov. 20/21, est.; sister to West Lewark

G. F. MATTHEWS, PORTLAND

Quinault, hull 1, steam schr. for Hart-Wood Lumber Co.; launch Nov. 10 20; delivery Jan. 1 21, est.; 210 LBP; 43 beam; 20 loaded draft; 9 loaded speed; 1500 DWT; triple-expansion engines; 650 IHP; Babcock & Wilcox WT boilers; del. Jan. 21.

Undaunted, hull 2, 5-mast schr. for Hart-Wood Lumber Co.; launch Jan. 15 21, est.; delivery Feb. 15 21 est.; 264 LBP; 46 beam; 24 loaded draft; 3800 DWT.

MOORE SHIPBUILDING COMPANY, OAKLAND

West Bohemian, hull 2862, tanker for USSB, 425 LBP; 57 beam; 26 loaded draft; 10,000 DWT; rec. eng., three Scotch boilers, 15-2x11; keel Oct. 23 20, launch May 28 21, est., delivery July 14 21, est.

West Tustem, hull 2863, tanker for USSB; sister to West Bohemian; keel Nov. 24 20, launch June 30 21, est., delivery Aug. 25 21, est.

West Lubrico, hull 2864, tanker for USSB; sister to West Bohemian; keel Jan. 21; launch July 30 21, est.; delivery Sept. 29 21, est.

Manulani, hull 158, freighter for Matson Nav. Co.; keel laid Aug. 5 20; 480 LBP; 62 beam; 30 loaded draft; 14,000 DWT; Parson engines; five Scotch marine boilers, 15-6 x 12-3½.

Manukai, hull 159, freighter for Matson Nav. Co.; keel laid Aug. 17 20; dim., etc., same as hull 158.

M. F. Elliott, hull 161, tanker for Stand. Oil Co. of N. J.; keel laid July 2 20; 425 LBP; 57 beam; 26-3 loaded draft, 10,100 DWT; rec. engines; three Scotch boilers, 15-2x12; launch Nov. 13 20; delivery Jan. 18 21.

Tho. H. Wheeler, hull 162, tanker for Stand. Oil Co. of N. J.; keel laid July 28/20; dim., etc., same as M. F. Elliott; launch Dec. 5 20.

No name, hull 163, tanker for Stand. Oil Co. of Calif.; keel laying Oct. 20; 330 LBP, 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engines.

Gargoyle, hull 164, tanker for Vacuum Oil Co.; keel laid Sept. 13 20; 425 LBP; 57 beam; 2603 loaded draft; 10,100 DWT; rec. engines; three Scotch marine boilers, 15-2x12; launch Jan. 9 20.

Tamihua, hull 165, tanker for S. P.-Atlantic S. S. Co.; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; rec. engines; three Scotch boilers, 15-9 x 12.

No name, hull 166, tanker for Vacuum Oil Co.; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec. engines; three Scotch marine boilers, 15-2x12; keel Dec. 9 20.

NAVY YARD, PUGET SOUND

Nitro, ammunition carrier for government; keel laying Mar. 19 19; launching Dec. 16 19; 460 LBP; 61 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp.; turbine engines, 5300 IHP; four Babcock & Wilcox WT boilers; del. Mar. 15 21, est.

Medusa, repair ship for government; keel laying Jan. 2 20; 460 LBP; 75 beam; about 19 loaded draft; 17-5 loaded speed; turbine engine, 7000 IHP; two watertube express type boilers; 10,000 tons disp.; del. Aug. 31 21, est.

Holland, submarine tender for government; date for keel laying not set; 460 LBP; 61 beam; about 20 loaded draft; 16 K. loaded speed; turbine engine, 7000 IHP; two watertube express type boilers; 10,000 tons disp.

NAVY YARD, MARE ISLAND

California, battleship for U. S. Navy; keel laying Oct. 25 16; launching Nov. 20/19; 600 LBP; 97-3½ beam; 30-3 loaded draft; 21 loaded speed; 32,300 displacement; turbo-electric engines, 26,800 SHP; eight Bu's express boilers, 50,984 sq. ft.

Montana, battleship for U. S. Navy; keel laying Sept. 1 20; 660 LBP; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 displacement; turbo-electric engines, 60,000 SHP; twelve Bu's express boilers, 74,040 sq. ft.

Zane, destroyer for U. S. Navy; keel laying Jan. 15/19; launching Aug. 12/19; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 displacement; geared turbine engine; 26,000 SHP; four Normand boilers, 27,000 sq. ft.

Wasmuth, destroyer for U. S. Navy; keel laying Aug. 12 19; launching Sept. 15 20; dim., etc., same as Zane.

Trever, destroyer for U. S. Navy; keel laying Aug. 12 '19; launching Sept. 15/20; dim., etc., same as Zane.

Perry, destroyer for U. S. Navy; keel laying Sept. 15 20; dim., etc., same as Zane.

Decatur, destroyer for U. S. Navy; keel laying Sept. 15/20; dim., etc., same as Zane.

NORTHWEST BRIDGE & IRON COMPANY, PORTLAND

Purchasing Agent: W. C. Smith

Swiftsure, tanker for Swiftsure Oil Trans. Co. (France & Canada S. S. Co.); 12,000 DWT; shelter deck; Isherwood system; 465-7 LBP; 60 beam; 26 3 loaded draft; 10½ loaded speed; TE eng., 3150 IHP; three Scotch boilers, 15-5½x11-9; keel June 6; launch Dec. 15; del. Jan./21.

Swiftarrow, tanker for Swiftsure Oil Trans. Co. (France & Canada S. S. Co.); 12,000 DWT; shelter-deck; Isherwood system; 465-7 LBP; 60 beam; 26-3 loaded draft; 10½ loaded speed; TE eng., 3150 IHP; three Scotch boilers, 15-5½x11 9; launch Jan. 18 '21.

Swifteagle, tanker for Swiftsure Oil Trans. Co.; sister to Swiftarrow.

Swiftking, tanker for Swiftsure Oil Trans. Co.; sister to Swiftarrow.

Swiftlight, tanker for Swiftsure Oil Trans. Co.; sister to Swiftarrow.

Swiftstar, tanker for Swiftsure Oil Trans. Co.; sister to Swiftarrow.

Swiftwind, tanker for Swiftsure Oil Trans. Co.; sister to Swiftarrow.

PACIFIC COAST SHIPBUILDING COMPANY, BAY POINT

Purchasing Agent: J. A. Smiley

Namasket, hull 948, steel cargo for USSB; 402-6 LBP; 53 beam; 26-6 loaded draft; 9400 DWT; rec. eng., 2800 IHP; three Scotch boilers, 11x15-6; keel June 18 19; launch Aug. 2 20; delivery Jan. 7 '21.

Meanticut, hull 949, steel cargo for USSB; keel laying July 18 19; dim., etc., same as Namasket; del. Mar. 21, est.; launch Dec. 22 20.

Nashaba, hull 950, steel cargo for USSB; keel laying Aug. 25 19; dim., etc., same as Namasket; del. June 21, est.; launch Mar. 25 21, est.

J. H. PRICE CONSTRUCTION COMPANY, ANDERSON SHIPBUILDING PLANT, SEATTLE

Wood M S Donna Lane, launch Nov. 15 20.

Wood M S Muriel, launch June 26 20.

PRINCE RUPERT SHIPBUILDING & DRYDOCK COMPANY, PRINCE RUPERT

Canadian Reaper, steel cargo for Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Sept. 27 19.

Canadian Thrasher, steel cargo for Canadian government; 8390 DWT; 2 deck; bridge, poop and forecastle; 11 speed; keel Oct. 20 19.

These vessels were about 75 per cent completed when work was suspended by the company in November. The Wallace Shipyards, North Vancouver, are reported to have been awarded a contract for completing them.

JAMES ROBERTSON SHIPYARD, ALAMEDA

Purchasing Agent: James Robertson

No name, hull 102, side-wheel ferryboat for Richmond-San Rafael Ferry Co.; keel Nov. 15 20; 190 LBP; 34 beam; 17 loaded draft; 10 loaded speed; digaonal cross comp. eng., 500 IHP; two marine dry back boilers, 9 x 17.

ST. HELENS SHIPBUILDING COMPANY ST. HELENS

Purchasing Agent: A. F. Barnett

No name, hull 52, fuel barge for Swift & Co.; keel laying Sept. 1/20; 130 LBP; 34 beam; 7 loaded draft.

No name, hull 53, fuel barge for Swift & Co.; keel laying Sept. 1/20; dim., etc., same as bull 52.

Both delivered; no additional work.

SAN FRANCISCO SHIPBUILDING COMPANY, OAKLAND

Peralta, hull 1662, tanker for USSB; keel laid Oct. 10/18; launching Oct. 26/20; delivery Jan. 31/21, est.; 420 LBP; 56 beam; 26 loaded draft; 10½ loaded speed; 7500 DWT; rec. engines, 2800 IHP; three watertube boilers, 21,000 sq. ft.

SEACRAFT CORPORATION OF CALIFORNIA WILMINGTON

Purchasing Agent: C. D. Callahan.

Recently took over yard of Marine Equipment Co.; overhauling equipment preparatory to construction of pleasure craft.

SOUTHWESTERN SHIPBUILDING COMPANY, EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

No name, hull 23, Isherwood tanker for Union Oil Co.; keel laying Dec. 22/20; delivery July/21, estimated; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engines, 2800 IHP; three Scotch boilers, 14x12.

No name, hull 24, Isherwood tanker for Anglo-Saxon Pet. Co.; keel laying Oct. 20/20; delivery Mar./21, estimated; 412 LBP; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engines, 2800 IHP; three Scotch boilers, 15-6 x 11-7.

No name, bull 25, Isherwood tanker for Anglo-Saxon Petroleum Co.; keel laying Oct. 20/20; delivery Apr./21, estimated; dim., etc., same as hull 24.

No name, hull 26, Isherwood tanker for Anglo-Saxon Petroleum Co.; keel laying Nov. 5/20; delivery May/21, estimated; dim., etc., same as bull 24.

Montebello, hull 21, Isherwood tanker for Union Oil Co.; keel laid Apr. 20/20; launching Jan. 24/21; delivery February/21, estimated; 440 LBP; 58 beam; 29-2 loaded draft; 11 loaded speed; 12,000 DWT; QE engines, 3300 IHP; three Scotch boilers, 15-6 x 12-1.

La Placentia, hull 22, Isherwood tanker for Union Oil Co.; keel laid May 20/20; launching Feb. 21, estimated; delivery Mar. 21, estimated; dim., etc., same as Montebello.

G. M. STANDIFER CONSTRUCTION CORPORATION, VANCOUVER, WASH.

John Worthington, hull 16, shelterdeck oil-tanker for Standard Oil Co. of N. J.; 11,740 DWT; VQM engines, 2800 IHP; three Scotch boilers, 14-4 diam.; Isherwood framing; launch Nov. 15/20; delivery Dec. 20.

W. H. Libby, hull 17, shelterdeck oil-tanker for Standard Oil Co. of N. J.; dim., etc., same as John Worthington; launch Dec. 15/20; delivery Jan. 21.

Livingston Roe, hull 18, shelterdeck oil-tanker for Standard Oil Co. of N. J.; dim., etc., same as John Worthington; launch Jan. 16 21.

Calgarolite, hull 19, shelterdeck oil-tanker for Imperial Oil, Ltd.; dim., etc., same as John Worthington, except boilers, which are 14-9 diam.

Albertolite, hull 20, shelterdeck oil-tanker for Imperial Oil, Ltd.; dim., etc., same as Calgarolite.

W. F. STONE & SON, OAKLAND

Purchasing Officer: Lester F. Stone.

Sea Lion, tug for S. O. & M. Tug Boat Co.; delivery Jan. [illegible] 130 LBP; 30 beam; 16 loaded draft; 12 loaded speed.

Sea Monarch, tug for S. O. & M. Tug Boat Co.; delivery Feb./21, estimated; dim., etc., same as Sea Lion.

Sea Ranger, tug for S. O. & M. Tug Boat Co.; delivery Mar./21, estimated; dim., etc., same as Sea Lion.

Sea Scout, tug for S. O. & M. Tug Boat Co.; delivery April/21, estimated; dim., etc., same as Sea Lion.

TODD DRYDOCK & CONSTRUCTION CORPORATION, TACOMA

Kennecott, Isherwood steel motorship for Alaska S. S. Co.; 360 OA; 49-6 beam; 22 loaded draft; 6500 DWT; McIntosh & Seymour four-cycle Diesel engines, 1200 IHP; 140 RPM; launch Jan. 6/21; delivery Feb./21, est.

Three scout cruisers for United States Navy, 555-6 LOA; 550 LBP; extreme beam 55-4; molded beam 54-9; depth molded 26; mean loaded draft 13-6; displacement 7100 tons; Westingbouse Parsons turbines and reduction gear, developing 105,000 IHP, driving four propellers; designed speed 34 knots; RPM each propeller 375 to 389; shaft HP to each propeller 24,500 max. at 389 RPM, 22,500 max. at 375 RPM; twelve Yarrow WT boilers, working pressure 265 pounds; oil-burning; twelve 6-inch rapid-fire guns, two 3-pounders, two machine guns, two twin torpedo tubes.

First of these vessels launched Dec. 14/20 and christened Omaha; keel laid by Seattle Construction & Drydock Co. July '17 but removed for merchant work; relaid by Todd Dec./18.

UNION CONSTRUCTION COMPANY, OAKLAND

Liebre, bull 12, oil-tanker for General Pet. Co.; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engines, 3000 IHP; three Scotch marine boilers, 15-4x11-8; keel June 9/20; launch Dec. 15/20; delivery Feb. 1 21, est.

R. J. Hanna, hull 14, oil-tanker for Standard Oil Co. of Calif.; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engines, 3000 IHP; three Scotch marine boilers, 15-2x11-6; keel July 12/20; launch Feb. 1/21, est.; delivery Mar. 15/21, est.

No name, bull 15, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; 412 LBP; 53-5 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec. engines, 2600 IHP; three Scotch marine boilers, 15-6x11-7; keel Aug. 7 20; launch Feb. 15/21, est.; delivery Apr. 1/21, est.

Tampa, hull 16, cutter for USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engines, 2600 IHP; two watertube boilers; keel Sept. 27 20; launch Feb. 18/21, est.; delivery April 7/21, est.

Haida, hull 17, cutter for USCG; dim., etc., same as hull 16; keel Sept. 27 '20; launch Feb. 18/21, est.; delivery Apr. 7 21, est.

Mojave, bull 18, cutter for USCG; dim., etc., same as hull 16; launch June 1/21, est.; delivery July 15/21, est.

Modoc, hull 19, cutter for USCG; dim., etc., same as hull 16; launch June 1/21, est.; delivery July 15/21, est.

Shawnee, bull 20, cutter for USCG; 150 LOA; 30 beam; 13-6 loaded draft; 12½ loaded speed; 1000 DWT; rec. engines, 1000 IHP; two watertube boilers.

No name, bull 21, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec. engines, 2600 IHP; three Scotch marine boilers, 15-6x11-7; keel Dec. 15/20.

No name, bull 22, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; same dim., etc., as bull 21.

No name, hull 23, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; same dim., etc., as hull 21.

All cutters on transverse system; otbers on Isherwood system.

WALLACE SHIPYARDS, NORTH VANCOUVER, BRITISH COLUMBIA

Canadian Skirmisber, cargo for Canadian government; 8400 DWT; 413 long; 52 beam; 31 deep; 11½ loaded speed; keel Oct./20; launch Feb. 28 '21, est.; delivery Apr. '21, est.

Coastwise steamsbip for Canadian Pacific; 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel Oct. 20; launch May 21, est.; delivery Aug. or Sept. 21, est.

Miscellaneous Construction

ALBINA ENGINE & MACHINE WORKS, PORTLAND

Building pontoon for Portland Dock Commission; four sections delivered, last to be completed about Feb. 15 21.

BABCOCK & WILCOX COMPANY, CHARLES C. MOORE, SAN FRANCISCO, PACIFIC COAST MANAGER

Steamer Quinault, Hart-Wood Lumber Co., installation of two Babcock & Wilcox marine boilers.

Steamer Pacific, Pacific Marine Iron Works, installation of two Babcock & Wilcox marine boilers.

COLUMBIA STEEL COMPANY, PITTSBURG, CALIFORNIA

Steel castings for many steel vessels now under construction in the Pacific Coast yards, including dreadnought Montana and sister ships 49, 50, 52; also for Coast Guard cutters under construction in the Union Const. Co. yard.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING COMPANY, PHILADELPHIA

Twelve Parsons manganese bronze propellers for scout cruisers 4, 5 and 6 building by Todd Drydock & Construction Corporation, Tacoma. Two right-hand and two left-hand propellers for each vessel. Weight of propellers 13,200 pounds each; diameter 11-3; pitch 11-10.

ALLAN CUNNINGHAM COMPANY, SEATTLE

On order and under construction: 6 steam and electric steering gears; 13 steam and electric anchor windlasses; 18 steam and electric and hydro-electric and hand capstans; 37 steam and electric winches.

DOW PUMP AND DIESEL ENGINE COMPANY, ALAMEDA

Unnamed, motorship for Standard Oil Company: one 200 IHP, two 267 IHP Diesel auxiliary electric drive engines.

FORD & GEIRRINE, AGENTS, SAN FRANCISCO

McNab direction indicator, mfd. by the McNab Company, for hulls 12, 14 at Union Const. Co., hull 163 at Moore's; Willett-Bruce whistle control, mfd. by the McNab Co., for hull 14 at Union Const. Co., Brown steam tiller, Hyde Windlass Co., for hull 5308 at Bethlehem; National stockless anchors, Upson Walton Co., for hull 165 at Moore's; Dean feed pumps, Dean Bros. Steam Pump Works, for 166 at Moore's; Reliance forced draft equipment, John Reid & Co., for hulls 165, 166, at Moore's.

LIDGERWOOD MANUFACTURING COMPANY, NEW YORK, SAN FRANCISCO, LOS ANGELES

One 10x10 inch screw gear steering engine for U. S. S. Holland building at Puget Sound Navy Yard.

One 13x13 inch automatic tension towing engine for Merrill-Ring Lumber Co.'s tug Wanderer.

LLEWELLYN IRON WORKS, LOS ANGELES

Five marine engines for G. M. Standifer Construction Corporation, 24½ x 41½ x 72, 48 stroke, TE, 2800 IHP.

One for steamship Montebello, Southwestern Shipbuilding Company, 24 x 34 x 51 x 74, 54 stroke, QE, 3300 IHP.

One for tanker Liebre, Union Construction Co., 27 x 47 x 78, 48 stroke, TE, 3200 IHP.

One for tanker Hanna, Union Construction Co., same dimensions as above.

MAIN IRON WORKS, SAN FRANCISCO

Purchasing Officer: B. W. Bengston.

Outfitting four tugs for Shipowners' & Merchants' Tug Boat Co.; 150 over-all; 30 beam; 16 loaded draft; TE engines, 1000 IHP; two Scotch marine boilers, 11-6; deliveries Jan. 15/21; and Feb. 15, Mar. 15, Apr. 15, est.

MARINE IRON WORKS, CHICAGO

Five hundred special ice machines.

SKANDIA PACIFIC OIL ENGINE COMPANY, OAKLAND

Purchasing Agent: A. Bolander.

Ten 850 BHP Werkspoor Diesel engines building for USSB; 6 cyl., 135 RPM; delivery of two engines Dec./20.

Ten 140 BHP 4-cylinder Skandia engines for self-propelled barges on Erie Canal.

Fifteen 16 BHP 1-cylinder Skandia engines, auxiliaries for above.

STEWARD DAVIT & EQUIPMENT CORPORATION, NEW YORK, SAN FRANCISCO, SEATTLE

Steward davits are being installed in the following: At Alameda works, Bethlehem S. B. Corp.; Yerba Linda, hull 5307, for Gen. Pet. Co. At Union Linda, hull 5307, for Gen. Pet. Co. At Union Const. Co.: Coast Guard cutters, hulls 16, 17, 18, 19, for U.S.; Liebre, hull 12, for Gen. Pet. Co..

At Todd's: SS. Edmore.

At Long Beach: SS. Mazatlan.

At Moore's: hull 164, for Vacuum Oil Co.; M. F. Elliott, hull 161, for Standard Oil Co. of N. J.; Thos. H. Wheeler, hull 162, for Standard Oil Co. of N. J..

For Pacific SS. Co.: Admiral Schley.

UNION GAS ENGINE COMPANY, OAKLAND

Purchasing Agent: E. H. Cole

Drydocking and Repairs

BETHLEHEM SHIPBUILDING CORP., LTD.,

Potrero Works

Purchasing Agent: O. W. Street.

Engine and boiler repairs, hull repairs. SS. Waihemo, Maui. Miscellaneous repairs, drydocking and painting: Haviside Barge No. 1, Tugs Tatoosh, Chief; SS. Tascalusa, Nile, Multnomah, Delisle, Rogday, West Honaker, Chehalis, West Ira, Newport; Tug Standard No. 2; Yacht Venetia; M.S. Oronite; SS. Lansing (also new propeller hub, new tail shaft). Raising crankshaft, engine and boiler repairs, hull repairs: SS. Lurline. Miscellaneous repairs: SS. Indian City, City of Para, Mexican, Miskianza, West Nilus, China Arrow (also repairs to windlass), Hyades (also electric welding on hull), Sonoma, W. S. Miller (also installing rudder indicator), Montrolite; Barge Olinda. Installing governor on engine: SS. W. S. Miller. Engine and boiler repairs, hull repairs, drydocking and painting: SS. West Calera, Waitemata (also steward's dept.), Marama, Pomona. Repairs to double bottom: SS. West Calera.

Alameda Works

Miscellaneous repairs, drydocking and painting: Sch. Taurus, Bktn. Chas. F. Crocker, Sch. Port Angeles, Stm. Sch. Trinidad. New tailshaft, new propeller: Stm. Sch. Bee. Overhauling windlass, electric welding on boilers: Stm. Sch. Caoba. Engine and boiler repairs, docking, cleaning and painting, electric welding, hull repairs: SS. El Dorado.

LOS ANGELES SHIPBUILDING & DRY DOCK COMPANY, SAN PEDRO

Purchasing Agent: L. R. McFie.

General overhauling, cleaning, painting, repairing bottom: West Eldara. General overhauling, replacement of tailshaft, etc.: Prentiss.

MOORE SHIPBUILDING COMPANY OAKLAND

Drydocking, cleaning, painting: Str. Eelbeck, S. C. T. Dodd. Drydocking, cleaning, painting, miscellaneous repairs: Str. Eastern Merchant, Bakersfield, Eastern Sailor, West Camargo, Imlay, Eastern Ocean, Rotarian, Effingham, Quabbin, Quillwark, Argyll, Santa Monica, Medon, Rose Mahoney, Point Judith (misc. engine repairs), Solano; Bark James Johnson. Extensive engine and deck repairs: Str. Point Bonita. Miscellaneous engine repairs: Str. Cuba. Extensive engine repairs: Str. Columbia, San Juan. Extensive deck repairs: Str. Maui.

SOUTHWESTERN SHIPBUILDING COMPANY EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

General repairs: SS. Atlas, Satanta. Main boilers: SS. Santa Alicia. Main engine: SS. San Jose. Steering gear and engine: SS. Haxtum. Condenser and air pumps: SS. Argyll.

TODD DRYDOCKS SEATTLE

Miscellaneous repairs: Barges 23-31; M. B. Petroleum, SS. Sioux, Tacoma, H. B. Kennedy, Ixion, Wm. Donovan (general alterations), Eldridge, Wheatland, Montana (also overhauling seacocks, strainers), Schr. Columbia (also caulking). Cleaning, painting: Barge Commodore, SS. Windber, Norwood, Admiral Dewey (also change propellers). Hull, engine, deck repairs: U.S.A.M.P. Samuel Ringgold. Engine repairs: SS. West Togus. Engine and boiler repairs: SS. Spokane.

In West Coast Yards

B. C. Marine Engineers

An auxiliary schooner, building at the yard of the B. C. Marine Engineers & Shipbuilders, Vancouver, for the Hudson Bay Company, scheduled for delivery in November, has been delayed by the non-arrival of engines from England and will not be delivered until spring.

Bethlehem

Bethlehem's Potrero works, San Francisco, delivered the 11,800-ton freighter Hanley to the Shipping Board December 30. Only one merchant vessel, the Hammac, a sister to the Hanley, remains under construction at the Potrero works and she will be delivered in May, according to the yard's estimate. The Potrero plant is busily engaged on destroyer and submarine work for the government, however.

The Alameda plant of Bethlehem expected to deliver the 10,100-ton tanker Crampton Anderson to the Pan American January 30. The keel of the first 15,000-ton tanker for the Standard Oil of California was laid January 11 and that of the second was scheduled to be laid January 25; the third probably will follow in February. Launchings of the two tankers for the Shipping Board, the 10,100-ton sisters Hambro and Hamer, are set for March 30 and April 30.

Cholberg

Cholberg, Vancouver, B. C., launched the first of four four-masted barkentines, the S. F. Tolmie, December 28. The three others are scheduled to follow at intervals of about six weeks beginning January 15.

Coughlan

Keels of two 8350-ton freighters for the Canadian government merchant marine, Canadian Transporter and Canadian Freighter, were laid by J. Coughlan & Sons, Vancouver, B. C., January 6, following upon the delivery of the 8800-ton City of Victoria, builders' account, in December.

Hanlon

The Hanlon Drydock & Shipbuilding Company, Oakland, scheduled the 5350-ton freighter Memnon, built for the Shipping Board, for delivery January 25. This is the last vessel built by Hanlon for the government.

Harbor Marine

A car ferry for the Canadian Pacific, being built by the Harbor Marine Company, Victoria, heretofore scheduled for launching in December, was changed to launching in January. This is the last work on hand at the yard, an 8100-ton freighter for the Canadian government, christened Canadian Traveller, having been sent to the Victoria Machinery Depot for outfitting.

Long Beach

The Long Beach Shipbuilding Company, Long Beach, delivered the motor yacht Edythe to J. F. Craig December 15. The West Kebar, the last 8800-ton freighter for the Shipping Board, was delivered in the same month.

Los Angeles

Work on 8800-ton freighters for the Shipping Board is nearing an end at the plant of the Los Angeles Shipbuilding & Drydock Company, Los Angeles. The West Cusseta was delivered January 14 and the West O'Rowa was launched December 30, delivery to be late in February. The keel of an 11,000-ton freighter, the West Prospect, was laid December 31, which leaves one to lay, that of the West Chopaka, scheduled for late February. The first of the five 11,000-ton freighters, the West Lewark, is scheduled to be launched February 25, the others following her down the ways in April, May, July and September.

Matthews

The steam schooner Quinault built by G. F. Matthews, Portland, for the Hart-Wood Lumber Company, had her dock and river trials and was delivered in January. She was launched November 10. Another vessel, the Undaunted, a five-masted schooner for the Hart-Wood

Lumber Company, also is under construction at the Matthews yard.

Moore

A tentative date for launching the two 14,000-ton freighters Manulani and Manukai, being built by the Moore Shipbuilding Company, Oakland, for the Matson Navigation Company, has been set for February 20. These vessels and the Alaska Steamship Company's motorship building at Todd, Tacoma, are the only steel freighters for private account under construction on the Pacific Coast of the United States. Moore delivered the 10,100-ton tanker M. F. Elliott to the Standard Oil of New Jersey in January; launched the 10,100-ton tanker Gargoyle for the Vacuum Oil Company January 9; and laid the keel of the 10,000-ton tanker West Lubrico in the same month. The West Lubrico is the third of three sisters, the keels of the others having been laid.

A pontoon for the floating drydock was launched at the Moore yard in January. Another will be completed in March or April. The Moore Company bought the five-pontoon dock of Skinner & Eddy, Seattle, and is adding three pontoons to it; the eight may be used as one dock or as two.

Northwest Bridge

Northwest Bridge & Iron, Portland, delivered the 12,000-ton tanker Swiftsure to the Swiftsure Oil Transport Company in January. Her keel was laid June 6 and she was launched December 15. A sister ship, Swiftarrow, the second of seven, was launched January 18. The names of the other five vessels will be Swifteagle, Swiftking, Swiftlight, Swiftstar, Swiftwind.

Pacific Coast

The Pacific Coast Shipbuilding Company, Bay Point, delivered the 9400-ton freighter Namasket to the Shipping Board January 7. Two sister ships remain, the Meanticut and Nashaba, which are scheduled for delivery in March and June.

Prince Rupert

Reports received from Vancouver say that a contract has been awarded to the Wallace Shipyards, North Vancouver, B. C., for the completion of the two 8390-ton freighters, Canadian Reaper and Canadian Thrasher, under construction at the yard of the Prince Rupert Shipbuilding & Drydock Company, Prince Rupert, for the Canadian government. The vessels were about 75 per cent completed when the Prince Rupert yard suspended. The keels were laid September 27, 1919, and October 20, 1919.

St. Helens

Two fuel barges for Swift & Company have been delivered by the St. Helens Shipbuilding Company, St Helens, Oregon. No other work is on hand.

San Francisco

The last concrete tanker building on the Pacific Coast for the Shipping Board, the 7500-ton Peralta, is scheduled for delivery by the San Francisco Shipbuilding Company January 31. No other work is on hand.

Southwestern

Southwestern Shipbuilding Company, Los Angeles, laid the keel of the unnamed 7500-ton tanker for the Union Oil Company December 22. The 12,000-ton tanker Montebello for the Union Oil Company was launched January 24 and is scheduled for delivery in February, and the sister ship, La Placentia, is scheduled for February launching and March delivery. Keels of the three 8400-ton tankers for Anglo-Saxon Petroleum have been laid.

Standifer

The 11,740-ton tanker John Worthington, built by the G. M. Standifer Construction Corporation, Vancouver, Washington, for the Standard Oil of New Jersey, was delivered in December, and a sister, the W. H. Libby, in January. A third sister, the Livingston Roe, was launched January 16.

Todd

The Todd Drydock & Construction Corporation, Tacoma, launched the 6500-ton motorship Kennecott for the Alaska Steamship Company January 6 and expects to deliver her in February. The Kennecott was launched fifty working days after the laying of her keel. She is the largest steel full-powered motorship built on the Pacific Coast to this time; in fact, she is only the second, the 2800 deadweight ton Charlie Watson, built for the Standard Oil of California by the Union Construction Company, having been the first. The Kennecott is a vessel of 6500 deadweight tons and will be driven by two McIntosh & Seymour Diesel engines developing 1200 indicated horsepower each. This is the only merchant vessel under construction at the Todd yard, but three large scout cruisers under construction are sufficient to keep the plant busy for a long time.

Union Construction

The Union Construction Company, Oakland, expects to deliver the 10,200-ton tanker Liebre to the General Petroleum Company February 1, following upon the delivery of the 10,100-ton Yorba Linda by Bethlehem to the same company. These vessels will be the first owned by General Petroleum, as heretofore it has operated only chartered tankers. Union Construction expects to launch the 10,200-ton tanker R. J. Hanna for the Standard Oil of California about February 1; an unnamed 8400-ton tanker for Anglo-Saxon Petroleum February 15; and the Coast Guard cutters Tampa and Haida February 18. The second two cutters will be launched about June 1. The keel of the second Anglo-Saxon tanker was laid December 15, and two remain to lay.

Wallace

As was noted under Prince Rupert, the Wallace Shipyards, North Vancouver, B. C., will complete two freighters for the Canadian government at the northern yard. The Canadian Skirmisher, an 8400-ton freighter for the Canadian government, is scheduled to be launched at the Wallace yard February 28 and to be delivered in late April. The coastwise steamship under construction for the Canadian Pacific will be launched in May and delivered in August or September.

Skandia

The Skandia Pacific Oil Engine Company, Oakland, has been awarded a contract for the construction of ten 140 B. H. P. four-cylinder Skandia engines for self-propelled barges of the Erie Canal and for fifteen 16 B. H. P. one-cylinder Skandia auxiliaries for the others. Skandia delivered two 850 B. H. P. Werkspoor Diesels to the Shipping Board in December. Eight more are under construction.

Stone

The seagoing tug Sea Lion, built by W. F. Stone & Son, Oakland, and outfitted by the Main Iron Works, San Francisco, for the Shipowners & Merchants' Tug Boat Company, was delivered in January. Three sisters will be delivered at intervals of a month.

Notes of the Yards

Approval has been granted by the Shipping Board, under Section 23 Merchant Marine Act, of the following vessels built or building in Pacific Coast yards: tanker Mary Luckenbach for Luckenbach Line, Southwestern; tankers E. R. Kingsbury and W. S. Miller for Standard Oil of California, Bethlehem; unnamed motorship tanker for Standard Oil of California, Moore; motorship tanker Charlie Watson and steam tanker R. J. Hanna for Standard Oil of California, Union Construction; motorship Kennicott for Alaska Steamship Company, Todd, Tacoma; tankers Franklin K. Lane, Crampton Anderson and William H. Doheny for Pan American Petroleum & Transport Company, Bethlehem. Up to the middle of December the board had approved 34 vessels of approximately 280,000 deadweight tons.

Analysis of Section 23

Several companies have notified the Shipping Board that they intend to take advantage of Section 23 by building vessels or depositing in trust an amount equivalent to the taxes from which they are exempt. The following analysis of the effect of Section 23 has been prepared by Winthrop L. Marvin, general manager of the American Steamship Owners' Association:

"In substance what the new plan means is that American shipowners who have tonnage earning excess profits in foreign voyages will be aided in the building of new tonnage by a subsidy of $1 for every $2 private capital so invested. This in effect would be, for example, a subsidy of $500,000 in the case of a cargo steamer of 10,000 tons deadweight capacity, assuming that such a ship would cost $1,500,000 at the present time.

"This is the most liberal national encouragement which any government has ever given toward the increase of the cargo carrying tonnage of a merchant marine. It is also a powerful aid toward the maintenance of ships built under its benefits. Assuming that the $500,000 subsidy from the government on a 10,000-ton ship would reduce the cost of the ship by that amount to the shipowner, the annual saving in the charges on invested capital would be as follows:

Insurance, 3 per cent	$15,000
Depreciation, 5 per cent	24,000
Interest on investment, 5 per cent	25,000

"That is to say, the actual value of the government subsidy of $500,000 to the owners of a 10,000-ton vessel would be at the rate of $65,000 a year, which would put the American ship in a very advantageous position in competition with foreign ships, whose owners are required to pay excess profits taxes to their governments."

Ames Yard Sold

Bills of sale have been filed in Seattle whereby the Ames Shipbuilding & Dry Dock Company sells to the Seattle Contract Company all of its machinery, equipment, stores and buildings, the Ames company retaining the land upon which the plant is situated on the West Waterway. It is the intention to immediately start dismantling the plant. The Ames Company is not yet decided as to what use it will make of its waterfront holdings.

Drydock Near Completion

The sixth and last section of the floating drydock of the Los Angeles Shipbuilding & Drydock Company, under construction at the yard of the Ralph J. Chandler Company, Wilmington, will be completed before the middle of February.

An unusual repair job was done during the month at the Moore Shipbuilding Company's yard, Oakland. The steam schooner Fred Baxter, damaged on Puget Sound and towed to San Francisco for repairs, had a 20-inch hog in her keel. Under supervision of Captain Cecil Brown, Marine Underwriters' surveyor, the Moore yard removed this by driving out the treenails and permitting the hull to drop back in place.

A contract has been awarded the Yarrows yard, Victoria, for the repair of the Standard Oil tanker Atlas, which went ashore in Alaskan waters in December.

The Todd Drydocks, Seattle, are overhauling the Pacific Steamship Company's liner President at a cost of about $125,000.

P. Lyall & Sons, Montreal and Vancouver, have been awarded a contract for the construction of the Canadian government's drydock at Esquimault for approximately $4,300,000, or $200,000 less than the government's estimate.

On the East Coast

Hog Island Nearly Done

During the four weeks ending December 18 Hog Island delivered three army transports, Somme, Argonne and Chaumont, and held the trial of a fourth, the Marne, the latter of which was delivered later in December, leaving only three transports under construction. Deliveries of these were scheduled for January, after which work at the great shipyard will cease. Of the 122 vessels built at the yard 110 were standard A-type cargo vessels and 12 B-type transports. In a holiday letter to employes of the yard, M. C. Brush, president, said: "The total ships delivered have steamed 3,508,434 miles and carried over 3,395,794 tons of cargo, and in no instance, to our knowledge, has there been a ship failure due to poor workmanship or material." If these facts could be told to the people of the United States the newspaper sneers at Hog Island would fail of effect.

Harlan 1920 Record

With the delivery of a cargo ship and a tanker in December, the Harlan plant of the Bethlehem Shipbuilding Corporation, at Wilmington, rounded out a production year of 67,500 tons for a five-way yard. The late 1920 deliveries included the last Emergency Fleet contract, the Natirar, a 7400-ton cargo carrier, and the Eugene V. R. Thayer, a 12,600-ton tanker for the Sinclair Navigation Company. December also saw the launching of another 12,600-toner for the Sinclair Navigation Company, the Albert E. Watts, making nine ships accepted and ten launched.

U. S. S. Board Work

The Atlantic Coast Shipbuilders' Association, Philadelphia office, has been advised that at the end of December there remained under construction at five yards on the Delaware River for the Shipping Board 26 vessels. All the vessels will be delivered by March 1 except some of the combinations of the New York Shipbuilding Corporation, some of which will not be delivered prior to September 1. Work for the board has been completed by the Chester yard of the Merchant Shipbuilding Corporation, the Sun Shipbuilding Company and the Gloucester and Wilmington plants of Pusey & Jones. In other Delaware River yards work for the board was as follows the first of the year: Harriman yard, Merchant, five 8800-ton cargo; Cramp, outfitting one 9400-ton and one 12,375-ton cargo; Hog Island, five 8000-ton army transports; New York Shipbuilding, thirteen 13,000-ton combinations; Harlan plant, Bethlehem, one 7400-ton cargo.

The Newburgh Shipyards, Newburgh, N. Y., completed its shipbuilding profram for the government with the delivery December 21 of the steamship Storm King, 8434 deadweight; and commemorated its building program for ships of private ownership with the delivery December 23 of the 7304-ton steamship Herman Frasch to the Union Sulphur Company. The Storm King was the twelfth vessel of her type.

Launchings

The Standard Shipbuilding Corporation launched the 8400-ton tanker San Theodore for the Eagle Oil Transport Company of London December 18. She is 427 feet long, has an extreme breadth of 53 feet and a speed of 11 knots. Three sister ships are building.

A Shipping Board combination vessel, the Centennial State, was launched by the New York Shipbuilding Corporation December 11. On the same day the Sun yard launched the 10,500-ton tanker Samuel L. Fuller for the Sinclair Consolidated Oil Corporation and Cramp launched the steamship Cuba for the Peninsular & Occidental's Key West-Havana service. The New York corporation launched the Lone Star State December 23.

The tanker Ogilvie was launched by the Tebo Yacht Basin Company for the Sinclair Navigation Company December 29, and the service boat Natalie Mae for the Todd service fleet on the same day. The two vessels brought the launchings of the Tebo yard to twenty.

The steamship Arden, the fortieth and last 8800-tonner built by the Harriman shipyard for the Shipping Board, was launched December 23.

WITH THE EXPORTERS AND IMPORTERS

Exchange in Shipping

For several months American business men have been forced to recognize the influence of foreign exchange rates upon our overseas trade, for the depreciation of certain currencies, notably the pound sterling and the Canadian dollar, in terms of American gold has been a grievous handicap to the continuance of our exporting. During these months, however, the bearing of exchange upon shipping has not been brought out so clearly. Now the question arises in two corners of the world, in the United States and Japan, and curiously enough the proposed solutions are diametrically opposite; Japan makes increases in freight rates to compensate shipowners for the decline of the shilling, the old-time basis of quotations; America, on the other hand, proposes decreases in freights to enable exporters to compete to better advantage with their Canadian brethren.

Australian Rates Up

Due to the decline of the pound sterling and naturally of the shilling as well, the Oriental steamship companies, whose rates are quoted in the latter medium, found their earnings severely cut when transformed into the Japanese yen. The N. Y. K., O. S. K. and the East Australian Steamship Company therefore suggested a change from the shilling to the yen, but objections of shippers to the departure from the traditional standard led the companies to reconsider their proposal and to decide instead to increase their rates to compensate for the decline of British currency. These increases have been approved by the Department of Communications in the the case of the N. Y. K., and presumably the O. S. K. and East Australian will conform, the raise being approximately 20 per cent, effective in January.

Diametrically the opposite proposal comes from James Grant, traffic manager of Falkenburg & Company, Seattle. He argues thus: "The rate on lumber from our own Coast ports and Vancouver to the Orient is $15 a thousand feet. If a Shipping Board carrier loads lumber in Seattle, she charges $15 a thousand feet in American money. If she loads in Vancouver, she charges $15 a thousand in Canadian money. The difference of the rate of exchange between the two countries is 16 per cent (end of December). In reality the Shipping Board vessel carries the lumber from Vancouver at the rate of $12.60 in American money. . . . In effect, therefore, the lumber rate from Vancouver is $2.40 lower. . . . As a result we have little or no lumber moving from our own Northwest ports, while Vancouver has a substantial movement."

Regarding Foreign Trade

We may accept Mr. Grant's statement that Canadian mills are shipping more lumber than are American and still disagree with him as to the efficacy of a reduction in the freight rate from American ports to $12.60. Let us take the hypothetical case of a thousand feet of lumber sold to Japan: The American mill charges $30 a thousand plus $15 freight, let us assume, the total cost of the lumber laid down in Yokohama being $45 American; the Canadian mill charges $30 plus $15, the cost being $45 Canadian. Although Japanese-American exchange has fluctuated, it had been comparatively stable, so that we may say that the cost of the American lumber is yen 90; but if Canadian currency be at approximately the same discount in Japan as in America, then the cost of the Canadian lumber will be, not yen 90, but 75. A reduction of the freight rate to $12.60 would absorb only about one-third of the unfavorable differential, leaving the Canadian exporter with an advantage of yen 10. Mr. Grant cannot expect the American shipowner to accomplish the impossible task of rectifying foreign exchange by making reductions such as this proposed.

We Must Increase Imports

The fact is, as scores of authorities have dinned into the ears of American exporters, that a country whose currency is at a discount has the most impelling of reasons for increasing its exports and contrariwise of reducing its imports, and nothing less than either or both of those acts can remedy the exchange situation. The National Foreign Trade Convention, held in San Francisco in May, reiterated that fact in a hundred different forms; many exporters did not take the truth home, but sooner or later they must.

Mr. Grant continues to indicate other effects of the exchange rate: "Freight originating in any part of Canada and going through Vancouver to the Orient pays its transportation charges, both rail and water, in Canadian currency." That is to be expected, for the Canadian Pacific scarcely could refuse to accept the Dominion dollar. And the resident of Canada probably experiences as much difficulty in acquiring a suitable collection of his own dollars as we of America experience in accumulating our fortunes. Mr. Grant goes on: "Freight originating in the United States and going to the Orient through Vancouver on a through bill of lading must pay its transportation charges in American money. In the case of American manufacturing centers close to the Canadian line is is possible, however, to ship the freight to a Canadian center on the local rate and then ship from that center to the Orient via Vancouver on a through bill of lading. In that case the through freight bill, both rail and water, would be paid in Canadian currency."

Americans Ship Across Border

As Mr. Grant says, freight moving from an American center to the Orient on a through bill of lading via Vancouver pays in American dollars. That American goods are being sent to Canadian centers near the line and being dispatched thence at the Canadian dollar rate comes somewhat as a surprise, because American shipping men had understood that the origin or destination of the goods determined the currency in which freights were paid. But there are others who believe that American importers and exporters are finding means of diverting their freight through Canada and of paying charges in Canadian funds to their consequent advantage. A letter to the editor of the Seattle Times by Wayne E. Butterbaugh, of W. J. Byrnes & Company, Seattle, says in part: "A Shipping Board steamship steamed into Elliott Bay with a few packages of freight for Seattle, her terminal and only port of discharge in the United States. . . . Her return cargo was mainly hemp, which was discharged at Vancouver, B. C. Why did this American steamship discharge her cargo at a Canadian port instead of an American port, when they are only 100 miles or so apart? For the same reason that all other steamers, American and foreign, have been doing this for the past two or three months. The cargo is ordered discharged there by the American importers. It is not an instance—but a steady practice. . . If discharged in Seattle the freight would be payable in American dollars. There is a difference of at least 15 per cent in the rate of exchange between the two countries. . . The result is that Vancouver is not feeling the trade slump that Seattle is feeling. Vancouver is prospering on American commerce—the commerce that formerly and rightly belongs to Seattle. . . The fact that they are both located on Puget Sound, enabling steamers from one port to touch at the other, creates a situation in connection with the rate of exchange for ocean freight that is unknown anywhere else in this country."

One solution, perhaps the only one immediately possible, is the making of rates in one currency or the other, in Canadian or American alone, as Mr. Butterbaugh suggests. But there are difficulties in the way of that solution; if the present rate in American dollars were extended to cover Canada the Canadian shipper would pay a freight increased by the difference in exchange; if the Canadian rate were extended to cover America, the American shipper would pay a freight decreased by the same difference; in the former case the steamship lines plying from Canada would benefit; in the latter those plying from the United States would lose. Canadian steamship lines would receive the same return or more, depending upon the medium; American would receive the same or less, so that our operators would be benefited only as they obtained more freight.

No doubt the port of Seattle and American shippers have a grievance; in that they are not alone: American shipowners deserve some consideration. In M. Grant's interview we read that rates should be reduced, in the next paragraph comes the admission that some foreign traders are shipping by Canadian lines so as to benefit by the exchange. What is sauce for the goose should be no less than sauce for the gander. To simmer the whole down to a few words: American foreign trade does not exist for American shipping; American shipping does not exist for American foreign trade; they exist for each other. Too often shippers ignore the mutuality of the relationship. They demand much of shipowners and sometimes are disposed to give little. If our foreign traders wish the support of the American merchant marine they can do no less than accord their support in return. Some of them demand regular line service by American vessels and yet ship by the first foreign tramp that cuts rates by five cents.

Hawaiian Tariff Out

Tariff No. 6 of the Pacific Coast-North Atlantic Eastbound Conference, issued December 9 and effective January 5, names commodity rates from ports of call of the Hawaiian Islands to Baltimore, Philadelphia and New York, direct service, as follows for tons of 2000 pounds: Coffee, green, in sacks, $22; pineapples, canned, in cases, $22; rice in mats or sacks, $19; sugar, raw, in sacks, $17.

This tariff was issued in anticipation of the opening of the Matson Navigation Company's direct service between Hawaii and Baltimore via San Francisco and the Panama Canal, which will be the first direct service between Hawaii and the Atlantic since the withdrawal of the American-Hawaiian.

No Statement as to Sugar

Although sugar appears on the tariff, no statement has been made as to what quantity, if any, will be dispatched to Eastern refineries. Formerly a large portion of the Hawaiian crop was refined in New York and Philadelphia, but the entire output of raws was diverted to the California-Hawaiian and Western refineries, San Francisco, during the last few years. Representatives of the different Hawaiian factors held meetings in San Francisco in December; they returned to Honolulu, however, without making any announcement as to the disposition of the 1921 crop. If no sugar is shipped, the principal eastbound cargo will be canned pineapple.

Other Lines Interested

Considerable interest attaches to the possibility of the American-Hawaiian re-entering the island service. The company's officials are considering the question, but no announcement has been made.

A New York-Hawaii service has been announced by the Isthmian Line, details of which are given under new services.

Rate Declines

A reduction has been made in the sailings of vessels of the European-Pacific Line, operated by Williams, Dimond & Company, San Francisco, from two a month to one a month. The new schedule will be effective during the slack winter season; to what extent the number of sailings will be increased later depends upon freight offerings. Only four European ports, London, Liverpool, Antwerp and Hamburg, will be made regular ports of call, but calls will be made elsewhere should cargo justify. Vessels of the line will return directly to the Pacific Coast.

With the announcement of fewer sailings, Williams, Dimond & Company made public reductions in freight rates from the Pacific Coast to Europe. The more important follow in dollars and cents a hundred pounds:

	New		Old	
	U.K.	Cont.	U.K.	Cont.
Canned goods,				
strapped	$1.25	$1.10	$1.65	$1.25
not strapped	1.40	1.25	1.80	1.40
Dried fruit,				
strapped	1.55	1.40	1.75	1.65
not strapped	1.70	1.55	1.90	1.80
in sacks	1.55	1.40	2.15	2.05
Kernels	1.55	1.40	2.00	1.75
Honey	1.50	1.50	2.00	1.90
Beans	1.40	1.25	1.60	1.35

Lumber Tariffs Drop

The Pacific-Argentine-Brazil Line of Swayne & Hoyt has cut the rate on lumber from Puget Sound to the East Coast of South America from $35 to $30 a thousand board feet. This will place Western Washington lumber on a parity with Southern yellow pine in South America, which has been held by the yellow pine producers. This was the third reduction in ocean lumber rates from Puget Sound in early January.

On January 1 four intercoastal steamship lines cut the lumber rates from Puget Sound to the Atlantic Coast ports from $22.50 to $20 a thousand board feet. Only three weeks before that, the same lines had cut the rate from $25 to $22.50. The new $20 rate placed Western Washington's Douglas fir on a parity with Southern yellow pine as regards the Eastern markets in the United States.

On January 8 the American and foreign steamship lines operating between Puget Sound and Great Britain and Continental Europe cut the lumber rate to the other side of the Atlantic from $45 to $40 a thousand board feet, as a means of stimulating great shipments of Douglas fir to Britain and the continent. The lines also agreed that the freight charges should be payable at destination instead of being prepaid. The new rate is legally placed at an English sterling rate of 225 shillings, which at present figures at $40.

And Also Flour

Meeting the competition of British ships, the division of operations of the United States Shipping Board reduced the rate on wheat and flour from $18 a ton to $16 a ton from Seattle and the Puget Sound and Columbia River districts to ports in the United Kingdom and Bordeaux and Hamburg range. The lower rate will apply to both cargo and parcel lots. The reduction in freights is expected to stimulate an increased movement of wheat and flour from North Pacific ports to the United Kingdom and Europe.

On January 14 a reduction was made in the trans-Pacific lumber rate from $15 to $12.50. Advices from the Orient state that a reduction has been made in the gunny rate from Calcutta from $12.50 to $10.

Freight Report

January 13, 1921.

Since our last circular, dated December 13, freight rates have continued to decline, although less on this coast than anywhere else in the world.

From the North, Strauss & Company chartered steamer Orient City at 95/- U. K., Continent, Bordeaux - Hamburg. This charter, however, had been made previous to the drop in freights recorded in our last report. The Pacific Grain Company are said to have chartered another steamer yet unnamed at 85/- for early February and 82/6 last half of

February. The Shipping Board also announced a reduction in its freight rates from $18 to $16, at which Kerr, Gifford & Company are reported to have chartered two steamers, and two more are supposed to have been taken by M. H. Houser.

The Pacific Grain Company also chartered motorship Peru from Portland to U. K., Continent, Bordeaux to Hamburg, at $15 a ton for February loading and $14 March 5 cancelling.

Board Rate More Favorable

With the present rise in exchange, the United States Shipping Board rate of $15 is more favorable to shippers than formerly, although they are still somewhat handicapped in that they do not allow freight to be payable at port of destination on vessel being discharged. The Shipping Board requires that freight be paid here on vessel's arrival at port of discharge.

From San Francisco no charters have been made for whole cargoes of grain, but from 8000 to 10,000 tons in parcels have been arranged to different ports in the United Kingdom at rates varying from 90/- to 85/-. Charterers are today willing to pay 80/- a ton for steamers for February loading from this coast, but do not seem inclined to charter for March loading as yet.

Few Lumber Charters

There have been very few lumber charters on account of the lack of demand from Australia, Africa and the West Coast. W. L. Comyn & Company have chartered John W. Wells for lumber from Portland to Sydney and Melbourne at a reported rate of $27.50. They have also sold cargoes from Eureka to Sydney or Melbourne, putting in their own vessels, the Charles F. Crocker and Rosamond, to carry the lumber sold.

Amsinck & Company chartered the schooner Bainbridge from Puget Sound to a Peruvian port at $30. Grace & Company chartered the schooner North Bend at the same rate of freight to Callao. These two charters were made some time ago. The present rate of freight is $25. The rates have been reduced to West Coast ports by the regular liners, which, failing to get general cargo, have filled up with lumber at the last moment at very low rates.

We quote present rates for lumber as nominally $25 a thousand to Sydney or Melbourne or Adelaide, and $25 to $27.50 for West Coast, and $40 to $42.50 for Africa.

C. A. Blumer, representing the Vacuum Oil Company, chartered auxiliary sailer Oronite, owned by A. F. Thane & Company, for petroleum products from San Francisco to two ports on the East Coast of Australia on private terms.

The Pan-American Line chartered the steamer Griffdu, also on private terms, on time charter, delivery and re-delivery this coast, intending to send her down to Mexico, Central America, etc., in its regular trade.

Purchases of Vessels

Captain Fletcher bought the schooner Oakland at the reported price of about $7000, and the Pere Marquette Line of Milwaukee, Wisconsin, have bought the steamer Rogday at $165,000. Their intention is to take her from this coast to the Atlantic, and then send her via Montreal into the Lakes where she was originally built as an ice-breaker. She is now resuming her original name of Nevada.

The steamer Lansing is supposped to have been sold to the Molasses Manufacturing people here for $550,000 by the Union Oil Company. Rumors have also been circulated that this same oil company either has sold or is arranging to sell the Erskine M. Phelps and the Simla, and the Robert Dollar Company is said to have bought the ex-German sailers now belonging to the British government, Hans and Thielbek, of the Santa Rosalia German fleet. We understand that these vessels will be towed to San Francisco to be refitted for sea.

The only kind of vessel that does not seem to have shared the depression in freight rates is the tanker, for which good rates are still obtainable and for which buyers will still pay good prices.

PAGE BROTHERS, Brokers.

Seattle Port Charges

Movements have been begun in Seattle to reduce port charges so as to place the city on a basis of equality with San Francisco and New York and also to endeavor to obtain a reversal of the ruling of the Interstate Commerce Commission whereby Portland was granted differential rates in the Columbia Basin case.

Freight Movement Declines

The situation as to port charges may be summarized from a comprehensive article in the Seattle Times. Said that paper: "Crippled by artificial shackles, Seattle's great foreign trade slumped approximately $125,000,000 in 1920 as compared to 1919, the city falling headlong from the second to the tenth place in the honor roll of America's major foreign trade ports. In the first eleven months of 1919, the port's foreign trade totaled 1,727,122 tons of cargo. In the first eleven months of 1920 it totaled only 1,334.327 tons, a sheer drop of 392,795 tons — a disaster that would have sent any ordinary port reeling to destruction. . . . In a period covering the greater part of last year (1920) Seattle's foreign trade fell off more than 30 per cent, while San Francisco's trade fell off less than 4 per cent. . . . On Oriental imports passing through Seattle on through bills of lading, the railroad and the steamship companies absorb all the handling charge of $1.30 a ton—provided the shipment moves out by rail within ten days of its delivery by steamship. The railroad absorbs half and the steamship absorbs half, or 65 cents a ton each. In San Francisco, the railroads enforce the ten-day limit, but the steamships absorb their share of the handling charge whether the shipment moves out in ten days or not. In New Orleans, New York, Boston, Philadelphia, Baltimore and other Eastern ports, the charges are all absorbed regardless of the length of time the cargo is held in the wharf or warehouse. . . . In Seattle a wharfage charge of 25 cents a ton is assessed against imports and a wharfage charge of 30 cents a ton against exports. This charge is levied against the shipper. The corresponding charge in San Francisco is 15 cents a ton, also paid by the shipper. New York, which outranks even San Francisco as a competitor for Seattle's Oriental trade, makes no such charge against the shipper."

Effective action demands the co-operation of steamship, railroad and ocean terminal.

Columbia Basin Case

The Columbia Basin decision, the bone of contention with Portland, was handed down by the Interstate Commerce Commission in November. This in effect gives Portland a 10 per cent advantage over Seattle in railroad rates from Inland Empire territory lying south of the Snake River. The original case was "a scantily disguised effort to exclude both Seattle and Tacoma from the markets of the richest wheat belt of Eastern Washington, Eastern Oregon and Idaho, and to obtain for Portland a monopoly of the wheat milling and exporting business originating in that territory," says Seattle; but the territory in which Portland was awarded the rate differential eventually was reduced to four Washington counties. The water-level haul to Portland as opposed to the mountain-grade route to Puget Sound was one of the reasons advanced by Portland for the differential, which was adjusted by the commission on a basis of a 5 per cent increase in the Sound rate and a 5 per cent decrease in the Portland.

Steamship Operations

The Conference Situation

An embryonic rate war in the westbound trans-Pacific trade was killed in the shell in November, a short time after the Shipping Board operators in the Orient had succeeded, with considerable difficulty, in forming a conference to have control of eastbound tariffs. Peace having been restored in the one instance and made in the other, the Pacific outlook, although possessing potentialities of trouble, was much better than it had been a few months previous. But now trouble has arisen in a somewhat unexpected quarter.

This quarter is the Orient-North Atlantic trade, in which the Shipping Board operators of Japan, with headquarters at Kobe, have reduced rates by about 20 per cent in order to meet reductions made by foreign companies, led by the Ellerman Line. Atlantic Freight Tariff No. 2 fixes new rates on goods moving from ports of Japan to the Atlantic north of the Capes of Virginia, via either Suez or Panama; among these new rates the most important are: beans and peas, reduced from $25 to $20; oils, by $6 to $7, the cut being about 20 per cent; and general cargo, from $25 to $20. Signatories to the tariff are Struthers & Dixon, Frank Waterhouse & Company, Pacific Mail, Admiral Line, Robert Dollar Company, Columbia Pacific, Los Angeles Pacific; and any other Shipping Board operators in the trade will be governed by the changes.

Cuts averaging 15 per cent have been made in the China-North Atlantic trade, according to reports from the Far East, but the China situation is not so clear as that of Japan. Preventing rate-cutting in the eastbound business is difficult because of the lack of a general conference; although the Shipping Board operators have their organization functioning, the foreign lines, not being members of any association, act independently as they see fit.

Pacific Lines Meet Situation

These reductions in Orient-New York rates have been met by the California members of the Pacific Westbound Conference recommending to their principals "the solicitation of cargo in the Orient for New York and New Orleans, for reshipment via Pacific Coast ports, at the through direct service rate. Division of this revenue between the trans-Pacific and the intercoastal lines will be made on a basis of 50 per cent to each line. Expense of transfer at San Francisco will be absorbed 50 per cent by each line." This cost is approximately $2 a ton of 2000 pounds.

Should the plan be adopted, as appears probable, only New York and New Orleans will be granted the equivalent of the direct rates; other ports, New Orleans-Boston range, will pay 15 per cent more except when they have direct sailings from the Orient, in which case the New York-New Orleans rates will govern for the time being. No provision is made, it will be noted, for rail and water shipments, which will be called upon to pay the old trans-Pacific rates, for the arrangement is solely between the steamship lines. But the plan does involve more trouble for the railroads, which through their increases have forced the diversion of cargo from the Pacific-overland routes to the all-water lines; the roads now find that the all-water rates, either by direct lines or via San Francisco, are materially lower than the rail and water charges. In brief, the railoads will discover import and export cargo to be exceedingly and increasingly scarce.

The effect of this plan may be indicated by referring to beans, Japan ports to the United States. The direct all-water rate to New York is $16; to the Pacific Coast, $7; the rail import rate, $25.10; the intercoastal, $14. The intercoastal lines, instead of receiving $14, will divide approximately that sum ($16 less handling charges) with the trans-Pacific companies. On the other hand, beans arriving at San Francisco for New York via rail will pay $7 trans-Pacific and $25.10 overland. As a matter of course, the railroads cannot expect to command business in these circumstances.

One result of the new arrangement will be the virtual annulling of the intercoastal import rates, announced a few months ago.

Harmony Restored

The intercoastal conferences were disturbed in January by the withdrawal of the United American Lines, operating the American-Hawaiian; the company, however, rejoined within a few days. The cause of the withdrawal was the unrestricted competition of the new Williams Line, which was a member of neither the westbound nor the eastbound conference; to meet this situation the United American withdraw, but rejoined, and the Williams Line entered the conference within a few days. In some newspaper accounts the suggestion appeared that the American-Hawaiian withdrawal was traceable to the fact that the Isthmian Line was not a member of the conferences. Such intimations are without foundation, for the Isthmian Line, although prevented by general policy from joining conferences, abides strictly by conference rates and works in harmony with other operators.

International Conference Desirable

In reductions such as those made in the Orient-New York trade, various and apparently unrelated factors often enter. For example, the celebrated cut in the Manila hemp rate, made by the Blue Funnel last spring, had behind it some little-known considerations; less remotely, the ruling rates from the Atlantic Coast to the Far East are continually subjected to possibility of change in order to conform to the tariffs from Great Britain; competition of steamship lines plying between the United Kingdom and the Orient is advanced as a reason for making reductions in the New York-Far East rates. When conditions such as these obtain the intimate relationship of freight costs with foreign trade becomes immediately apparent and gives point to Admiral Benson's argument that an international understanding with regard to rates is desirable. Beginnings have been made in stabilizing costs of production on land, such as fixing maximum hours of labor, and on sea as well —witness the International Seamen's Conference.

What Are Proper Rates

If a New York exporter is to have a fair field with his British rival, he should be granted proper freight rates. But what are proper rates? British lines plying from the United Kingdom make Singapore the point of division in rates, Hongkong taking a tariff higher by 10 per cent, because Hongkong is farther from Liverpool than is Singapore. But for the New York exporter Hongkong is the nearer port via Panama, though the farther via Suez. Thus a British line operating from New York to the Orient may insist upon meeting the Liverpool-Far East rates, giving the advantage to Singapore as against Hongkong, although from New York the relative distances are by no means what they are from Liverpool.

Conferences In Orient

The following conferences are in existence in the Orient:

Trans-Pacific Freight Tariff Bureau of Japan: This organization has been in existence for several years, but apparently had not functioned completely prior to the request made by Shipping Board operators during the last summer for an agreement with the Japanese and British lines. When the board directed that its operators organize conferences in the different trade routes and to work in harmony with those already in existence, the Americans in the Orient formed their own rate-making body and also sought and gained admission to the Trans-Pacific Freight Tariff Bureau of Japan. This organization has headquarters at Yokohama, N. Hayashi of the Nippon Yusen Kaisha being secretary, and maintains a branch at Kobe. The following are members: Canadian Pacific, Admiral Line, China Mail, Columbia Pacific, Sudden & Christenson, represented by the China Pacific Company; Los Angeles Pacific, represented by the American Express Company; N. Y. K., O. S. K., Pacific Mail, Struthers & Dixon, T. K. K.; Frank Waterhouse, represented by the American Trading Company.

Board's General Body

United States Shipping Board Trans-Pacific Homeward Conference: This is an association formed in compliance with the order of the board. It has committees in the principal ports of the Orient and headquarters at Shanghai, where L. Everett, of Struthers & Dixon, is general and local chairman. The local chairmen elsewhere are: R. C. Morton, Pacific Mail, Manila; R. O. Baker, Struthers & Dixon, Kobe (a subcommittee also has been formed at Yokohama); M. H. Hunt, Pacific Mail, Singapore. The general committee at Shanghai is made up of Struthers & Dixon, Pacific Mail, Admiral Line, Waterhouse, Columbia Pacific, China Pacific Company, agent; and the Robert Dollar Company. J. W. Shannon, Shipping Board, is secretary. Mr. Everett succeeded C. S. Holmes, Struthers & Dixon, who is returning to the States.

Trans-Pacific Freight Tariff Bureau of Hongkong: This conference is made up of the Canadian Pacific, O. S. K., N. Y. K., T. K. K. and Pacific Mail. J. Oram Shepard, Pacific Mail, is secretary. The Pacific Mail is the only American member company, but, as stated, the general conference of the Shipping Board has a Hongkong committee; and the Trans-Pacific Freight Tariff Bureau of Hongkong has a sub-committee at Shanghai.

Rates "Absolutely Net"

Hongkong-Japan Freight Conference: A preliminary agreement was signed by organizers of this association, effective September 1. Under the agreement Hongkong-Japan rates are protected. The signatories were: Jardine, Matheson & Company; Butterfield & Swire, Canadian Pacific, Dodwell & Company, Java - China - Japan Line; Mackinnon, Mackenzie & Company; Messageries Maritimes, Mitsubishi Shoji Kaisha, Nippon Yusen Kaisha, Asaka Shosen Kaisha; Shewan, Tomes & Company, Toyo Kisen Kaisha and the United States Shipping Board, Hongkong committee, representing the following: Pacific Mail, Barber, Robert Dollar, Los Angeles Pacific, Admiral Line, China Pacific Company, Struthers & Dixon and Frank Waterhouse. This agreement provides that "the rates of freight to be charged shall be net absolutely with the exception of commission (not exceeding 5 per cent) payable to brokers," although American lines might have given rebates, only foreign ports being affected, and some of the foreign lines are members of deferred-rebate conferences in other territories.

Foreign Lines Free

A study of this list discloses that no general conference exists in the Far East to control rates to the Atlantic, except, of course, for the Shipping Board organization, which includes no foreign members. Because of that condition the foreign lines, such as the Ellerman, were free to cut rates.

The really admirable organization of the Orient is the China Homeward Conference, "homeward" in this case being to Great Britain. That conference has divided territory among three companies: the Blue Funnel has complete jurisdiction over rates between all ports of the Orient and Atlantic ports of Europe; the Glen Line has the Mediterranean; and the Peninsular & Oriental the London and Liverpool express service. These three companies, acting for the conference, make their own rates in their allotted territories, the other members conforming; and the business is blanketed by a 10 per cent deferred-rebate the plan of which is well known.

A British System

In most of the important ports of the Far East, such as Hongkong, Kobe, Yokohama and Manila, the secretaries of the British conferences are sworn measurers, who are represented as having considerable authority in rate - making as between the lines and shippers. Their positions, too, give them first - hand knowledge of cargo movements, so that the deferred-rebate system is made more tight. The virtual monopoly held by sworn measures of Great Britain in the Orient has worked to the detriment of American business, as other foreign monopolies elsewhere in the world have worked, but some beginnings are being made to remedy the condition.

So far as can be ascertained on the Pacific Coast, no agreement has been reached by the Shipping Board and foreign operators as to the admission of American operators to deferred-rebate organizations such as the China Homeward. Negotiations looking toward the entry of the Americans were begun last summer and apparently considerable progress was made in London, although a consular report said that the Sherman Act was a stumbling-block. What the Sherman Act has to do with the Hongkong-Calcutta trade is not clear; moreover, the Merchant Marine Act implicitly permits American companies to give deferred rebates when United States ports are not affected, although rebates on freight moving to and from American ports are forbidden under severe penalties.

In Re Section 28

After several months of uncertainty, the policy of the Shipping Board as to the enforcement of Section 28, Merchant Marine Act, is becoming clearer. Following upon the positive statement of the board that the section would be enforced, once the necessity of the latest indefinite suspension had passed, comes authoritative announcement that the board proposes to work toward two ends: first, to build up adequate American services as soon as possible; and then to apply the section as those services to foreign ports and ports of American dependencies become adequate. This latter policy means that if Manila, for example, has sufficient American steamers to handle all business, preferential rail rates would be denied Philippine goods imported in foreign bottoms, regardless of the situation as regards Kobe.

New Vessels Produce Crisis

The dispatch of the new 535's and 502's to the Pacific will be critical. There could be no question as to the adequacy of freight tonnage when several vessels were tied up, but there has been an undisputed lack of passenger vessels under the American flag. On this fact some requests for another suspension of the section were based. A time may elapse before the board would regard different services as adequate, of course, but the eventual enforcement of Section 28, unless it should be repealed, now appears a certainty.

Such action doubtless will come as a surprise to foreign operators. Japanese steamship owners, as quoted in the press of that country, have frankly doubted the intention of the United States to enforce the section, citing, as ground for their belief, the fact that American freighters were being tied up for lack of cargoes; but the Japanese paid little or no attention to the shortage of passenger tonnage as an element of primary importance.

Represented as Club

Some Americans also may be surprised at the decision of the board, inasmuch as the statement had been frequently and authoritatively made that Section 28 was a club. No less a person than R. A. Dean, at that time general counsel to the board, so stated in an address before the San Francisco Chamber of Commerce; and other assertions to the same effect had been made, in spite of the fact that the Merchant Marine Act provides for suspension only on the ground of inadequate services. In other words, the Shipping Board's sole discretion lay, not in determining the advisability of enforcement, not in weighing the effect on other nations, but in deciding whether existing American services could be described as "adequate."

An interesting explanation of a method by which the Shipping Board might have suspended Section 28 indefinitely without violating the spirit of the act, however, is contained in a statement issued by W. L. Clark, Washington representative of the Pacific Steamship Company. Mr. Clark said in part: "It was the intent of the Shipping Board, however, in recommending the provisions of Section 28, that if foreign interests were inclined to treat American shipping fairly, abandoning subsidies for their ships in our trades, then in that event the board would not allocate to any trans-Pacific trade vessels adequate to carry all of the commerce in such trades and would not therefore be obligated to enforce the provisions of Section 28 in these trades."

So long as the Shipping Board controls such a large portion of American tonnage the enforcement of Section 28 might be postponed in the manner outlined by Mr. Clark, but upon the sale of the government fleet to private corporations the board would lose control of the vessels.

Protection for Pacific

Mr. Clark also brings forward an exceedingly interesting means of guarding against the diversion of foreign shipping from the trans-Pacific routes to the Pacific - Panama - Atlantic trades. This means is the embargo. That an embargo could be imposed against freight moving from the Orient through Canadian ports and thence to the United States has been stated repeatedly, but the suggestion that the embargo also might operate on the Atlantic is new. Mr. Clark says: "It was next claimed that Japanese and British carriers would divert to the Atlantic Coast business which they now handle through the ports of the Pacific. That now is an exploded theory. Long before the Jones Bill became a law (yes, even before Admiral Benson recommended the provisions of Section 28 to the committee on commerce), the Japanese carriers operating between the Orient and the United States Pacific ports had diverted away from the Pacific ports to their New York service every shipment for eastern destinations within the United States which it was possible for them to control in that direction or which could with economy be moved through the Panama Canal to United States ports on the Atlantic. . . . . Propagandists against this act claim that more than 80 per cent of the cargo handled through Pacific Coast ports originates on the Atlantic seaboard. A careful summary of the business of this company (Pacific Steamship) for a six months' period of 1920, January 1 to June 30, has demonstrated that more than 75 per cent of the 125,000 tons of cargo carried during that period originated at points from Chicago and west and that less than 25 per cent originated at points east of Chicago. So that erroneous claim is disposed of. . . . .

Prevent Traffic Diversion

"If Section 28 were made effective, it is contemplated by the Shipping Board and so stated by the chairman that the Interstate Commerce Commission will prevent foreign carriers from diverting from Pacific Coast ports to Atlantic ports freights such as formerly moved and should move in the transcontinental rail haul. In the event that the Interstate Commerce Commission should fail to appreciate the necessity for exercising its authority in that direction, there is vested in the Shipping Board under the authorities of Section 19 of the Jones law the mandatory power to require the commission to issue such regulations. Such action would protect the coast from loss of business."

Enforcement of Section 28 as regards American dependencies would affect the Philippines almost alone. Alaska and Hawaii are teritories and are under the coastwise laws, although in the case of Hawaii the coastwise laws have been suspended from time to time to permit of foreign vessels transporting passengers to and from the States. The only steamship line operating to American Samoa is the Oceanic, an American company; Guam is served only by United States Army transports, aside from a few trading vessels; so that the Philippines remain the one dependency that will feel the enforcement of Section 28. And this enforcement probably will come prior to the application of the coastwise laws to the archipelago, which cannot be until February 1, 1922, at least, according to Section 21 of the Merchant Marine Act.

Shipments in Transit Exempt

A statement has been issued by George B. McGinty, secretary of the Interstate Commerce Commission, on the application of import and export rates to shipments in transit when Section 28 becomes effective. It is in full as follows:

"The Interstate Commerce Commission has considered with the United States Shipping Board the question as to the application to import and export rates in connection with the provisions of Section 28 of the Merchant Marine Act of the well established principle that under the Interstate Commerce Act a rate upon a given shipment cannot be changed while the shipment is in transit, and the common understanding has been reached that in the event the provisions of Section 28 of the Merchant Marine Act should become effective they will not apply to import shipments which, prior to that effective date, have completed their ocean voyage and been turned over to the rail carriers, and will not affect export shipments which, prior to that effective date, have been delivered to, and receipted for, by the rail lines."

502 Arrives

The Pacific Coast had its first glimpse of the new passenger ships of the Shipping Board when the Creole State arrived at Los Angeles and San Francisco in January. This vessel, of the 502 class, will be used in the East India service of the Pacific Mail with two sisters, the Wolverine State and the Granite State, the allocation of the last of which was announced in January. With the three the Pacific Mail will maintain a schedule of slightly better than monthly sailings, the Creole State, for example, being due to depart from San Francisco February 1 and again April 22, less than three months afterward. Calls will be made at Honolulu, six days from San Francisco, and at the other ports as follows, the number of days indicating the time between ports: Honolulu to Manila, 15-16 days; Manila to Saigon, 3 days; Saigon to Singapore, 3 days; Singapore to Calcutta, 5 days; and return by the same route. No call will be made at Colombo by the first two vessels, but a service to that port will be maintained by all three beginning with the Granite State, sailing from San Francisco March 22.

22 Days to Manila

To put the schedule in another way, the Philippines will be reached on the 22d day from San Francisco, Singapore on the 28th, Colombo on the 34th and Calcutta on the 39th, and homeward bound the voyage will require 34 days. This service, as has been urged by Pacific Marine Review, should silence the outcry of the Philippines against the Merchant Marine Act, for Manila will have by far the best mail and passenger connection it has had with America.

Refrigerator space for 1300 tons is available on the three vessels of the 502 class. This should be of interest to exporters of fresh fruits.

535's Will Follow

The first of the 535's, the Golden State, is due to sail from Baltimore February 15, the same day as the Matson Navigation Company's Hawkeye State. Both will call at Havana. The first trans-Pacific voyage of the Golden State will begin March 19, when she will depart for Hongkong via Honolulu and ports of Japan. A sister, the Empire State, is due to sail May 14 and a third, name not known, June 11. The Pacific Mail intends to withdraw the Venezuela, Colombia and Ecuador from the trans-Pacific service upon arrival at San Francisco May 19, July 4 and September 8 and place them in the Panama Line service to Mexico, Central America, Panama, Havana and Baltimore. This schedule is tentative, however, and may be changed if the 535's are delayed. Two more 535's have been assigned to the Pacific Mail, but their arrival is indefinite.

The 502's are equipped with Sperry gyroscopic compasses; the 535's have the compasses and gyroscopic stabilizers as well.

New Ocean Services

Norton, Lilly & Company, representing the Isthmian Line, have announced a monthly service between New York and the Hawaiian Islands beginning with the sailing of the steamship Montgomery City in February. Calls will be made en route at Los Angeles and San Francisco, but cargo will be handled without transshipment. Beginning in January, the company increased its sailings in the intercoastal service from one every two weeks to one every ten days.

The Royal Mail Steam Packet expects to dispatch its first vessel of the Royal Mail-Holland America joint service from the United Kingdom to the Pacific Coast in March. Each vessel will have space for about 2000 tons of refrigerator goods. Large shipments of apples and other perishable foodstuffs have gone to Europe by vessels of the Holland-America Line. An office has been opened in Seattle with Keith G. Fisken, formerly of Frank Waterhouse & Company, as traffic manager, and Major H. L. Flack as head of the passenger department. The Waterhouse Company represented the R. M. S. P. prior to the opening of the new office.

M. J. Wright, freight traffic manager of the Admiral Line, succeeding R. D. Pinneo, now traffic manager of the Astoria Harbor Commission. Entering the employ of the old Pacific Coast Steamship Company in 1905, Mr. Wright has steadily climbed up through the ranks and is recognized as one of the best informed freight traffic men on the Pacific Coast. His first position that warranted a title came in 1910, when he was appointed contracting freight agent of the company in Seattle. In 1913 he was named general agent at Vancouver and in the same year was transferred to San Francisco, where he was made chief clerk to the general freight agent, in which capacity he served until January 1, 1918, when he was made assistant general freight agent of the Pacific Steamship Company, which had come into existence as the result of the consolidation of the Pacific Coast Steamship Company and the Pacific-Alaska Navigation Company. When the Admiral Line invaded the Oriental field, Mr. Wright was selected to plant the Admiral flag in the Philippine Islands and was made general agent for the Philippines with headquarters at Manila, from which post he was recalled to assume the duties of freight traffic manager with headquarters in Seattle.

An office has been established in Seattle by the Pacific Motorship Company in charge of R. S. James. The company's motorships, which heretofore have plied between San Francisco and the West Coast, will call hereafter at Seattle as well.

The Vancouver-India service of the Canadian government merchant marine was opened with the sailing of the steamship Canadian Inventor from Vancouver for Calcutta January 4.

Call at Dairen

That the Toyo Kisen Kaisha would have two of its trans-Pacific liners, the Siberia Maru and the Persia Maru, call at Dairen instead of Nagasaki was stated in these columns last month. Now come the Osaka Shosen Kaisha and Nippon Yusen Kaisha with similar announcements. Only unsubsidized vessels will call at Dairen, however, because the Japanese government must give permission before any changes in the routes of subsidized vessels may be made. The Mitsui Bussan Kaisha had a Dairen-America service prior to the entrance of the other companies in the trade. Although bunker coal is about yen 5 cheaper a ton at Dairen than at Nagasaki, an official of the O. S. K. said that the impelling reason for the change was the promising trade of Manchuria.

The Vancouver-India service of the Canadian government merchant marine was opened with the departure of the steamship Canadian Inventor in December.

The first call of a Blue Funnel vessel at Portland was made by the steamship Eurydamas, which loaded 6000 tons of wheat for Kerr, Gifford & Company.

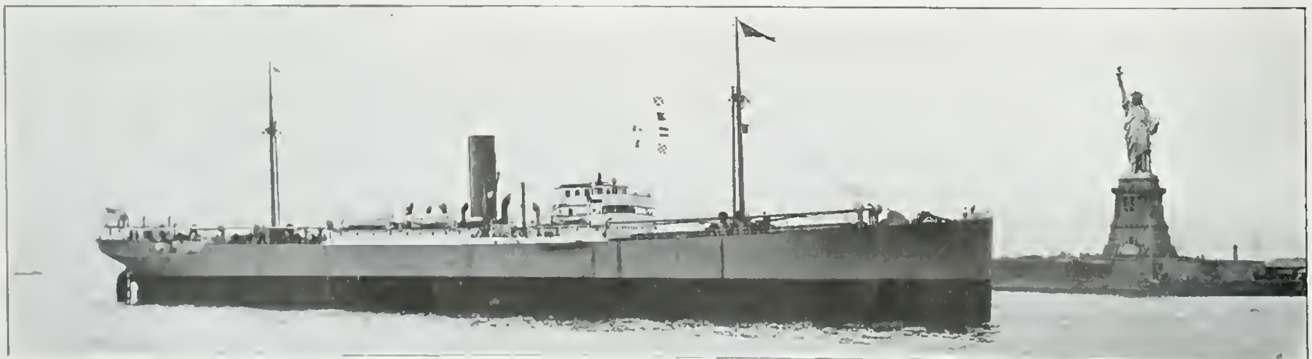
Tanker Line in Prospect

Axel Johnson, owner of the Johnson Line, Stockholm, on his recent visit to the Pacific Coast, said that he intended to establish a tanker line between Pacific Coast ports and Sweden.

Inquiry has been made by the San Francisco Chamber of Commerce of Governor Thomas Riggs of Alaska as to the possibilities of developing cargo movement between Alaska and San Francisco. The chamber's letter said: "We are at this time making a survey of the possibilities in connection with a contemplated steamship line between San Francisco and Alaska."

The 8800-ton freighter Choyo Maru Japan early in January for the United Kingdom via Suez. Her call will be the first made by a vessel of the company at a European port. Whether the service will be maintained has not been stated by officials of the T. K. K. The company probably will withdraw three freighters from the South American service after the delivery of the three new geared-turbine combination liners, now building at the Asano yard, Tsurumi.

The Cunard Line announces the opening of a new service between New York and Vigo by the steamship Italia in Jan-



The Isthmian steamship Steel Exporter and the Goddess of Liberty uary. The Italia will continue from Vigo to Patras, Dubrovnia and Trieste.

Unusual Immigrant Service

An ususual immigrant service has been established between New York and Hamburg by the United American Lines. The steamship Mount Clay, formerly the Prinz Eitel Friedrich, has been entirely refitted for third-class passengers, who will have all the privileges, such as access to promenade decks, smoking rooms, etc., heretofore usually denied them. The cabins accommodate from two to six passengers. Five other steamships will be added to the service, so that by summer there will be regular weekly sailings; two of the additional vessels will be American and three German ships of the Hamburg-American fleet. The Mount Clay was reconditioned at the yard of the Morse Drydock & Repair Company, Brooklyn.

N. Y. K. Denies Reports

In a statement given to the Seattle Chamber of Commerce, M. Watanabe, manager of the Nippon Yusen Kaisha, Seattle, again denies the truth of reports that the N. Y. K. would make Vancouver instead of Seattle its principal Pacific Coast port. Mr. Watanabe's statement is unequivocal and conclusive:

"Our main office on the Pacific Coast is in Seattle and will remain here. In the past all boats coming to the United States stopped both inbound and outbound at Victoria, B. C., and in the future some of these boats may go to Vancouver. As in the past, all passenger and freight boats will come to Seattle, which remains as the terminal on this side of the Nippon Yusen Kaisha. The company has just taken a five-year lease on Pier B, Smith Cove Terminal, Seattle, to dock its trans-Pacific passenger boats, which shows that we have no intention of moving to Vancouver. In case there is sufficient cargo to warrant, the passenger boats will make a side-trip from Seattle to Vancouver to get this cargo while laying over in Seattle. As a general rule our passenger boats will not stop in Vancouver. In some cases our freighters will stop at Vancouver when coming to the United States, then to Seattle, and on the outbound trip stop at Victoria. In case the cargo is not sufficient at Victoria the boat will proceed to Vancouver."

An office in the Board of Trade Building, Portland, has been opened by the Atlantic-Gulf & Pacific, with G. W. Chilson in charge. The steamship Henry S. Groves has been added to the company's intercoastal fleet, which now is composed of seven vessels.

Suzuki & Company have opened an office in the Spalding Building, Portland, in charge of I. Izumi.

U. S. Mail Service

Plans are being made by the United States Mail Steamship Company for a passenger service between New York and Antwerp and Bremen. When all the former German liners have been placed in operation, there will be semi-weekly sailings from New York and weekly sailings from Boston. A line to the Mediterranean also is under consideration.

The Portuguese Line will employ two steamships in its new service between New York and the Azores, Madeira and Lisbon. Both vessels are ex-Germans.

The Red Star Line is busy enlarging its fleet of passenger carriers for the Antwerp trade. Work will begin soon on the completion of the 26,000-ton steamship Belgenland as a first, second and third-class carrier. This ship will be the largest and most elegantly fitted vessel to enter the port of Antwerp. She was built during the war, and has been used as a transport and later as a freighter, under the flag of the White Star Line, being known as the Belgic.

Traffic Statistics

Panama Canal traffic for the calendar year 1920 set new high records; 2814 commercial vessels of 10,378,000 net tons carried 11,236,000 tons of cargo, exceeding the traffic for the fiscal year 1920 by approximately 20 per cent, and the calendar year 1919 by approximately 50 per cent. Tolls levied amounted to $10,295,000.

The number of ocean-going commercial ships passing through the Panama Canal during October was 238, in addition to which there were 26 United States government vessels. The Panama Canal net tonnage of the commercial vessels aggregated 935,579 tons, being 73,206 tons less than for the preceding month. The total cargo carried was 991,066 long tons, being 18,491 tons less than for September. The total tolls earned were $911,854.58, as compared with $1,010,166.38 for September. The United States coastwise trade for October included 20 vessels with a total Panama Canal net tonnage of 85,915, and cargo of 79,085 tons. There were 13 vessels from the Atlantic to the Pacific with a total tonnage of 51,477 and cargo of 44,659 tons; and from the Pacific to the Atlantic, 7 vessels with a total tonnage of 54,438 and cargo of 34,426 tons. From East Coast of the United States to the Far East the number of vessels was 18 and their cargo 125,642 tons, and from the East Coast to Australasia 10 vessels with 65,355 tons.

During 1920 1370 vessels of an aggregate of 2,772,863 tons entered and cleared at Portland, as compared with the 1919 figures of 1206 vessels of 1,866,219 tons. Of the vessels entering and clearing in 1920, those engaged in foreign trade numbered 260 of 842,767 tons; in 1919 those engaged in foreign trade were 130 of 330,921 tons.

During 1920 Grays Harbor shipped by water 362,570,000 feet of lumber in 401 vessels as compared with 289,838,000 in 346 vessels during 1919. Willapa Harbor shipped 121,015,000 during 1920.

A gain of $43,000,000 in commerce was made by San Francisco in the year ending October 31, 1920, as compared with the preceding year. Imports of the year ending October 31, 1920, aggregated $237,910,066, and exports $248,504,466. Exports to Europe declined and imports increased. Several tables of statistics published by the San Francisco Chamber of Commerce show the condition of the port's commerce in terms of dollars, but unfortunately no tonnage figures are given. The merchant and the banker are interested in values, but the primary concern of the shipowner is tonnage.

The marine department of the San Francisco Chamber of Commerce has reported the arrival during 1920 of 4816 vessels of 7,033,480 tons as compared with 4696 vessels of 6,047,425 tons in 1919.

Approximately 8650 ships, with a total tonnage of 10,000,000, carried over 2,000,000 tons of cargo in and out of the port of Vancouver during the fiscal year ending September 1, 1920. Inbound cargo totaled 1,460,000 tons, practically evenly divided between offshore and coastwise, and outbound 721,000 tons, of which 425,000 was offshore. Coastwise vessels numbered 8220 as against 430 offshore.

A marked increase in the number of American vessels calling at ports of Japan was made in 1919 as against 1918. In 1919 there were 356 steamships of 1,206,506 tons and 4 sailers of 3945 tons; in 1918 there were 136 steamships of 383,171 tons and 5 sailers of 4044 tons. The total tonnage arriving at Japanese ports in 1919 was less than that of 1913, although the number of vessels increased.

An increase of more than 100 per cent in the tonnage of American vessels entering and clearing at Chinese ports in 1919 is shown in a recent consular report. The number of vessels and their aggregate tonnage for 1913, 1918 and 1919 follow: 1913, number of vessels, 2458, tonnage, 898,750; 1918, vessels, 3119, tonnage, 1,214,921; 1919, vessels, 4433, tonnage, 2,569,887. However, the number of British vessels ranged from 31,034 to 36,074, and the tonnage from 29,911,369 to 36,284,312; and Japanese from 22,716 to 27,182 in number and from 23,422,487 to 27,532,449. No other country attained 1,000,000 tons in any of the three years. The statistics exclude junks but include coasting steamers and launches.

Record to Luckenbach

The Luckenbach Steamship Company's promise of a sixteen-day service between New York or Philadelphia and Los Angeles and of an eighteen-day service between either of the Atlantic ports and San Francisco was more than made good by the Julia Luckenbach. This vessel arrived at Los Angeles January 1, having made the voyage from Philadelphia in 15 days and 1 hour steaming time, or 15 days and 10 hours elapsed time. This constitutes a new intercoastal record.

A 15,000-ton Cargo

The Julia Luckenbach departed from Philadelphia at 8 o'clock in the morning of December 17 and arrived at Colon at 7 o'clock in the morning of December 23. She required nine hours for the passage through the Panama Canal and departed from Balboa at 4 o'clock in the afternoon. In addition to making a record passage, the Julia Luckenbach had the unusually large cargo of 15,000 measurement tons, which indicates the business being done by the intercoastal lines, especially since the rail rate increases of August diverted much business from the railroads.

Following the Julia Luckenbach came the Edward Luckenbach, which made the voyage from New York to Los Angeles in 16 days and 14 hours steaming time, 17 days elapsed time. She departed from New York at 5 o'clock in the afternoon of December 30; arrived at Colon at 11 o'clock in the morning of January 6; departed from Balboa at 9 o'clock that evening; and arrived at Los Angeles at 5 o'clock in the afternoon of January 16. The Edward is expected to break the record of the Julia at any time, inasmuch as the former is a slightly faster vessel.

Part of the Day's Work

Emphasis should be placed, however, on the fact that these runs are not the result of striving after records, but are part of the day's work and are in keeping with the schedule set by the Luckenbach Line, which possesses twelve 15-knot vessels and one 16-knot, the latter being the Walter A. Luckenbach. In view of such freight service being maintained between the Atlantic and Pacific Coasts, there is no reason for wonder at the alarm of railroad officers, who are witnessing the continued diversion of freight to the steamship lines.

Fast Run by Texan

The United American Lines announced the arrival at Los Angeles on January 19 of the steamship Texan, which left Boston with general cargo January 1. The run of 5113 miles through the Panama Canal was made in the excellent time of 17 days, 21 hours. This is believed to be the fastest voyage ever made of a freight steamer between Boston and the Pacific Coast. Boston shippers delivering goods for Los Angeles on December 31 were able to have goods at destination on January 19, which is about the time taken for all rail freight across the continent under good conditions.

John Vincent Braga, recently appointed general passenger agent of the Toyo Kisen Kaisha, San Francisco.

Shipping Briefs

Announcement is made by the United States Mail Steamship Company that all the seven 12,000-ton tankers being built by the Northwest Bridge & Iron Company, Portland, for the Swiftsure Oil Transport Company, would be placed in operation during the year 1921. The first of the vessels launched was the Swiftsure on December 15, her keel having been laid June 6. The entire fleet will be used in the overseas trade.

A new house flag for vessels of the Canadian government merchant marine has been designed to replace the old. The new flag is of pennant form, having a red cross, bordered with white, on a ground of blue, with a white ball in the center of the cross and on the ball a maple leaf.

Preliminary to greater activity the powerful Japanese copartnership of Suzuki & Company has increased its capitalization from 500,000 yen ($250,000) to 50,000,000 yen, or $25,000,000. The Suzuki firm's assets exceed $250,000,000 and for years its small capitalization has been one of the unusual features of the world of international trade and commerce.

Announcement has been made of the taking over of the Union Steamship Company, with head offices at Dunedin, New Zealand, by the Peninsular & Oriental. There is some talk of the head offices of the Union Company being transferred to London, while others are inclined to the opinion that the head offices will be transferred to Wellington, the capital of New Zealand. It seems probable that the latter plan will prevail, says a consular report.

Sailings of vessels of the Isthmian Line from New York have been announced as follows by Norton, Lilly & Company, Pacific Coast general agents: Steel Mariner, February 11; Steel Ranger, February 15; Steel Exporter, February 21; Montgomery City, February 26. The Steel Worker sailed from New York January 20, five days ahead of her scheduled time.

Announcement is made by the Pacific Mail Steamship Company that its agents in Europe are: Catania, Italy, Messrs. Bonanno Fratelli, v. Mueso Biscari, 10, Catania, Italy; Joseph Huret, Place de Capecure, Boulogne, France; Nigri & Vitulli, 15 Piazza Massari, Bari, Italy; E. H. Mundy & Company, No. 2 Fenchurch Avenue, London, E. C. 3, England; A. G. Gunnison, 316 Valencia, Barcelona, Spain, general agent for Spain; Witty Shipping Company, subagent, Barcelona; Maura y Aresta, subagent, Calle Estacion, 2, Bilbao, Spain; Fernand et Francis Barry, 14 Rue Beauvau, Marseilles, France. The West Indies Shipping Company, Postoffice Box 499, Havana, is general agent for Cuba, with O. K. Williams sub-agent for Cienfuegos and Sobrinos de Bea & Company sub-agents for Matanzas. Raymond Gamble has been made passenger agent at Hongkong instead of Manila, and R. J. Murray has been appointed Manila passenger agent. Fred J. Halton of Chicago has been appointed general agent for passenger business in Chicago and vicinity.

A recent newspaper report contains interesting information concerning the activities of the Schichau Company, which operates important shipbuilding yards at Danzig and Elbing. Before the war the yards built principally for the account of the government and a few large shipping concerns. Government orders have for the present almost entirely ceased, and, owing to uncertainty as to confiscation by the entente and indemnities to be paid by the German government, the large German companies have not been in the market. The Schichau Company has consequently been compelled to seek a new field, which it has found in the construction of freight steamers, four of which are for Danish account, two Finnish and two for the Orient interests of Copenhagen. All are of 7300 tons deadweight.

Across the Water

Japanese Merger Off

The great Japanese shipping merger of the Nippon Yusen Kaisha, Osaka Shosen Kaisha, Toyo Kisen Kaisha and Kokusai Kisen Kaisha, which was proposed a few months ago, now appears to have fallen through, despite statements by Japanese that it merely has been postponed. One primary difficulty in the way of the consummation of the plan was the value to be given the different fleets. That an appraisement on a flat gross tonnage basis scarcely could be made is evident when the sizes of the many vessels, both freight and passenger, are considered.

O. S. K.'s Attitude

In discussing the amalgamation, Yonejiroh Ito, formerly managing director of the N. Y. K. and recently appointed vice-president, said that the proposal had not been abandoned but was awaiting the recovery of Keijiro Hori, president of the Osaka Shosen Kaisha. A few days later, however, Mr. Hori was well enough to consult with Mr. Noda, minister of communications, and following their conference an announcement was made that no steps toward the amalgamation would be undertaken until spring. Mr. Hori had the casting vote because he alone of the prominent shipping men of Japan had not taken part in the earlier discussions, as he had been absent at the International Seamen's Conference in Genoa and had been ill for a few weeks after his return. He was represented as agreeing with the principle of the amalgamation but as doubting the immediate necessity of pressing it to conclusion, especially as there appeared to be no intention on the part of the United States to enforce Section 28 of the Merchant Marine Act. The expressed intention of the Shipping Board to build up American services until they become adequate and thereupon to enforce the section may cause a change in the plans of the Japanese companies.

Mr. Uchida's Views

Upon his return from the International Seamen's Conference at Genoa, Kakichi Uchida, a Japanese authority on shipping, made the following criticism of the merger:

"It is very difficult to amalgamate the Nippon Yusen Kaisha and the Osaka Kisen Kaisha because of their traditions, but if either company should take over the interests of the Toyo Kisen Kaisha and the Kokusai Kisen Kaisha the task will not be very difficult. It is thus better to arrange for the establishment of two great companies, one under the Nippon Yusen Kaisha and the other under the Osaka Shosen Kaisha. If all the four companies are amalgamated into one company, as is apparently intended by the government, some day there will arise many evils of monopoly and it will be very difficult to check the evil tendency. It is by no means to the interest of the state to amalgamate the four companies."

$41.50 a Gross Ton

Some Japanese lines may feel the necessity of protecting themselves against the increasing competition of America and the restored ocean services of Great Britain, but the Nippon Yusen Kaisha appears to be in a position of extraordinary strength. According to copies of the sixty-first report, presented to the shareholders at the semi-annual ordinary general meeting in Tokyo November 29, the reduced book value of the fleet is yen 41,126,184.73. Inasmuch as the gross tonnage of the fleet, vessels under construction being excluded, was 494,028, the book value a gross ton is the exceedingly low figure of yen 83, or approximately $41.50. Moreover, the assets list shows such entries as: public loans and other securities, yen 75,890,932, and cash at banks and on hand, 34,039,241. In the liabilities column are: insurance fund, yen 17,138,236; ships' structural repair fund, 5,281,369; legal reserve, 15,820,000; dividend equalization fund, 22,600,000; fund for extension of services and improvement of fleet, 15,700,000; special reserve for depreciation of steamers to be built and purchased, 10,670,028. Assets and liabilities balance at yen 219,154,202.24, the American equivalent being about $110,000,000.

30 Per Cent Dividend

For the six months ending September 30, the net profit was yen 12,433,280, including yen 3,044,331 brought forward, after depreciation, insurance and repairs had been provided for. The surplus was appropriated as follows: legal reserve, yen 470,000; directors' and auditors' fees, yen 435,000; dividend, 10 per cent a year, yen 2,900,000; extra dividend, 20 per cent a year, yen 5,800,000; balance to be carried forward, yen 2,828,280.48. The paid capital of the N. Y. K. is yen 58,000,000 and unpaid yen 42,000,000. The dividend of 1919 was 100 per cent.

Figures of the fleet show 103 vessels of an aggregate gross tonnage of 494,028, the average being more than 4800 tons. The fleet may be classified as follows: less than 2000 gross tons, 16 vessels; only one of which is less than 1000 tons; 2000 to 3000 tons, 13 vessels; 3000 to 4000 tons, 14 vessels; 4000 to 5000 tons, 6 vessels; 5000 to 6000 tons, 21 vessels; 6000 to 7000 tons, 16 vessels; 7000 to 8000 tons, 13 vessels; two of 9800 tons each and two of 10,900 each. In addition to these steamships, the company lists 12 vessels building, of which six are of 7000 tons, one of 2700, two of 4500, and three of 10,180, the tonnage being 84,240 gross. All the new vessels except the smallest will be twin-screw; of the 103 steamers now in service, 39 are twin-screw, and one, the Katori Maru, is triple-screw. When the present program has been completed the company will possess 115 steamships of 579,761 gross tons.

Idle Vessels on Increase

Japan's foreign trade increased 28 per cent during 1920 as compared with the pre-war volume, said Baron Kondo, president of the N. Y. K., in his report, although the world's tonnage increased by 8,500,000 tons, and in addition 7,650,000 tons was building. In these circumstances, he said, the tying up of 70,000 or 80,000 of Japanese shipping was natural and the number of idle vessels was bound to increase.

Subsidy Discontinued

A request has been made by the Department of Communications of Japan that the Finance Department appropriate about yen 1,500,000 a year as payment to the Nippon Yusen Kaisha for carrying mails of the Japanese postoffice on its European, Australian and North American runs. This sum is for three years and is about half that paid under the subsidy system, which for 1919, 1920 and 1921 was yen 8,170,000. The Japanese government wishes to do away with the subsidy system because of the retaliatory laws of other countries. The change will be confined to the Nippon Yusen Kaisha for the present, however, because the government holds that its lines have developed sufficiently to do without the subsidy, whereas those of other companies have not. With the ending of the subsidy grants the N. Y. K. no longer will be subject to the supervision of the government as to rates on subsidized vessels.

Agitation Against Subsidies

This action of the government doubtless was inspired in part by a desire to meet foreign criticism, especially as embodied in the Merchant Marine Act, but for years prior to the passage of that law by the United States a steadily-growing demand for abolition of subsidies had manifested itself in Japan, largely on the ground that such companies as the N. Y. K did not need aid. On the other hand, Vice-President Ito of the N. Y. K. sees actual benefits in that the company will not be subject to governmental regulation of rates and routes of vessels, although the grant will be reduced by about 60 per cent of yen 1,370,000, the grant of the last half-year. (This figure is slightly different from that given above.) The decrease is about 9 per cent on the net profit of the last six months.

America Gains in Orient

Upon his return from a tour of the South Seas (which in Japan mean Malaysia), Kiyoshi Kimura, managing diector of the O. S. K., said that the striking development was the increase in American shipping, although Holland still leads, followed by Japan, Great Britain, Scandinavia and America. Holland's position has been strengthened since the end of the war, principally at the expense of Japan. During 1919 the number of Japanese vessels engaged in the Malaysian trade was 299, as compared with 15 or so prior to the war, but some Japanese companies are withdrawing from the field.

About 6000 seamen are reported to be idle in Kobe alone. Other industries are unable to absorb them, even the farms having a surplus of labor at the end of the harvest.

Island Empire's Building

Although shipping of Japan, as typified by the N. Y. K., is in a good position, shipbuilding has declined greatly. October launchings included six vessels of more than 1000 gross tons, the aggregate being 19,900, as compared with double the number during the first months of the year. Nevertheless, the war did for Japan what it did for the States: it increased shipbuilding greatly and placed much of the new work on a firm foundation. Prior to the war there were four major plants in the empire and their output was no more than 30,000 or 40,000 gross tons; the number of plants had increased to forty-five by the end of 1918 and the tonnage was as follows: 185,000 gross tons in 1916; 486,000 in 1917; 721,000 in 1918; 619,000 in 1919. At the present time there are twenty-one yards capable of building vessels of more than 1000 gross tons. To the end of October their output was 83 vessels aggregating 394,605 gross tons, and indications were that the tonnage of the year 1920 would be about 400,000 and of 1921 about 350,000. Naval construction, however, is a factor of importance in supporting Japanese yards. In this connection a recent statement by Admiral Okada, chief of naval construction at the Sasebo station, is of interest. The admiral denied reports that some of the eight-eight program (eight battle-cruisers and eight dreadnoughts) would be built abroad, although he indicated that some special vessels might be ordered in Great Britain.

Vessels Owned by Japan

At the end of September Japanese steamers of more than 20 tons gross numbered 2923, the total tonnage being 2,982,999; only 742, however, exceeded 1000 tons, the total tonnage of which was 2,510,827. The largest tonnage as classified by the Department of Communications was made up of vessels of 5000 tons, of which there were 108 aggregating 615,565. There were 14,331 sailing vessels of 20 tons or more aggregating 972,908 tons gross, but 11,452 were less than 100 tons and the largest of all was 2403.

Asano Builds Turbo-Electric Vessel

Hard on the heels of the United States, which recently installed its first turbo-electric drive in a freight vessel, Japan has launched its first steamer of that type, the Biyo Maru, 5500 tons gross, being built by the Asano Shipbuilding Company, Tsurumi, for the Toyo Kisen Kaisha. The propelling machinery will consist of two steam turbines, 3600 r. p. m., each driving a three-phase, alternating-current generator, 60-cycle, 1000-kilowatt. The motors are geared to the propeller, which will make 80 r. p. m.

These turbines are of the Ljungstrom design. Sven Stenberg, director of Gadelius & Company, Tokyo, who supplied the machinery, said that the turbo-electric engine is guaranteed to consume .81 pounds of best British coal or 1.2 pounds of Japanese coal a horsepower hour, 50 per cent of what is consumed by a triple-expansion engine of the same power. The saving by reason of lighter machinery and small coal bunkers is estimated at 700 tons on the basis of a twenty-day voyage.

To Compile Register

Following upon the formation of the Imperial Marine Corporation of Japan and the decision of the corporation to compile a register of Japanese vessels, the government is expected to discontinue the surveys heretofore made by Tishinsho, or the Department of Communications. Lloyds also probably will lose business as a result. The Japanese corporation will co-operate with the British Corporation and the American Bureau of Shipping in addition to some other societies.

Port Development

On the Pacific

A meeting of Pacific Coast port authorities was held in San Francisco January 17. Some action looking toward stabilizing port charges had been expected, but the meeting adjourned after passing resolutions favoring an extension of time during which the railroads should absorb switching charges on import freight, approving the handling of freight by ship's tackle from hold to wharf in one operation and appointing a committee to co-ordinate the systems of handling oil at northern and southern ports. Seattle had postponed action on absorption of charges pending the San Francisco meeting. In view of what had been expected, the result of the meeting was disappointing.

A contract has been let by the Grays Harbor Port Commission to the Pacific Construction Company, Aberdeen, for placing 91,675 linear feet of piling. This is part of an extensive program.

Ports Make Deposit

A deposit of $295,000 has been made by Newport and Toledo, Oregon, to the credit of the government, so that the work of dredging Yaquina Bay to 20 feet may be completed. The ports agreed to assume half the expense, which first was estimated at $836,000, but now is much larger. The money just deposited is the port's portion of the increased expense.

Work has been begun on a wharf to be used by the Vegetable Products Company, Wilmington, Los Angeles Harbor. The wharf will be 55 by 600 feet and will have a concrete shed.

A radio station at Fort McArthur, Los Angeles Harbor, is being constructed by the United States Army, but it will be primarily for army use and not for vessels.

Terminal at Los Angeles

A terminal for the steamships Yale and Harvard of the Los Angeles Steamship Company will be constructed by the Los Angeles Harbor Commission at a cost of $100,000. It will adjoin Shed 1, Pier A, and will be completed by April 1, when the San Francisco-Los Angeles service of the steamers will begin.

G. F. Matthews, shipbuilder of Hoquiam, Washington, has leased one-half mile of frontage on the Willamette river, Portland. No definite statement has been made by Mr. Matthews as to his plans for using the frontage. The Willamette Iron & Steel Works, the Portland Vegetable Oil Mills Company and the Portland Railway, Light & Power Company have bought about twenty acres of waterfront land in North Portland of the O.-W. R. & N. The Willamette Iron & Steel Works got 500 feet of front and the others 250 each.

Largest Vessel Yet

The recent visit of the British steamer Orca to Astoria was noteworthy in shipping annals. This, the largest vessel that ever entered the Columbia River, crossed the bar in the face of a 63-mile gale to her berth off the Astoria port terminals in 90 minutes without the slightest difficulty. She loaded in the record time of ten days, despite her inconvenient cargo appointments, 500,000 bushels of wheat, the largest grain cargo ever shipped from a Pacific port. The Orca, which is the third largest cargo vessel in the world, was handled rapidly and perfectly by the modern facilities at the new Port of Astoria terminals and found no difficulty whatever with the depth of water in the river at any point, though she drew 36 feet, 4 inches, loaded.

A contract has been let by the Port of Portland to the Jacobsen Construction Company for clearing the present drydock site and providing a berth for the new dock.

The Vancouver Harbor Commissioners have sent a questionnaire to shipping companies requesting information as to the advisability of building a cold-storage warehouse in connection with the new Ballantyne pier.

On the Atlantic

An American steamship terminal of the most modern type is to be erected at Hamburg, according to an announcement by President P. A. S. Franklin of the International Mercantile Marine. The terminal will be built with American capital, equipped with American machinery and used exclusively by American steamers.

Best in Germany

Adjacent to the Hamburg-American piers, the American terminal will excel them in equipment and efficiency, and will rank as the finest in Germany. It will be built on the Ross Quay, one of the largest dock structures at Hamburg that remained incomplete at the beginning of the war, of which the American Line has taken a long lease. It will have a total length of nearly half a mile, with depth of water alongside to accommodate the largest passenger liners now operated in the American Line's service from New York. Sheds will be built of concrete and steel, 656 feet long and having a ground floor area of 2¼ acres. The latest type electric cranes will be installed, and trackage will be laid to connect the terminal with through rail lines by which American products will be moved to interior points in Germany, and to Czecho-Slovakia, Rumania and other central European countries. The ships that will use this new terminal are now docking temporarily at piers had on hire from the civic authorities of Hamburg.

Office Building Bought

In pursuance of its policy to establish itself permanently in Hamburg, the American Line has bought a building at 2 Borsenbrucke, in the steamship section, for its own occupancy as German headquarters, and has sent out an American steamship expert, Herman Winter of New York, as resident manager.

Although plans of the Cunard Line for a terminal at Weehawken have been completed, the company has deferred beginning construction for the time being. All freight business will be accommodated on the Jersey side. No less than eight 1000-foot piers are provided for in the plans.

Civic associations of Baltimore are endeavoring to have the channel from the capes deepened from 35 feet to 40, in order that the large ore-carriers of the Bethlehem Steel Corporation may carry their full loads of 20,000 tons.

Work at Panama

Three new office buildings are being erected at Cristobal by the All-America Cables, Royal Mail Steam Packet-Pacific Steam Navigation, and Royal Netherlands West India Mail. The Pacific Mail Steamship Company has applied for a lot and will be assigned that next to the All-America Cables.

Steamship Cape Romain of the Atlantic-Gulf & Pacific Line, as she appeared in heavy seas of the Atlantic. The Cape Romain recently made the run from Mobile to Los Angeles in nineteen days

Across the Pacific

A bond issue of $500,000 for the construction of a new wharf at Hilo, Hawaii, has been sold and the proceeds have been deposited with the territorial treasurer. E. J. Lord of Honolulu has been awarded a contract for the construction of a wharf at Lahaina, Maui, at a cost of $204,830. A bond issue of $600,000 to provide a wharf at Kahului, Maui, has been subscribed.

The Tauranga, New Zealand, Harbor Board proposes to expend $608,312 on the improvement of the harbor at that place. Works proposed will, when completed, enable vessels drawing 23 feet to enter the harbor. This is the first step toward developing the harbor to admit overseas steamers in general. Tauranga will be the harbor for an important section of the east coast of the North Island.

The harbor facilities of the Port of Calcutta will be greatly improved by the construction of a canal 22½ miles long and from 250 to 400 feet wide. The canal will extend from Baramagar, on the Hooghly in Calcutta, to Kulti on the Kultigong river. The estimated cost is 309 lakhs.

Singapore Facilities Improved

Consul Dickinson writes from Singapore, Straits Settlements, that the volume of shipping using the wharves is rapidly attaining pre-war dimensions. Figures for the first six months of 1920 show that vessels with a tonnage of 2,523,973 tons used the wharf, and that the amount of coal and cargo handled was 1,281,327 tons. The last six months previous to the war these figures were 2,933,679 and 1,396,679, respectively. The question of improving the lighters has had the attention of the harbor board, and energetic measures have been taken to improve the fleet and provide new tonnage, so that now tonnage difficulties are entirely removed and ample opportunities are available for shipment to all parts.

Bills of Lading Delayed

Banks of Japan are about to follow the strict letter of Article 69, Commercial Law, which provides that "one copy or several copies of a bill of lading shall be issued without delay after the shipment of cargo." This means, of course, that shippers will be subjected to considerable delay. Heretofore the custom has been to issue bills of lading prior to actual shipment, but a recent dispute in Kobe, which arose when a Japanese company disputed the validity of a bill of lading on the ground that the Commercial Law had been violated, led to British banks and then the Japanese banks deciding to abide by the letter of the law.

At the National Capital

Shipping Board's Report

From the beginning of the Shipping Board's work to June 30, 1920, the net loss to the government was $513,366,139.19, according to the financial report of the board. But General Comptroller Alonzo Tweedale, after entering the above figure, takes into account various other items, such as expenditures in behalf of the War and Navy Departments, and discovers that the excess of revenues over expenses actually amounted to $56,379,652.13. In other words, the board has made money! This gives point to the resolution of Senator Edge of New Jersey demanding "without argument" and in language that is "intelligible to the lay reader" a report of the board's operations.

Operations Net $243,000,000

To return, however, to the loss of a half-billion dollars. In the total are included such items of bookkeeping as insurance, depreciation and maintenance, part of the last of which is merely bookkeeping. Operations show an excess of revenue over expenses of $242,796,256 for vessels and $652,037 for houses, to which is to be added an excess of $7,949,421 from other sources, the aggregate being $251,397,715.30. At the end of the fiscal year the current assets of the board amounted to $638,267,749.31, of which $96,547,951.73 was in cash, $293,792,558.14 in accounts receivable, $70,248,537.05 in notes receivable, $3,360,816.88 in advances to contractors, $30,917,587.86 in investments and $143,400,297.65 in materials, supplies, stores, etc. Capital assets are given as:

Purchases, construction and reconditioning expenditures, owned vessels, $2,670,612,755.81.

Plants, property and equipment, fuel oil stations, real estate and buildings, furniture and fixtures, mechanical office equipment, automobiles, launches, etc., $158,895,243.99.

Construction of, improvements to, etc., housing projects and transportation facilities, $69,604,977.83.

Total capital assets, $2,899,112,977.63.

Total assets, $3,537,380,726.94.

Depreciation 12½ Per Cent

Current liabilities are given as $99,281,047.71, of which $12,842,611.85 is charter hire due foreigners and $56,797,903.61 due Americans. Capital liabilities total $2,630,400.

The most interesting portion of the board's statement deals with the bookkeeping items of insurance, depreciation and maintenance. Depreciation was entered at 10 and 12½ per cent a year; maintenance, in part a book item, at 4 per cent; and the insurance represents not money paid out but the cost to the board of carrying its own risks.

Bareboat Charter Up

Adoption of a bareboat charter plan for the disposition of government vessels has now been taken up seriously by the Shipping Board as a substitute for the present allocation system. A two-day conference was held by the standing committee of operators and managers and officials of the board, at which all phases of the bareboat charter were discussed. Admiral Benson stated that the discussions, which will be continued, will probably include the question of a guarantee against decline in prices of ships and later may involve the prices at which vessels are to be sold.

Negotiations with companies to which the combination cargo and passenger vessels have been allocated for the chartering of the vessels have not been successful, Admiral Benson has said. The companies have notified the board that they prefer to operate the ships for the account of the board.

A bill to permit the chartering of Shipping Board vessels has been introduced in the House of Representatives by Representative Hulings of Pennsylvania. The bill makes no material change in the law as embodied in the Merchant Marine Act.

209 Freight Services

The annual report of the Shipping Board for the fiscal year ending June 30, 1920, says that the board has established 209 freight services, of which 202 were between United States and foreign ports or between United States ports and of which seven were between foreign ports. Another classification shows that 100 of the 202 were from the North Atlantic, 27 from the South Atlantic, 54 from the Gulf and 21 from the Pacific Coast.

From the beginning of the Shipping Board to December 4, 1920, the board sold 430 vessels of 2,157,000 deadweight tons, for a total of $297,000,000. Of this number 136 were steel cargo ships valued at $141,000,000.

Amalgamation Urged

The annual report of Secretary of the Navy Daniels urges the amalgamation of the Coast Guard and Lighthouse services with the Navy. Shipping interests of the Atlantic, Pacific and Gulf have urged for some time the amalgamation of the Coast Guard and Navy. The secretary also says that "it would be to the advantage of the Army as well as the Navy if all United States transports were manned by the Navy in time of peace as well as war. . . . In other words, there should be but one marine department of the government, and its craft afloat should be operated by the Navy Department. This cannot be considered a radical departure, as its worth and practicability were thoroughly demonstrated under the severe test of war."

Board Considers Prices

Further developments have made it clear that the price at which government ships are to be sold is an active question upon which the board will act within a short time. Publication from New York of the resolution introduced at the Shipping Board, which would authorize the sale of ships at $50 to $67.50 a deadweight ton, retroactive to past sales and providing for the turning over of profits on ships already sold in exchange for a fixed compensation by the board, has brought from Admiral Benson and other commissioners the statement that the board will not sell its vessels at "ridiculous prices." At the same time Admiral Benson has stated that the question of a guarantee against declines will be considered shortly. This may also include a discussion of the advisability of revising the prices somewhat in view of changing conditions in the market for ships. In this connection Admiral Benson has also said that the board will abide strictly by the provisions of the Merchant Marine Act, directing the board, in selling its vessels, to establish and maintain trade routes, and to consider the market value of ships here and abroad and the cost of reproduction. The Goff resolution was not acted upon by the board and there is no prospect that it will find favor later.

208 Vessels Idle

Figures recently made public show that at the first of the year the Shipping Board had tied up 208 vessels of 1,262,000 deadweight tons as a result of the depression in shipping all over the world. Officials anticipate that before the peak of the depression is reached, approximately 400 ships of 2,250,000 tons will be tied up. The larger portion of these will be the small Lake type steamers.

Opinion in Congress seems to be that the Edmonds bill to exempt American vessels from the provisions of the National Prohibition Act will not be enacted, in spite of the forceful arguments of steamship officials at a hearing before the House Judiciary Committee that prohibition means the practical ruin of American passenger traffic.

Decision of the Bureau of Internal Revenue that the income of foreign ships derived from traffic originating in this country is taxable has been taken into consideration by the Inter-departmental Committee, which after further investigation is expected to begin negotiations with other nations having similar laws for uniform action, probably involving a repeal of such laws.

New Shipping Board

Reports that the names of new Shipping Board Commissioners will be ready for confirmation by the Senate within a day or two following the inauguration of President Harding have come from apparently reliable sources, says the bulletin of the Atlantic Coast Shipbuilders' Association. A special session of the Senate is expected immediately after the inauguration to confirm cabinet and Shipping Board appointees. Members of the Senate Committee on Commerce are said to have called on the President-elect to give first consideration to a new board. The unsettled status of the present commissioners, it is said, makes them hesitate to formulate policies of a permanent character.

Indications from the Republican leaders and from remarks made by the President-elect in his various speeches point out that the incoming administration considers the shipping situation to be one of utmost importance. The party is committed to an adequate American merchant marine and will take effective steps to maintain and expand the position of the United States on the seas. Aggressive enforcement of the Merchant Marine Act is intended as an aid to American shipping. Until the various sections have been put into operation Congress feels that it cannot undertake further action for the assistance of the shipping under the United States flag. President Harding is expected to give personal attention to shipping policies and will give it an importance equal to that of taxation and the tariff.

Status of E. F. C.

The United States Supreme Court announced on January 3 its opinion on the legal status of the Emergency Fleet Corporation. In the action of the United States vs. James H. Strang, Henry C. Thomas and Leroy W. Walter, Justice McReynolds delivered the opinion of the court, which was in part as follows: "The ultimate question for determination is whether the employment of defendant Strang as an inspector by the United States Shipping Board Emergency Fleet Corporation, without more, made him an agent of the government within the meaning of Section 41, Criminal Code. . . Holding that this employment did not suffice to create the relation alleged, the trial court sustained a demurrer to the indictment. . . The demurrer was properly sustained." After reciting the history of the Emergency Fleet Corporation, Justice McReynolds continued: "The corporation was controlled and managed by its own officers and appointed its own servants and agents who became directly responsible to it. Notwithstanding all its stock was owned by the United States it must be regarded as a separate entity. Its inspectors were not appointed by the President, nor by any officer designated by Congress; they were subject to removal by the corporation only and could contract only for it. In such circumstances we think they were not agents of the United States within the true intendment of Section 41."

Joint Committee Appointed

Admiral Benson in announcing the adoption of a resolution calling for the appointment of a joint committee made up of three members of the Shipping Board and three members of the Interstate Commerce Commission for the purpose of considering various provisions of the Transportation Act, 1920, as well as rates, regulations and other practices, said that the members appointed from the Shipping Board were Commissioner J. N. Teal, chairman; Commissioner F. I. Thompson, and Commissioner Guy D. Goff. The members from the Interstate Commerce Commission are Commissioner C. C. McChord, Commissioner Henry C. Hall and Commissioner Mark W. Potter.

Commissioner Teal stated that he hoped something would be done through joint action of the two bodies toward a readjustment of export and import rates to the end of obtaining a greater amount of tonnage for handling through American ports. He referred to the movement of tonnage over the Canadian roads because of lower rail rates. The development of ports is another problem that will be considered by the joint committee. Mr. Teal said: "The powers accorded the Interstate Commerce Commission and the United States Shipping Board are so extensive under the Merchant Marine Act and Transportation Act that a great deal can be accomplished by co-operation."

Shipping Ventures

Two hundred and thirty-seven companies with an authorized capital of $50,000 or greater were organized last year to engage in some branch of shipping activity, according to the records maintained by the New York Journal of Commerce. The indicated investment involved in their formation was $585,448,000, a new high record for any twelve-month period since 1914. In 1919, the aggregate authorized capital was $323,613,000, or more than $250,000,000 below last year's total. The smaller aggregate stood as the previous record.

The total for May, 1920, of $31,083,000 was the smallest for any month during the first half, while in November the aggregate rolled up was only $3,650,000. Sixteen concerns were launched in December, their aggregate authorized capitalization amounted to $19,375,000.

The average indicated investment per company during December figures out as $1,210,938. This average compares with $521,428 in November, $3,650,000 in October, $746,666 in September, $1,227,500 in August and $1,458,533 in July. For preceding months of the year the company average was as follows: June, $2,607,575; May, $999,469; April, $8,128,864; March, $2,945,237; February, $1,963,530, and January, $2,384,531. The average for the 237 concerns organized during the year is $2,470,244.

Fuel Oil and Coal

According to advices received in Japan, the Indian government has restricted the amount of bunker coal obtainable at Calcutta. Vessels will be granted only enough to permit them to make Singapore, Port Said or Durban.

Oil Imports Increase

A marked increase in importations of crude oil is reported by Los Angeles. In the last half of January three tankers with 200,000 barrels were due from Tampico. The entire Pacific Coast imported only 116 barrels in 1918; 834,426 in 1919 and 135,000 in the first half of 1920, according to the report of a special committee of the San Francisco Chamber of Commerce.

Records at Panama

Records in coaling vessels are being made and broken again by the Panama Canal plant at Cristobal. On November 25 the plant delivered to the steamship Wiltshire 1101 tons and 2060 pounds of coal in 1 hour and 35 minutes, this time having been taken from the beginning to the completion of delivery with bunkers trimmed. This delivery was at the rate of 696 tons an hour, 11.6 tons a minute or one ton in slightly more than 5 seconds. On December 19, however, another record for 20 minutes was made, the steamship Rio Grande having received 297 tons and 480 pounds in that time, at the rate of 891 tons an hour. Steamships frequently are coaled in less than a half-hour. Some other good records are: steamship Elm Branch, 204 tons and 1700 pounds in 10 minutes; Indian Transport, 349 tons and 1160 pounds in 23 minutes; Cumberland, 507 tons in 31 minutes.

Shortage at Vancouver

"Consumers of fuel oil in Vancouver were notified on November 1 that the Imperial Oil Company's sources of supply would soon be cut off and that there is no hope of securing more oil until the first of June, 1921, when two tank steamers, now building, will be ready to carry oil from the Mexican fields to Vancouver," says a report by Consul General Frederick M. Ryder, Vancouver, B. C., to the Department of Commerce. "The company announced that after December 31, 1920, all delivery wagons and tank cars will be withdrawn.

"The lack of fuel oil may force many of Vancouver's modern office buildings and apartment houses to convert their heating plants to the use of coal; and as most of these heating plants were not constructed with such conversion in mind at the time of installation, this announcement is likely to cost local consumers thousands of dollars. The Grand Trunk Pacific, the Terminal Navigation Company's steamers, the North Vancouver ferries, and a number of small boats depend on Imperial fuel oil, and considerable agitation is visible in marine circles. The local manager of the Imperial Oil Company stated that it might be possible for the company to give the Grand Trunk Pacific Coast service oil and also the North Vancouver ferries, but that absolutely no city delivery could be made.

"It is estimated that the withdrawal of the Imperial Oil Company from the field will necessitate an increase in the production and distribution of coal in Vancouver to the extent of 3000 tons per month. However, according to the general sales manager of a locally prominent coal company, there need be no fear of a shortage of coal in Vancouver this winter, as the recent announcement of the oil company had been expected and the coal companies were prepared to take up at once the burden of supplying the people of this city with coal. The pulp and paper plants announced that the new order, notifying them of a cessation of oil deliveries for six months, would have no ill effect on their operations."

New Station for Cuba

The establishment of a fuel-oil supply terminal at Punta Piedra, one-half mile from Antilla, is being contemplated by a company already established in Cuba. At that point the water has a shore depth of but four to five feet; 1000 feet from shore the depth is twenty feet; 2200 feet from shore it is twenty-two feet. The company plans to erect two storage tanks of 55,000 barrels' capacity each, pump houses and a dock to be at least 1000 feet long. Vice Consul Buck states that this company is already established at Habana, Matanzas, Ceinfuegos, Manzanillo, Nuevitas, and Cienaga and Regla, the two latter places being just outside of Habana, and has 55,000-barrel tanks at each point. It is said that similar tanks will be built at Santiago de Cuba.

More Coal for Panama

The placing of two 7500 - ton coal barges in the service of the Panama Railroad Steamship Line between Norfolk and Cristobal will increase considerably the ability of the line to furnish coal to the coaling plants at the canal. One of the barges, the Darien, has been in service for several months, and the other, the Mamei, recently made her first voyage to the Isthmus. The barges are towed by the colliers Achilles and Ulyssus. Each of the barges is 352 feet in length over all, 335 feet on the load waterline, by 52 feet beam, with a molded depth of 33 feet. The barge is equipped with sails, to take advantage of the winds in lightening the tow and to afford some means of making headway if the tow should break loose. The four masts carry fore staysail, foresail, mainsail, mizzen sail, jigger sail, and spanker. The steam equipment is for the steering engine, capstan, windlass, towing machines, pumps, winches, heating system and electric plant, including a radio outfit.

Each of the barges has a capacity of 7500 long tons. The gross tonnage of each is 4074, and the net 3760. They were built at Mobile, by the Alabama Dry Dock & Shipbuilding Company.

One of the canal colliers and one of the barges together can carry approximately 19,500 tons of coal. With the barge in tow the time of the voyage from Norfolk to Cristobal is about eight days, as compared with six days without a tow. The time required for passage is increased approximately one - third, while the carrying capacity of the unit is increased approximately three-fifths; the net gain in ability to deliver is about one-fourth.

It is anticipated that, with the improvements which have been taking place in railway transportation to the seaboard in the United States, the canal plants can count on receiving 50,000 or 55,000 tons of coal a month in the near future.

Japanese Oil Monopoly

A cablegram to the Department of Commerce from Commercial Attache James F. Abbott, Tokyo, advises that no proposal looking toward a government monopoly of petroleum will be made until Parliament convenes in January. While nothing definite has been decided upon, the proposed monopoly is likely to affect all Japanese possessions as well as the oil fields in Japan proper.

Japan produced only about one-half of one per cent of the world's crude petroleum in 1919, and its production has shown a steady decline since 1916, when 123,558,416 gallons were produced. The production for 1917 dropped to 119,576,223 gallons and that for 1918 to 102,110,650 gallons. The figures for the full year 1919 are not yet available, but basing estimates on the first nine months' production of 67,737,796 gallons, the total production for 1919 will not reach much more than 90,000,000 gallons.

The oil monopoly is being proposed largely in order to guarantee supplies for the navy, and new wells have been bored at Nairya and Kosenho, in Formosa, with rather indifferent results. The Echigo fields, which produce about 60 per cent of Japan's supply, showed a decline of about 10 per cent in production during 1919. Decline in production is attributed somewhat to increased difficulty of importing well-boring apparatus since the armistice, and this has undoubtedly impeded the development of new resources.

Japan recently sought to place contracts for oil for the navy with both America and Great Britain, but without success, according to press reports.

Facilities at Aden

Consul Addison E. Southard of Aden has reported as follows on fueling facilities at that port:

"There are generally 25,000 to 30,000 tons of coal available in Aden, the amount available on September 30, 1920, being 24,000 tons. This fuel is supplied from India, South Africa, Wales and America. It is stated that ships not regularly calling at Aden should make previous arrangements for coal with the home offices of supplying firms, namely, Luke Thomas & Company, Ltd., 138 Leadenhall Street, London, E. C. 3, and Cory Brothers & Company, Ltd., Cardiff, Wales. Coal can be supplied upon notice of a few hours and is loaded from lighters by Arab coolies. There are no coaling docks at Aden. The present storage capacity for fuel oil at Aden is 2,000,000, and another similar tank is being constructed. Probably not over 300 tons could be supplied at present to any single purchaser. There is usually no Diesel engine oil available. About 4500 cases of gasoline are usually available for purchase. Fuel oil is supplied by pipe lines running out to a terminal buoy in the harbor, but is supplied only after arrangement with Messrs. Shaw, Wallace & Company's London office at 23 Great Winchester Street—Anglo-Persian Oil Company, Ltd. Gasoline is stored in warehouses on shore in wooden cases, each containing two four-gallon tins. This is taken to the ships by lighters. Market prices are as follows: fuel oil, per ton of 250 gallons, $45.42; gasoline (motor), per case of eight gallons, $5.84."

On the Street

Personals

Chester H. Rowell of Fresno, California, recently appointed a member of the Shipping Board by President Wilson, has resigned to become a member of the California Railroad Commission.

Winners of a competition conducted by the San Francisco Art Association to select artists to paint mural decorations of the steamship Golden State, allotted to the Pacific Mail, are Maynard Dixon, Armin Hansen, Gottardo Piazzoni, Maurice Del Mue and Henry V. Poor.

Robert H. Blake, formerly general freight manager of the Cunard Line in America, has been apointed associate director, and will share with Sir Ashley Sparks, director in America, and DeLos W. Cooke, associate director, the management of the Cunard business in America and Canada.

R. D. Pinneo, freight traffic manager of the Pacific Steamship Company, with offices in Seattle, has resigned to become traffic manager of the Astoria Harbor Commission. This commission was established recently and the selection of Mr. Pinneo as traffic manager is one of its first moves toward building up the port's business. M. J. Wright, general agent in Manila, succeeded Mr. Pinneo January 10. J. D. Gilmore has been appointed superintendent engineer of the Pacific Steamship Company, with jurisdiction of all routes, coastwise and foreign.

Axel Johnson, owner of the Johnson Line, Stockholm, arrived at San Francisco as a passenger on the motorship Buenos Aires, which was making her maiden voyage. Mr. Johnson and party visited other Pacific Coast ports.

P. T. Draper has been re-elected president of the Marine Engineers' Beneficial Association, No. 38, Seattle.

Dudley W. Burchard, director of operations, Shipping Board, Puget Sound District, retired January 1 and was succeeded by Richard M. Semmes, formerly in the service of the Admiral Line and Independent Steamship Company and more recently traffic adviser of the Alaska Territorial Shipping Board.

Charles E. Peck, president of Willcox, Peck & Hughes since the incorporation of the firm, has retired from the presidency to become chairman of the board and has been succeeded as active head of the company by William G. Willcox, formerly first vice-president. Elmer F. Hunt and H. N. Townsend have been elected vice-presidents.

Edward J. Brandreth and William J. Edwards were admitted as general partners of the firm of Norton, Lilly & Company December 31. Mr. Edwards is Pacific Coast manager with headquarters in San Francisco.

With the retirement of Dr. Alfred Kinney from the Port of Astoria commission, the shipping of the Pacific Coast loses from active participation one of its staunchest supporters and advocates. Dr. Kinney has made the development of the Columbia River the moving factor of his life and has been in a large measure responsible for the establishment of the first railway to the mouth of the Columbia, the deepening of the harbor mouth to its present depth of 42 feet at mean low water, the securing of the Tongue Point naval base for the Columbia River and the organization of the Port of Astoria commission, with the subsequent erection of its terminals, one pier of which is the second largest in the world.

In the departure of Captain F. E. Cope from Kobe November 30 for London, where he will become superintendent of navigation for the Nippon Yusen Kaisha, there is more sentiment and sifinificance than usually attaches to the embarking of a single passenger. Captain Cope, in taking up shore duty, leaves the N. Y. K.'s great fleet entirely in the hands of Japanese officers and he is, in fact, the last foreign officer in the company's service, having survived the many whites, particularly Englishmen, who operated the vessels of the N. Y. K. for years. After twenty-four years of service, Captain Cope gave up the command of his last vessel, the Kitano Maru, in October, 1920.

C. A. Drew has been appointed manager of the shipping department of Castle & Cooke, Honolulu, succeeding his brother, J. H. Drew, recently killed in an automobile accident.

Captain P. J. Hickey of Vancouver, who had been in the service of the Canadian Pacific for nearly thirty years, has retired.

F. G. Phillips, controller of the Los Angeles Shipbuilding & Drydock Company, and has assistant, E. Bornstein, resigned in January.

S. L. Kreider has been appointed Southern California manager of the Williams Line, which recently established an intercoastal service. Mr. Kreider's offices are in Los Angeles.

Captain J. E. McGrath, of the Seattle station, Coast and Geodetic Survey, has retired after forty years of government service and has been succeeded by Captain Richard B. Derickson.

At an organization meeting of the Seattle Port Commission Dr. W. T. Christensen was elected president for the year, succeeding Thomas S. Lippy, who was defeated for re-election as commissioner by George S. Lamping.

John Clausen, vice-president and director of the Union National Bank, Seattle, and formerly vice-president in charge of the foreign department of the Chemical National Bank, New York, has resigned to become vice-president and director of the Mexico City Banking Corporation, Mexico City.

James Shewan & Sons, Inc., have announced the removal of their New York offices to 32 Broadway and the appointment of Fred M. Fenwick as New York manager.

L. M. Rhea has been appointed district freight agent, Los Angeles Pacific Navigation Company, at Los Angeles, succeeding G. T. Darragh.

Offices of the United States Shipping Board in Yokohama, which were maintained to have supervision of repairs after the completion of the building program in Japan, have been closed and M. A. Perry and M. E. Merriman have gone to Shanghai, where four vessels are under construction by the Kiangnan yard. The ships probably will be completed by the fall of 1921. The division of operations of the Shipping Board has an office in Yokohama in charge of Captain M. S. Harloe.

Deaths

Louis Paquet, builder of numerous boats for service on the Columbia, Willamette, Snake, Colorado and Yukon rivers, in Portland, December 24.

Commodore W. E. Filmer, late commodore of the Toyo Kisen Kaisha and father of Captain W. C. T. S. Filmer, in Southampton, England.

Alfred Woolley, O. B. E., chief agent of the Peninsular & Oriental in Japan, in Kobe, December 23, at the age of 70. Mr. Woolley had been chief agent in Japan for thirty years and was in the P. & O. service for fifty years.

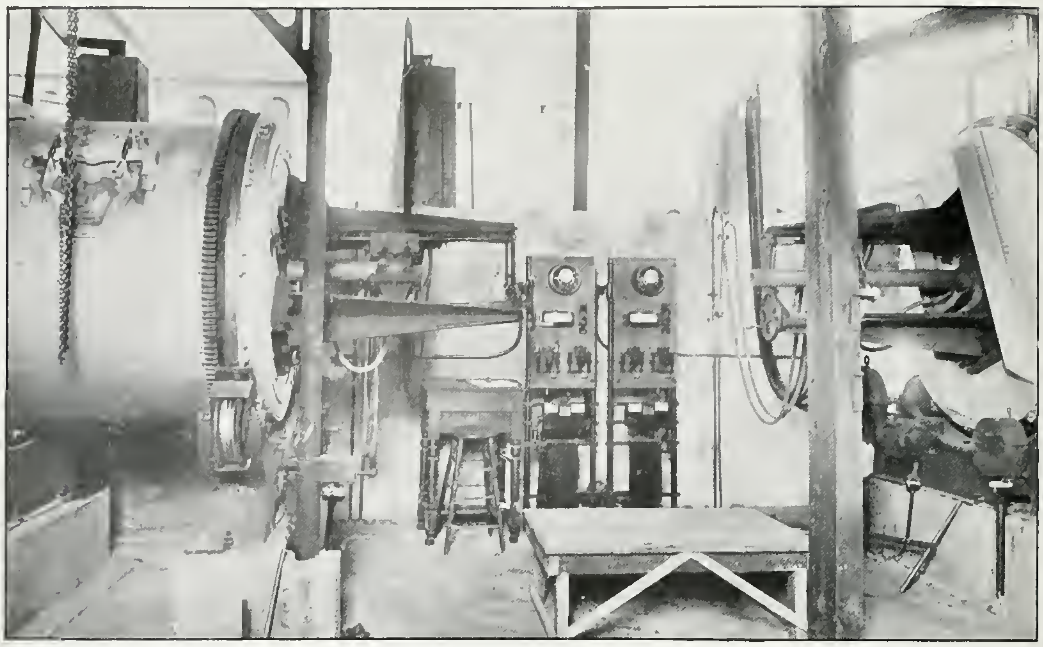
Mrs. Grace Dollar Dickson, only daughter of Captain Robert Dollar, in San Geronimo, California, January 16.

Captain George D. Korts, oldest San Francisco bar pilot, in Piedmont, California, January 15, at the age of 86. Captain Korts had been a pilot for thirty-six years and formerly was in the Pacific Mail and lighthouse services.

M. G. Waites, purchasing agent of the Moore Shipbuilding Company, Oakland, committed suicide January 14.

A. L. Germain-Griffiths, chief accountant of the Los Angeles Shipbuilding & Drydock Company, Mrs. Germain-Griffiths and Mrs. C. E. Forrest were killed January 8 in a collision of their automobile with a train.

THE OREGON BRASS WORKS



View in the Oregon Brass Works showing the two electric brass melting furnaces and the switchboard control

THE Oregon Brass Works was organized prior to 1880 and reorganized in 1904 by Mr. W. F. Prier, president of the company. It is an organization which has kept abreast of the full tide of accomplishment and development of the Pacific Coast. Having a modest beginning, it now is a concern employing nearly a hundred skilled mechanics, doing a large volume of business, with its products known and used from Kansas City to the Pacific Coast, and from Alaska to the Hawaiian Islands, and even in the Orient.

The success of the Oregon Brass Works has been due to the personal efforts of its president, Mr. Prier. Having worked as a boy in his father's plant in Kansas City, later operating a plant of his own in that city, his basic knowledge of all the many sides of the brass manufacturing business has been the mainstay of the organization, and has gained for Mr. Prier recognition as one of the best informed men in the country in this line, from a metallurgical standpoint. Considering his wealth of first-hand, practical and accurate information it is easy to trace the growth of the Oregon Brass Works from small beginnings into one of the leading firms of its class on the Pacific Coast.

In keeping with its progressive policy, this company has from time to time added to its equipment the latest and most efficient machines on the market. By far the most important of these recent installations is that of two electric furnaces, one of 1000 pounds capacity, and one of 2000 pounds capacity. These represent an investment of $30,000, and are the only electric furnaces for melting brass and bronze west of St. Louis. The use of electric furnaces for melting non-ferrous alloys is of comparatively recent date. The cost of operation in this line of work is high, but there are advantages which compensate. First, a better product can be made. Better, because the electric furnace makes possible the exact control of the temperature at which the casting should be poured, and the rocking feature of these furnaces thoroughly mixes the various metals composing the alloy. This insures absolute uniformity of product. Another important advantage gained is in the improved conditions for the workman. The furnaces are so well insulated that one can, without discomfort, hold the bare hand against the shell of the furnace when there is a molten charge within. There is also an almost total absence of fumes. A still further advantage is the smaller metal loss through oxidation. This loss is considerably smaller in the electric furnace than in any other type.

With the new electric furnaces, the capacity of the foundry is 30,000 pounds of castings per day. The work includes non-ferrous castings of all kinds, such as brass, bronze, manganese bronze, phosphor bronze, nickel silver, and also castings in copper, zinc and aluminum. Castings of all sizes are made, from less than 1 pound to over 4000 pounds each. In order to meet any demand which may be made on it the company has on hand at all times 1,000,000 pounds of metals for melting purposes.

A complete finishing plant is also operated, which enables the company to offer to its customers a finished job, not only making the casting from the alloy best suited for the purpose, but also to machine and finish it for the use for which it is intended. One important unit of the finishing plant is the electro-plating department, where brass and nickel plating and polishing is done, and ornamental work is colored in any shade. In the machine shop and plating department, the company does not confine itself to the products of its own foundry, but handles a large amount of work which is brought in for machining, nickel plating and refinishing.

Another feature of the business is handling what is known as mill stock — rods, tubes, sheets and wire in brass, copper, aluminum, nickel silver. In these articles there is maintained a stock of 125,000 pounds, which is the largest in the Northwest. Ingots of brass, bronze, copper, tin, zinc and aluminum are also handled.

A brief list of the more common articles and work which this company turns out includes manganese-bronze propellers, such as the largest steel ships built in this district use, and other innumerable marine fittings, bronze bearings of countless sizes and kinds, nickel silver saddle horns, stand pipe fittings which include roof connections, siamese connections, and hose gate valves. Many of the bronze bank and store fixtures seen in several of the prominent banks and stores of Portland are the work of the Oregon Brass Works. Densemore bearing bronze, a special bearing metal which is used by many automobile shops, by the government in Alaska and which is in demand by the sugar refineries in Hawaii, is among their products.

Railroad journal bearings, standard M. C. B. journals, for the quantity production of which $10,000 of new equipment has recently been installed, are also features of the company's output. One of the most popular side windshield brackets for automobiles is made by the thousand complete by the Oregon Brass Works. Among the articles which have been perfected and patented by the company is the "Orebrass" line of bubbling cups and drinking fountains.

It is estimated on reliable authority that only about one per cent of the brass melting in the United States is now done electrically, as in the case of the Oregon Brass Works, and that approximately 90 per cent could be done in this manner. This is illustrative of the progressiveness of the Oregon Brass Works. The company is justly proud of the fact that, operated on the American or open shop plan, they have never had a strike in their plant. They specialize in manganese bronze propellers, brass and bronze marine fittings of all kinds, and it will be the policy of the company throughout the coming year to vigorously maintain its reputation for absolute dependability in the marine industry of the Pacific Coast.

Small Turbo-Generator Sets—Bulletin No. 42010-A. General Electric Company.

Describes the Curtis steam turbine generating sets of capacities up to 300 kilowatts built by the General Electric Company, with either alternating or direct current generators. In these sets the alternating generators are of the 60-cycle revolving field type and are direct connected to the turbine, operating at 3600 R. P. M. The direct current generators of 100 to 300 kilowatt capacity are operated through speed reduction gearing, the turbine operating at 3600 R. P. M. and the generator at 1200 R. P. M. The smaller direct current sets are direct connected. Many of these sets have been operated very successfully on board ship as auxiliaries.

CALENDARS FOR 1921

Youngstown Sheet and Tube Company, Youngstown, Ohio.

A very large poster calendar with page for each month and splendid illustrations on each page showing various phases of the manufacturing carried on by this firm. Beginning in January with a picture of the model mine which supplies coking coal for the plant, this calendar in the successive months carries one through all of the main processes by which the raw material is worked up into the finished sheet and tube products.

These calendars will be gladly furnished to interested parties on receipt of six cents to cover postage and mailing.

Chicago Pneumatic Tool Company, Chicago, Illinois.

Poster type of calendar 12½x24 inches with varicolored halftone illustrations showing various uses of the products of the Chicago Pneumatic Tool Company, each page containing calendars for preceding and following as well as current months and having the very attractive feature of the blank spaces in the current calendar being filled with small halftone engravings showing many uses of pneumatic tools, which include Little Giant air dills, Boyer pneumatic hammers, Little Giant portable electric drills and electric spike drivers, Giant semi-Diesel oil engines, Little Giant pneumatic geared hoists, Little Giant portable electric coal drill, Chicago pneumatic portable electric compressors, Keller pneumatic rammers, pneumatic chipping hammers, and Chicago pneumatic air compressors.

Champion Engineering Company, Kenton, Ohio.

A handsome poster calendar in blue, white and black, illustrated for each month with large halftone engravings of typical installations of Champion cranes. These pictures show the Champion crane handling scrap in a foundry yard by means of a magnet; handling engine parts in an erecting shop; as an overhead bridge gantry; handling a special grab bucket over ore and coal piles, both indoors and out; as a bridge gantry over a plate storage yard; and as a bridge gantry spanning shipbuilding ways. Each page has the calendar for the preceding and following as well as for the current month, a very handy feature.

Columbian Rope Company, Auburn, New York

A very handsome wall calendar with a beautiful illustration of the clipper ship Daniel I. Tenney under full sail, a very faithful reproduction in colors of the famous marine painting by Charles Torrey.

Morse Dry Dock and Repair Company, Brooklyn, N. Y.

This splendid poster calendar is not only a typographical work of art but is very restful to the eye, the figures in the tabular register being one and one-eighth inch high. Each page is illustrated with a scene from the Morse shops or from the docks or the work of the Morse tugs in New York harbor. One very pretty feature is the marking of all holidays with a line cut in green showing a small ship with the date and the name of the day on the sail. Tide figures are given for Governor's Island, New York harbor.

Marine Electric Company, San Francisco

The Edison Mazda lamp art calendar illustrated with one of Maxfield Parrish's beautiful conceptions entitled "Primitive Man" and showing Woman as keeper of the fire.

Samson Cordage Works, Boston, Massachusetts

A desk pad calendar illustrated with the typical picture of Samson and the lion which has become associated with the advertising of this company's products.

TRADE LITERATURE

"Western" Diesel Engines, Stationary and Marine Types. Western Machinery Company, Los Angeles, California.

This new and very attractive 50-page pamphlet describes the new "Western" Diesel engine. It is copiously illustrated, both with half-tones and line cuts, the latter being reproductions of the working general arrangement drawings with white lines on blue background. All of the details of construction of the engine are fully described, and specifications and sizes for all working parts given in great detail.

The "Western" Diesel engine as now manufactured is assembled in units having from one to six cylinders, the standardization idea being built up on a cylinder unit to produce 25-brake horsepower. The construction is of a very sturdy character, ample bearing surface being provided on all wrist pin and crank bearings. The frame is designed so as to make all working parts readily accessible. Positive forced feed lubrication is supplied for all bearings, the oil being driven by a geared pump. After use the oil finds its way to the bottom of the crankcase where it is diverted into a specially designed filter, strained, cooled, and then returned to the pump suction.

The Western Machinery Company have been kept busy supplying the trade with these standard engines of various capacities. They have made a specialty of correct packing for both domestic and export shipment and have received many compliments upon the way in which their engines have arrived at ports of destination, particularly in export trade.

For marine purposes the Western Machinery Company are manufacturing this engine on exactly the same construction and principle of operation as their stationary engine and combining with that engine a specially designed reverse gear and thrust block. This unit has become very popular in sizes up to 75 to 100 horsepower. The reverse gear is of the drum planetary type, and the thrust of the standard collar type, water cooled, easily adjustable, and running in an oil bath. The forward drive on this set consists of a friction clutch of the multiple disk type and the reverse drive of a set of planetary gears controlled by means of shoes working on the outside of a brake drum. Both of these drives are controlled by means of a handwheel conveniently located for the engineer.

The Dodge Heavy Oil Engine. Dodge Sales & Engineering Company, Mishawaka, Ind.

A 16-page booklet describing the Dodge heavy oil engine and the new complete electric generating units powered with this engine, which are the latest products of the Dodge Sales & Engineering Company. These units are manufactured in capacities ranging from 12½ to 75 horsepower.

The Dodge heavy oil engine is sold under a standard guarantee that, using fuel of .28 Baume, it will deliver its rated horsepower at a fuel consumption of not greater than .5 pounds of oil per B. H. P. hour. Figuring that the fuel costs on an average of 5 cents per gallon, the annual fuel cost of a 50-horsepower engine direct connected to a 30-kilowatt generator if operated ten hours under full load for three hundred days, would be $500. A simple steam engine used in the same way would cost for fuel over the same period $1755. The generators used in these sets are manufactured by the Engberg Electric & Manufacturing Works, St. Joseph, Mo. The specifications of the generator show it to be of the highest quality in all of its working parts. The Dodge Sales & Engineering Company manufacture this same engine in various sizes for marine use equipped with clutch and reverse gear mounted on the same bedplate.

Oxygen - Hydrogen Generators, Bulletin No. 61 of the International Oxygen Company, Newark, New Jersey.

This 12-page book describes the I. O. C. system of unit cells for the electrolytic production of oxygen and hydrogen. This cell is the product of ten years of concentration on the refinement of the design of the original unit cell for this purpose first introduced into the United

States by this company in 1910. Each unit generator in this system consists of a cast iron body divided into two vertical compartments by means of an inner diaphragm of pure woven asbestos. On the right side of this cast iron body and insulated from it is a nickel-plated cast-iron electrode or anode on which the oxygen is generated. On the left side of the body and similarly insulated from it is a cast iron electrode or cathode on which the hydrogen is generated. At the top of the cast iron generator body and cast integral with it are suitable reservoirs for taking off the hydrogen and oxygen from their respective sides of the generator, and means are provided for taking off these gases into ducts which are connected with multiples of the cell to any capacity desired. Caustic soda dissolved in distilled water is used as an electrolyte, the distilled water consumed in producing the gases being replenished periodically.

This type of cell is guaranteed to produce oxygen not less than 99.5 per cent pure and hydrogen not less than 99.7 per cent pure, and it is claimed that a very slight difference in purity in these gases in their commercial use is responsible for very large differences in the cost of burning and cutting operations. It is stated also that the Underwriters' laboratories have given this system of oxygen-hydrogen generating the standard fire and accident rating when installed in accordance with the requirements of the National Electric code. Plans are given in the booklet for typical installations in industrial plants.

Getting the Swing of Things in the Construction and Quarry Business. Dake Engine Co., Grand Haven, Michigan.

A folder pamphlet describing the use of the Dake swinging engine in various contracting jobs. Dake swinging engines are built in horsepowers of from five to fifteen with compound gearing to the drum. One lever starts, stops and reverses the engine. These engines make for economy in the use of steam in the main engine. They speed up the work, are simple, easily handled, and inexpensive to install.

Harron, Rickard & McCone, 139 Townsend Street, San Francisco, are distributors for California.

Victory Engineering & Sales Company, Monadnock Building, San Francisco.

A very attractively bound and neatly printed 45-page booklet describing the products of the Victory Motor Company of Niles, California, for whom the Victory Engineering & Sales Company are distributors. The booklet describes standard and extra heavy cast iron-flanged fittings for pipe work, Victory valves, cast iron pulleys, sprocket wheels, cup and pump leathers, various types of deep well cylinders, hand winding gears or winches for handling pumps, the Hubbard power head for deep wells, and the Victory oil motor.

This motor has met with a great deal of success in the irrigation pump field. It has several features which recommend it peculiar to this use. It can be started by a one-quarter turn of the fly wheel and has a special safety starting device on the magneto which holds the armature while the engine is on compression stroke, releases the same after the piston passes the center, and at the same time gives the armature increased speed through spring compression, insuring a hot spark just when it is wanted for starting. The engine operates with ease and economy on low grade fuels. It is built in sizes from 8 to 100 horsepower, is equipped with a very efficient governor with Bosch high tension magneto, which, being direct driven, can be removed and replaced without danger of spoiling the timing, so that whenever it is desirable the operator on leaving the engine can take the magneto with him, thereby insuring the non-operation of the engine until his return.

Thermit Insert Rail Weld. Metal & Thermit Corporation, New York.

An attractively bound pamphlet describing the method and appliances by which Thermit welding is applied to railroad joints making the rail practically continuous and eliminating the joint.

This method has been used considerably on electric street railways, and steam railroads are using the method for many special joints, particularly along paved streets in the cities, one instance of this being the one hundred joints so welded on Pratt Street, Baltimore, in 1917 by the Baltimore & Ohio Railroad, the rails in this instance weighing 141 pounds to the yard. The success of Thermit welding in this case was very marked. Such welding of joints of course eliminates any necessity for the use of connecting cables where rails are used as return circuits for the transmission of electric power.

Dake Worm Drive Double Cylinder Steam Steering Engine. The Dake Engine Company, Grand Haven, Michigan.

A leaflet describing the construction of and the specifications for the steering engine and steering wheel control manufactured by the Dake Engine Company and especially adapted for tugs and small steamers. This steering engine is designed for steam operation only, but may be used with an ordinary hand steering gear where hand steering is desirable.

The steering engine located in any convenient place on the ship is controlled from a steering standard by means of shafting and gearing. The cylinders are 4½ by 4½ inches. Th control valve is of the floating type balanced and attached in a vertical position to the frame in front of and between the valve chests of the two cylinders. The control valve stem is threaded to fit a flanged nut and is fitted to a bevel pinion with a feather key so that any rotation of the stem causes a vertical up or down movement of itself through the threads in the nut, thereby operating the valve and admitting steam to the cylinders. The motion of the engine itself transmits to the control valve stem and brings the valve back to neutral position when the rotation of the pilot wheel is stopped, thus cutting off the flow of steam and stopping the steering engine.

The worm gear is cast iron with cut teeth and is keyed to the drum shaft. The worm is cut from solid steel blank and is attached to the crankshaft with a feather key, allowing a sliding movement. The worm runs in an oil bath and the oil reservoir provides two additional bearings for the crankshaft. The drum is of cast iron with grooves cast in the surface for chain in the standard equipment, but can be furnished with a machined surface grooved for wire rope. At present the Dake worm drive double cylinder steam steering engine is built in one size only. The over-all dimensions of this steering engine, in round numbers, are: length 47 inches, width 40 inches, height 38 inches. The weight of the steering engine is 2500 pounds, and the weight of the standard and steering wheel is 280 pounds.

A view of the New York showroom of Kelvin & Wilfrid O. White, where a complete line of nautical instruments, charts and books are available to all those interested in navigation. A staff of compass adjusters are retained here for all emergency calls. Capt. Abbott, who is in charge, is shown guarding the "strong box." Capt. Abbott's experience of 33 years at sea—28 years of which he was an officer—enables him to render a most intimate service to his patrons.

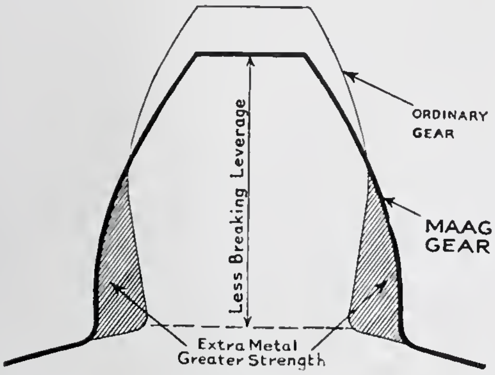
Super-Accurate Gears for Marine Turbine Use

HITHERTO the one weak spot in steam turbine practice has been the reduction gears. These have never been quite satisfactory because of two reasons—lack of accuracy in the gears and lack of strength in the pinions. Maag Gears overcome both these obstacles to success.

Cut, first of all, with an accuracy far beyond that possible in ordinary gears, Maag Pinions for high speeds are case hardened and then GROUND to final perfection.

By case hardening, the originally very strong Maag tooth—which is strongest at the base where other gears are weakest—is made still stronger. By grinding, any distortions due to the hardening process are not only remedied to produce a tooth outline of superaccuracy, but the grinding actually increases the resistance of the metal to wear and tear.

Maag turbo-reduction drives, made in this way, have given results that approach 100% efficiency. For example a standard set of Maag Gears, after being more than 12 months in continuous service, have shown no discernable wear whatever; the original fine grinding lines still remaining visible and unchanged.



We'll be glad to give you figures on high speed Maag Gears for steam turbine, rotary pump, and electric motor reductions.

MAAG GEARS

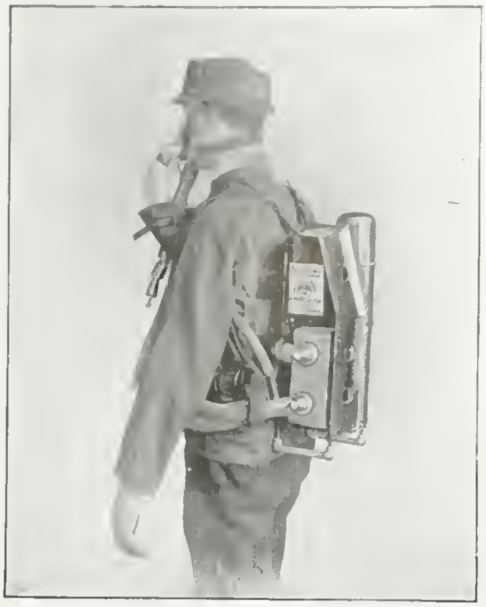
NILES-BEMENT-POND CO.

111 BROADWAY NEW YORK CITY

See them at the Marine Show, January 24-29, Grand Central Palace, New York.

RESCUE BREATHING APPARATUS

By Willard W. Keith



The Paul Breathing Apparatus as manufactured by the American Atmos Corporation

REFERENCES to our daily bread are to be found in numerous expressions in common use, but no one seems to remember that the nutrition of the body is only partially accomplished by the consumption of food, and that the only way in which it can be completed is by enabling the oxygen of the air to combine with the food, or the combustible carbohydrate ingredients of the same, in the body.

Unconsciously, so far as we are concerned, the nourishment of our bodies is based only in part on the edible products of our mother earth, and for the other, and equally important part, on the surrounding atmosphere.

The aerobic character of the human race has dropped out of sight in consequence of our habits of existence in daily life, and its full meaning is only occasionally recognized by the individual. Nature has provided our planet so lavishly with our atmospheric food, and our lungs, which play the part of a stomach with regard to air, work day and night in such a beautifully automatic and noiseless manner—expelling the product of combustion, carbon dioxide, in an equally unnoticeable manner—that man now fails to recognize any other organs of nutrition than those connected with the stomach.

When, however, we begin to appreciate the enormous volumes of air we require without cessation, daily, hourly, and even every minute, as a source of oxygen food, the possible necessity that might arise for maintaining such a supply will appear in a somewhat terrifying aspect. This is more so because, while the body possesses in its fat muscle substance and the contents of the stomach, storage appliances of extensive capacity in respect of solid food, by virtue of which it is able to fast for days at a time, there is no possible way in which the body can lay up a store (to say nothing of an equivalent store) of the atmospheric food, oxygen. Under normal conditions of existence, man draws from the extensive air store enveloping the whole earth—and on that account his body has not yet equipped itself with devices for storing oxygen.

The question will be asked: How much oxygen is required by the body? There will be some difficulty in crediting the assertion that a man leading an ordinary life, working by day and resting by night, and consuming about 4½ to 6½ pounds of solid food per diem, requires to inhale and exhale some 700 cubic feet of air (weighing approximately 62 pounds), from which the body absorbs nearly 25 cubic feet (2¼ pounds) of oxygen, which it converts into carbon dioxide and exhales about 35 cubic feet (4½ pounds) of this latter. These values may fluctuate with heavy work.

A city of 100,000 inhabitants consumes daily two and one-half million cubic feet, or one hundred tons of oxygen; produces daily three and one-half million cubic feet or 200 tons cubic feet or two hundred tons of carbon dioxide. This city yearly consumes nine hundred million cubic feet, or 35,000 tons of oxygen, and produces yearly 1220 million cubic feet, or 70,000 tons of carbon dioxide.

It is only by means of such reflections as these that one arrives at a due appreciation of the importance of oxygen to our existence, and it will be admitted that a respiratory apparatus designed to enable men to exist and perform heavy work for hours at a time without any supply of air from outside, has a weighty task to fulfill. Nevertheless, well directed endeavor on this difficult sphere of operations has once more led to the triumph of man over nature, and has provided him—by artificial means—with the air store that nature has denied him corporeally.

Each new phase of human activity, each new convenience, creates new dangers that must be guarded against.

It is to the lasting credit of the progressive spirit of American business and American community spirit that our leaders in industrial and social life were broad-visioned enough to realize the need for safety measures, and courageous enough to put them into operation even before public attention was focused on this vital need.

In the past, the feverish activity to develop the wonderful resources of the country disregarded waste, and ignored the safety of the workman. Those days are gone. The development of resources has settled to a steady stride. The true relationship between employer and employe, citizen and state, has become better understood.

Employers have discovered the waste and the expense of shifting labor, of accidents, of maimed pensioners, and have taken steps to protect their employes. The state has assisted, and the present compensation laws are long steps in the right direction.

The creation and construction of an apparatus, or machine, which would permit its wearer to live and work in an atmosphere filled with the most deadly gases, his respiratory organs properly functioning, was determined as an absolute necessity to modern industry. European countries were the first to experiment and to manufacture a commercial product that would fulfill these requirements. It was not until 1907 that the importance of this apparatus was recognized by the government of our country, and in this year Congress appropriated funds for the purchase and installation of apparatus.

The mining industries were among the first to realize the protective value of breathing apparatus. Mine fires that otherwise would have destroyed untold millions of property and probably countless lives, have been quenched in their infancy. Mines that could not otherwise be worked have been made safe.

Likewise the fire departments of most of our large cities, prominent public service and industrial corporations, metallurgical and chemical companies, Federal and state departments of our government, and many others, have adopted safety breathing apparatus as standard equipment.

The shipping world is also becoming acquainted with the practical efficiency of the apparatus as suited to their requirement. Bursting amonia pipes, chemical fires, oil fumes and numerous other occasions have demonstrated the necessity of being prepared with means to prevent and overcome such catastrophes. Our large oil corporations, the United States Navy and numerous shipping companies are equipped with breathing apparatus.

Probably the most recent and modern apparatus to appear in the field is the new Paul—designed by Mr. James W. Paul, seven years with the United States Bureau of Mines. This apparatus is manufactured by the American Atmos Corporation of Pittsburgh, Pennsylvania, who have had years of experience in the manufacture of breathing apparatus and safety and life saving devices.

In theory and principle, the Paul apparatus is compartively simple. The respired air is passed over trays of caustic alkali, which absorbs completely the poisonous products of respiration. It is then cooled and revivified with the necessary oxygen and returned to the wearer's respiratory organs, thus making a complete closed circuit absolutely tight against and independent of the outside atmosphere.

The apparatus contains a self-adjusting oxygen feed valve which controls the oxygen feed and furnishes a varying flow in exact accord with the requirements of the wearer. The breathing bag of the Paul is of "positive pressure" design. This means that the pressure on the air in the apparatus is at all times higher than the atmospheric pressure surrounding the machine. This highly desirable result has been attained by the use of a very simple valve mechanism within the breathing bag itself.

The Paul apparatus, when properly charged, provides for a working period varying from an average of four hours to a maximum of twelve hours, the period of course being dependent upon the energy expended by the wearer.

The Paul breathing aparatus has accomplished the long desired result of being compact and strong in manufacture, and safe and durable in operation.

BOOK REVIEWS

The Story of the American Red Cross in Italy, by Charles M. Bakewell; 253 pages, numerous maps and illustrations; bound in blue buckram with gold stampings; published by the MacMillan Company, New York.

This is the second of a series of books covering the work of the American Red Cross in the great war. The first of this series, which was reviewed in these columns recently, covered the work in a broad general way. It is now being followed by books covering the work in special fields. "The American Red Cross came to Italy in the hour of her greatest need, not to bring charity but to render justice by alleviating as far as possible the sufferings brought on by two hard years of fighting in our common cause before America took up arms."

The purpose of the writer in this work is to contribute a better understanding between Italians and Americans and to convey to the American reader something of that "finer and more discriminating appreciation of Italian character" gained by Red Cross workers in the field with the Italian armies. While no personal praise is indulged in by the author for any individual worker, the style of the book is such that many stories of individual heroism are told in a delightful way.

In common with the other books of this series, this volume is published for the benefit of the Red Cross work, all net earnings being turned over to the American Red Cross.

The Passing Legions, by George Buchanan Fife.

A companion volume to the above, bound in the same style, published by MacMillan, and setting forth the work of the Red Cross in Great Britain as exemplified in the care for the American army on its way through to the front. An intensely interesting story, showing the difficulties under which Red Cross workers labored, both to secure the comfort of the American army passing through England and in the succoring of the survivors from transports caught by the submarine warfare, and in the care for convalescent American soldiers back from the front on sick leave.

This story starts with a graphic description of the arrival of the British torpedo boat destroyer Mounsey at the harbor of Belfast one Sunday night with a deckload of from five to six hundred ragged American soldiers, survivors of the Otranto wrecked at the head of the North Channel, all suffering from exposure, and tells how the American Red Cross took care of these soldiers through their emergency stations along the northern Irish coast, one of which was located in Belfast itself. As one of the soldiers remarked, "It looked as though this Red Cross had just been sitting up waiting for us to come in so they could put our feet in hot water."

From this through all the stressful times of the big drives the author carries us through a drama of great action in England. The narrative closes with the account of how the huge transports, loaded to the guards with troops, were cheered on their homeward way by the Red Cross supplies, the Red Cross Christmas, the Red Cross nurses, and all the other good things which the "Greatest Mother on Earth" is always preparing for her children.

Sea Power in American History, by Herman Krafft and Walter B. Norris; 374 pages, 8vo., copiously illustrated; bound in blue buckram with gold stampings; published by the Century Company, New York City.

The authors of this book are associate professors at the Naval Academy, Annapolis. They have endeavored in this work to describe in a general, comprehensive way in one volume the decisive influence of sea power on American history. In narrative form we are told how British sea power won a colonial empire in America and how the defeat of that same British sea power gave America independence. A chapter is then devoted to Paul Jones, the genius of Revolutionary sea power, and another to the rise of the American merchant marine during the Napoleonic wars. It is shown how American naval power was reborn and dominated the war of 1812, and several chapters are devoted to the commercial blockade and commerce raiding as sea power weapons; sea power on the Great Lakes; and the battle of Lake Champlain. Stephen Decatur is described as the popular idol of American sea power and David Porter as the personification of marine Americanism. The naval history of the Civil War is reviewed, and then we come to two chapters on two outstanding American naval men, Farragut and Mahan. The last three chapters of the book deal with the effect of the Panama Canal, sea power in the Pacific, and America's naval part in the great world war.

Upon the whole, the book is a welcome contribution to America's marine library and should be read by all loyal American citizens.

LEE FORE-BRACE

By C. FOX SMITH

There was ten men haulin' on the lee fore-brace,
In the drivin' rain an' hail,
An' the mile-long grey beards chargin' by,
An' the thunderin' Cape Horn gale.

That dark it was, you scarce could see
Your hand before your face;
That cold it was, our fingers froze
Stiff as they gripped the brace.

There was ten men haulin' on the lee fore-brace
When the big sea broke aboard;
Like a stream in spate, a foaming flood
Right fore and aft it poured.

The ship, she staggered and lay still,
So deep, so dead lay she
You'd think she could not rise again
From such a weight of sea.

There was ten men haulin' on the lee fore-brace,
Seven when she rose at last,
The rest was gone to the pitch-dark night,
An' the sea, an' the ice-cold blast.

An' one of them was Dago Pete,
Another was Lars the Dane,
An' the third was the lad whose like on earth
I shall not meet again.

An' I'll heave an' haul an' stand my wheel,
An' reef an' furl wi' the rest,
For winds an' seas go on the same,
Though they take an' drown the best.

An' I'll drink my drink an' sing my song,
An' nobody'll know but me,
A lump o' my heart went down with Dan
That night in the wild Horn sea.

—Nautical Magazine.

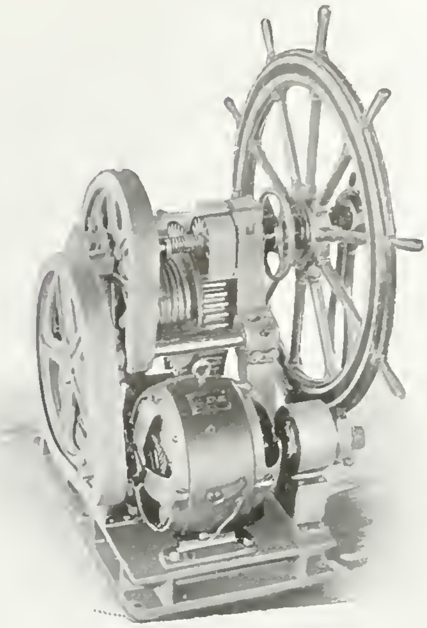
ELECTRIC STEERING GEAR FOR BARGES

THE three steel barges, the Buffalo Socony, the Rochester Socony, and the Utica Socony, built for the Standard Oil Company of New York by the Bethlehem Shipbuilding Corporation, Limited, present two notably outstanding features in that they are self-propelled and electrically steered. They are designed to carry oil in bulk and will be placed in service on the New York state barge canal.

These barges are 156 feet long and are listed at 690 tons deadweight. They are driven through a single screw, and the propelling power is furnished by an oil engine which also runs a generating set of sufficient size to furnish the electricity required to operate the electric steering gear.

The electric steering gear installed on these barges is of the drum type, always recommended for flexibility of installation and economy of space, specially designed to combine light service with a very compact arrangement. It was designed by the auxiliary machinery department of the Bethlehem Shipbuilding Corporation, and built at their Moore plant, Elizabethport, New Jersey.

All working parts of this mechanism, including the motor and brake, master switch, drum, hand-wheel and the required gearing, are mounted on a single base measuring 25 inches by 41¾ inches. This compact arrangement makes it possible to place the entire gear in the pilot house.



Electric Steering Gear installed by the Bethlehem Shipbuilding Corporation on self-propelled barges for the Standard Oil Company of New York.

The motor employed is of the compound-wound, direct current type, rated at three horsepower, 110 volts. It is provided with ball bearings and is designed to accommodate 100 per cent overload for five minutes. The motor is controlled by means of a magnetic control panel operated by a master switch at the steering stand.

A shift of the master switch to the right or left actuates the magnetic control to start the motor in the required direction. Power is transmitted from the motor through triple gears and drum to the quadrant on the rudder stock by means of a three-quarter-inch extra flexible steel wire rope. When the switch is brought back to the central, or off, position, the line is disconnected and the motor is stopped by means of a quick-acting shunt brake. Electrical dynamic braking is also provided.

A rudder indicator mounted on the framework shows the position of the rudder at all times. When the rudder reaches a hardover position, a gear limit switch disconnects the power, stops the motor and so prevents damage. A 60-inch hand-wheel is provided for emergencies. Shifting from electrical steering to hand steering is accomplished by moving a clutch wheel, which shifts two jaw clutches so that when the hand steering wheels are connected to the drum, the motor is simultaneously disconnected, and vice versa. When the gear is connected up for hand steering, the clutch is held in place by a spring latch, so that when it is desired to shift to electrical steering, the spring latch is raised and a steel coil spring automatically moves the clutches to the required position. This renders it impossible for the motor and hand-wheel to be connected to the drum at the same time and eliminates all danger of accidents from this source.

This type of electric steering gear is suitable for service on river barges, yachts or any other light draft vessels.

MULTIWHIRL SUBCOOLING CONDENSER

THE Griscom-Russell Company of 90 West Street, New York, has recently placed on the market the Multiwhirl subcooling condenser designed for use in oil refineries, particularly for the condensing and subcooling of gasoline, kerosene or any other vapors encountered in the refining process. The construction is clearly shown by the accompanying cut. The vapors to be condensed enter the tubes at the top and are condensed and cooled in their passage through the tubes and the resulting distillate is taken off at the bottom, the tubes being arranged single pass. The condensing and cooling water enters the shell at the bottom and travels upward through the helical path and leaves the condenser at the top, this arrangement insuring contraflow operation.

The unusual feature of this condenser is the patented helical baffle which insures a maximum length of water path for a given length of shell and a minimum water pressure loss. The helical baffle directs the water in its flow through the shell without appreciably retarding its progress.

Small Space Occupied.—The Multiwhirl design permits a given size condenser in a much smaller space than has hitherto been possible because the efficiency secured by the use of the patented helical baffle permits the use of a much smaller amount of condensing and cooling surface than is ordinarily required.

Reduced Quantity of Cooling Water.—The efficient operation of the Multiwhirl cooler permits delivery of the given cooling and condensing duty, using about one-third to one-quarter the condensing water required with other types of apparatus, with corresponding reduction in pumping costs.

More Complete Absorption of Non-Condensible Gases.—The design of the apparatus is such that a much larger percentage of the valuable non-condensible gases are absorbed in the distillate than with present condensers.

Lower Outlet Temperature of Distillate.—The high efficiency of heat transfer results in a temperature of distillate within a few degrees of the condensing water supply.

Patented Helical Baffle.—The patented helical baffle has been used in the Multiwhirl cooler for the past four years and is, therefore, not an experimental design, but has been fully proven in other fields. This design permits a long, smooth path with a minimum pressure loss.

Removable Tube Bundle.—The entire tube bundle may be removed from the shell, provided such removal is necessary for inspection and cleaning.

General Advantages.—The tubes are expanded into the tube plates without the use of sweated joints. The upper tube plate is rigidly attached to the shell, but the lower tube sheet floats and is free to move, thus preventing any expansion strains on tube joints. The floating head is outside packed and this construction prevents any possible leakage of water into the oil through faulty packing.

Construction.—The Multiwhirl subcooling condenser is made standard with shell of close grain cast iron, waterhead of cast iron or cast steel, and floating head of cast steel with floating head cover of either cast iron or steel. The tubes are of ⅝-inch O. D. No. 16 B. W. G. seamless drawn steel expanded into tube sheets of rolled steel. The helical baffle is of brass. These materials of construction are varied to suit the requirements of the particular installations.

Operating Pressure.—These condensers are built for both low or high pressure operations. They are especially well adapted to various cracking and topping systems.

This aparatus is described and illustrated in the publicity sheet, No. 171, published by the manufacturers.

THE BEST IN TOOLS

SINCE 1875

EVERYTHING

FOR THE

MACHINE SHOP

GARAGE

SHIPYARD

RAILROAD

SERVICE-QUALITY
HARRON, RICKARD & Mc CONE
MACHINERY SUPPLIES
WHEN YOU SEE THIS NAME PLATE ATTACHED QUALITY IS ASSURED

HARRON, RICKARD & McCONE
SAN FRANCISCO LOS ANGELES

SMALL TOOLS

AND

SUPPLIES

OF ALL KINDS

LARGEST STOCK ON PACIFIC COAST

TRADE LITERATURE

Forged High Speed Twist Drills—Catalog No. 3 of the American Twist Drill Company, Detroit.

A very attractive cardboard covered booklet of 90 pages, giving specifications for twist drills of high speed steel manufactured by the American Twist Drill Company. About ten pages are devoted to some very useful and convenient tables for drill users. Cutting speeds, decimal equivalents, fractional sizes in millimeters, tap drill sizes, and much other useful information are here very conveniently presented.

Johansson Combination Gage Blocks. C. E. Johansson, Incorporated, New York City.

This splendid 45-page book is a typographical joy and at the same time an accurate scientific treatise on standardization in measurement. The Johansson combination gage blocks embody in their commercial manufacture the solving of four universal metallurgical and mechanical problems: first, flat surfaces in steel; second, parallel surfaces in steel; third, dimension accuracy; fourth, effective heat treatment and seasoning. That Johansson blocks have solved these four problems is a fact attested to by their use in all branches of manufacture where standardization and interchangeability of parts is necessary for success. Complete instructions are contained in the catalog as to the use of these blocks, their combinations to get at various measurements, and a large variety of typical applications.

The catalog also describes Johansson adjustable limit snap gages, which are used in connection with the blocks for gauging dimensions of parts. These limit gauges are set to dimensions by the use of the blocks and are then sealed for use in the shop. Johansson tolerance blocks are also described, together with many typical uses.

Johansson is represented in San Francisco by the Chas. A. Dowd Sales Company, 320 Market Street.

P & H Quality Service, 1920. Published by Pawling & Harnischfeger Company, Milwaukee, Wisconsin.

A very attractive brochure setting forth in narrative fashion the history of the Pawling and Harnischfeger Company, which was first formed in 1884 and very soon thereafter built the first electric traveling crane with individual motor drive. The plant has grown wonderfully since that time, and the company has branched out into various manufacturing enterprises, but the individual electric motor drive crane and various forms of material handling machinery, such as excavators, backfillers, tampers, mono-rail overhead conveying systems, and special hoists have been their specialties.

Naturally, many engineering problems were put up to this company by their early clients, and among their first products were steam feed engines for sawmills and steam steering engines for ships. In working out their own shop problems special tools were devised for work on the bulky parts characteristic of cranes, and from this special designing at their own shop were developed two types of drilling and boring machines which have come into great favor and use in manufacturing plants throughout the United States.

The booklet introduces its readers in a very "homey" way to the entire organization of the Pawling & Harnischfeger Company and forms a very effective New Year's greeting to the company's friends.

Punches and Other Tools. Geo. F. Marchant Company, Chicago, Illinois.

A neat 25-page board covered booklet, describing the punches and dies manufactured by this company. Mr. George Marchant began the manufacture of guaranteed tools in a small room in Chicago in 1903. The business was founded on a discovery made by him of an improved method of hardening and tempering punches. The business grew and along about 1906 "Vanadium" sets were brought out. These sets were guaranteed to drive 10,000 rivets. The process devised by Mr. Marchant was christened "New Process." Both the "New Process" standard punches and dies and the "Vanadium" rivet sets, and the "New Process" air hammer chisel blanks, shear blades, and rivet machine gripping and heading dies are quality tools and sold on that basis only under a positive guarantee.

Standard Radius Lathe and Planer Tool. R. G. Smith Tool & Manufacturing Company, Newark, New Jersey.

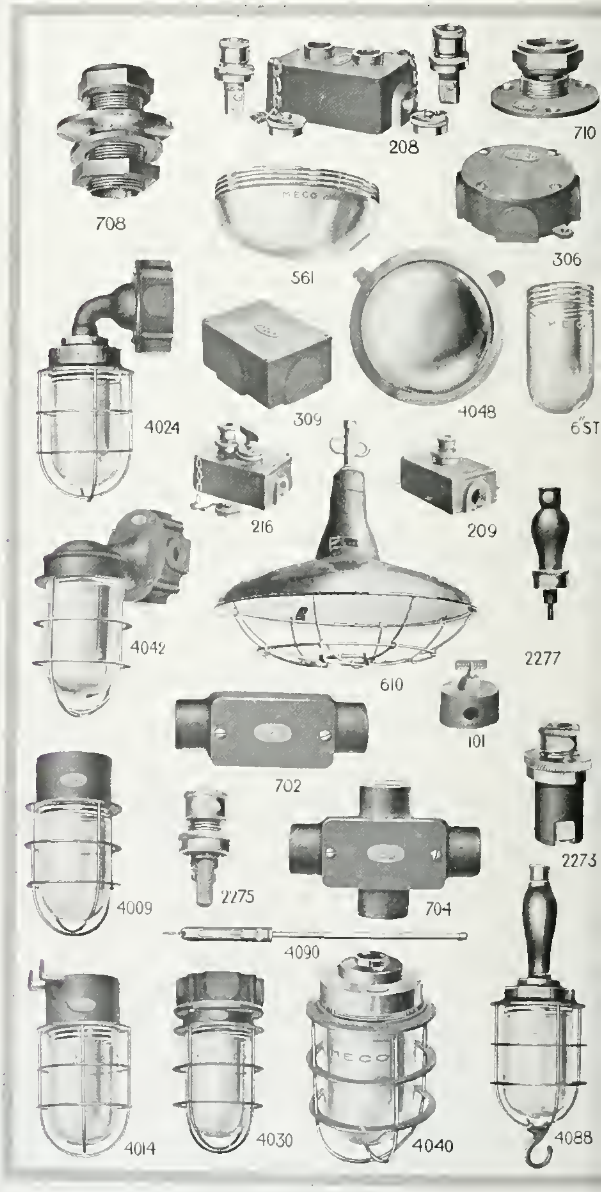
A 12-page booklet describing a special tool made for use with the spring tool holder manufactured by this company. This standard radius tool is made in all sizes from 1/16-inch diameter circle to 1 inch, advancing by sixteenths, both for concave and convex radius cutting. Special sets are made up with the spring tool holder and wrench for same, radius cutters from 1/16 inch to 1 inch, a 60-degree groove cutter, and a special cutting-off tool. These sets should prove great time and money saving devices in many of the machine shops throughout the country.

Established 1886

Manufacturers and Distributers of

MECO

Marine Watertight Fixture
and Fittings



MARINE ELECTRIC COMPANY
195 FREMONT STREET
San Francisco, Calif.

Cable Address
MECO

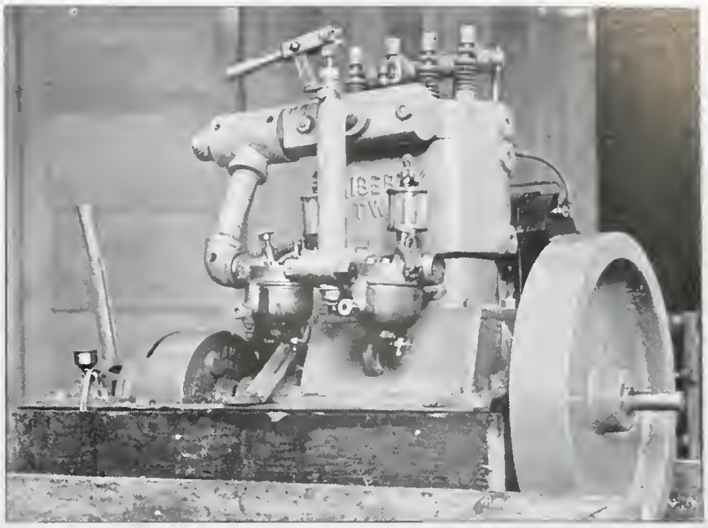
Codes:
A. B. C. 5th Ed. (Imp.
Western Union

Dual Carburetor System on Liberty Twin Engines

HE Liberty Twin engine of 8 - 10 horsepower manufactured by A. G. Hebgen of n Francisco is the result of ry careful development work the part of its designers.) expense or time has been ared to produce a reliable meum duty engine which will ow good fuel economy with rd, continuous service.

A dual carburetor system has st been perfected for the Libty Twin engine which makes ssible the use of either gasoe or kerosene without any justment or change in the eration of the engine. The al carburetor system is used connection with only one nifold and is arranged so at the operator may instantly ange from one fuel to the her without stopping the enne or adjusting a carburetor. n ingenious design of valve d throttle controls both the rosene and gasoline carbutor. A turn of the throttle ndle toward the front of the gine opens the gasoline inke; reversing the throttle handle toward the after end of engine opens the kerosene intake. The same throttle handle governs the amount of fuel supplied to the engine and thus this triple-acting throttle is used by the engine operator to change his fuel at will and at the same time increase or decrease the speed of the engine.

In designing the Liberty Twin engine the manufacturers have steadily had in mind the use of the engine either with kerosene or gasoline, and therefore the designer arranged for sufficient hot spots in both manifold and head to give the engine perfect combustion on either kerosene or gasoline. The kerosene side of the carburetor system is equipped with a preheating device which heats the air before passing through the carburetor bowl. An indication of the efficiency and flexibility of the Liberty Twin engine in operation on either kerosene or gasoline is seen in the range of speeds obtained from the normal speed of 850 r. p. m. to the minimum speed of 200 r. p. m. on gasoline and 250 r. p. m. on kerosene.



These medium duty engines which range from 4 to 10-horsepower are manufactured in San Francisco by engineers who have long been familiar with the requirements of engine users requiring a sturdy and reliable engine constructed with high-grade material and workmanship.

CANADA'S EXCLUSIVE WHOLESALE AND RETAIL MARINE ENGINE, PROPELLER JOBBERS. Dominion's Largest Distributors. Free illustrated catalog. Mention this publication.

CANADIAN BOAT AND ENGINE EXCHANGE, LTD.

For lowest transportation costs and quick despatch route your freight via

"ATLANTIC-GULF & PACIFIC"

The eight-thousand-ton steamship Cape Romain of the Atlantic-Gulf & Pacific Corporation's fleet operating in the inter-coastal service.

ATLANTIC-GULF & PACIFIC S.S. CORP.

Semi-monthly Fast Freight Service
BETWEEN
BALTIMORE — PHILADELPHIA — MOBILE and LOS ANGELES (Harbor)—
SAN FRANCISCO — OAKLAND — PORTLAND — SEATTLE

T. J. WADE, *General Freight Agent*
60 California St., San Francisco

G. W. BLAKE, Gen. Agt.,
Van Nuys Bldg.,
Los Angeles.

G. W. CHILSON, Gen. Agt.,
Board of Trade Bldg.,
Portland.

A. B. NATLAND, Gen. Agt.,
Smith Building,
Seattle.

Application of the Winton Diesel Electric Drive to Ocean Liners

By RENWICK Z. DICKIE

GENERALLY, when speaking of the economy of a ship, it is customary to consider her in operation at sea, while in many instances the largest of her bills are incurred while the boat is lying in port discharging and loading cargo. These bills are caused by trying to do all the upkeep work on the power plant while the vessel is in port, as this is the only possible time to make permanent repairs to boilers or engines.

With the adoption of the Diesel electric drive where the main power plant is divided into many units, this condition changes and permanent repairs can be made to any one of the units without seriously affecting the speed of the ship. To accomplish this end it would be necessary to carry three guarantee engineers from the Diesel engine shop who would work entirely independent of the operating force and make repairs and do overhauling in a permanent manner while at sea, thus avoiding asking the operating crew to work longer than their respective watches.

These men could be directly in charge of the first assistant engineer, who does not stand watch on large ocean liners. An arrangement could be made that their sea time would count the same as oilers, entitling them to apply for a license. This would build up competent Diesel engineers for future ships and would give them the practical training that an engineer requires.

In order to accomplish the permanent repairs, a machine shop would have to be fitted with a complete set of small motor-driven machine tools. The auxiliaries of the ship would be motor driven and in this case it would be well to limit the sizes of motors to as small a number as possible so that they would be interchangeable.

The spare parts of the main power plant would all be the same, meaning that a smaller amount of parts would have to be carried as spares. A complete engine could be installed as a spare engine, making it unnecessary to make vital repairs at sea that would require heavy lifting.

A plant built up of several units would not only cost less than a steam plant of similar power, but would make a saving of the weight of the feed water and one-half of the fuel required with a steam plant, which could be carried in the double bottom, making it possible for a smaller ship to fulfill the conditions.

In every way the arrangement of the power plant and machine shop should be to facilitate the handling of small parts and a system of small electric cranes should be installed so that all these parts could be quickly handled while at sea.

The auxiliaries would all be electric driven, using the standard size motors as near as possible, and it has been suggested that the circulating water be handled by an independent pump for each four engines, with the surplus water discharging into the sanitary line.

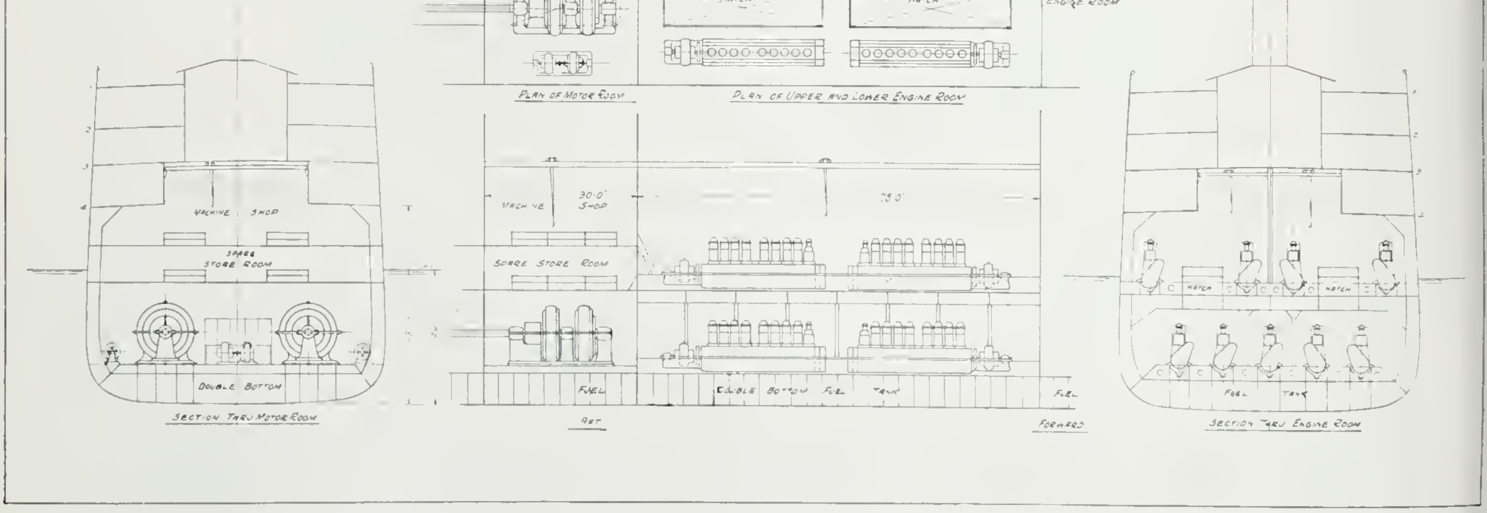
Instead of fitting air compressors on each engine, it might be well to have a motor-driven compressor for each four engines, thus eliminating many working parts.

The question of electric losses will be much discussed in connection with a plant of this kind and each one of the eighteen 500 horsepower Diesel engines and generators is guaranteed 91.7 efficient—that is, 500 h. p. × 18 × 91.7 = 8253.00 h. p.—and the efficiency of the driving motors would be the same as the turbo electric.

The electrical end of this power plant will consist of the direct current system in series and reverse motor control by generator excitation, which tends to simplify the whole arrangement. In the first place, any slight variation in the speed of the various engines is of no importance and the speed of the propelling motors, which is any number of revolutions from zero to the maximum value, is varied by controlling the generator voltage, and the direction of rotation of the driving motor is accomplished by changing the generator excitation. Both the speed of the driving motor and the direction of rotation of the driving motor is regulated by means of a small field rheostat, the control of which is placed in the pilot house. With this system the main current is not handled in operation, but the whole control of the equipment simply consists of handling the generator field current.

The arrangement of control will be that nine generators will be connected in series to one of the double armature reversing driving motors which are directly connected to the propeller shafts and on account of the number of units and the necessity of keeping the voltage down for safety aboard ship the main generators will be of 125 volts and in series this will give 1125 volts at each of the driving motors. The control would be arranged so that individual control would be possible with each driving motor and there would be essentially two separate propelling plants, consisting of one double armature driving motor and nine generators to each unit. Provision is made for interconnecting so that the generators on one side could be used for operating the motor on the other side in case of emergency. The exciters necessary for the excitation of these units will be 170 kilowatt separately driven. Two are furnished in order to have one as a spare unit in case of breakdown.

In the advance that has been made in marine engineering practice from the use of reciprocating compound and triple expansion engines little has been said regarding the im-



Plan and sectional elevation of Diesel-electric drive arrangement for 7000 S.H.P. plant on cargo-passenger liner iense gain in torque. In 1903 series of experiments was iade in England to determine ie variations of angular ve- ocity in the shafting of ma- ine engines by Mr. John Heck n the northeast coast.

These experiments were car- ied out in a rather unique and riginal manner by means of a oecially designed machine that arried a revolving pencil and ecorded on a piece of paper 'hich was wrapped around the ropeller shaft and held in place y rubber bands.

In several vessels equipped ith compound engines the va- ations in speed per revolution ere found to be very notice- ble, varying from 10 per cent) as high as 24 per cent when inning slowly. It will be read- y seen that this variation in oeed will have a very appre- able effect on the propeller fficiency.

In triple expansion engines iis variation runs from about per cent to 5½ per cent, hile with a four-crank quad- iple engine the variation was rom 1.2 per cent to 4.6 per ent when running slow.

On the trials of the U. S. S. ıpiter, as compared with her ster ship the U. S. S. Cyclops, ie Jupiter being fitted with ırbo electric drive and the Cy- ops with triple expansion re- procating engines of the same ıpacity, the Jupiter made bet- r time with 15 per cent less ower than the Cyclops, which was believed to be due to an even torque, so it is reasonable to assume that with the adoption of the reduction gear, the turbo electric drive, and the Diesel electric drive, rapid strides have been made in the science of propulsion.

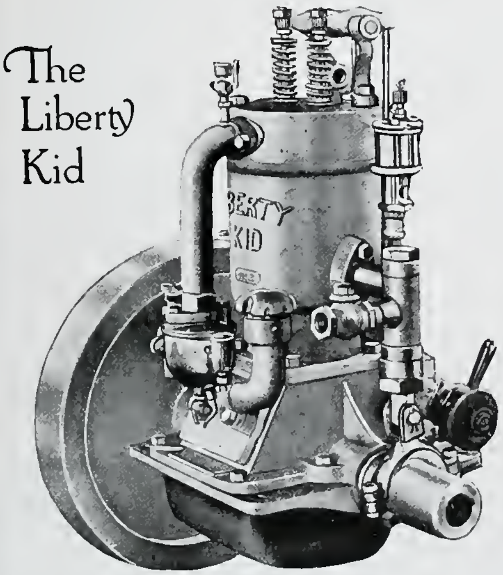
For the sake of comparison, the nearest competitor of this type of marine power plant would be the turbo electric. By careful analysis a power plant of the Diesel type of many units can be produced on less weight, but about 25 per cent additional first cost than the turbo electric and the additional operating help required in the engine room would be offset by that required in the boiler room of the steam plant, and at the same time the Diesel electric plant would be more flexible and less liable to complete shutdown owing to its many units. To compare the commercial efficiency of the two types of plants installed in a liner, an effective horsepower of 7000 will be required in similar vessels, and it will be assumed that the voyage each way occupies twenty days—hence the ship will carry forty days' fuel, which can be entirely carried in the double bottoms in the case of the Diesel electric drive.

	Diesel Electric Drive	Turbo Electric Drive
Effective shaft horsepower	7,000	7,000
Weight of plant installed	. . .	. .
Fuel used per horsepower pounds	.55	.9
Fuel used per day at sea (in barrels)	273	480
Cost of fuel oil per barrel	....	$2.00
Cost of fuel oil per day at sea	$567.84	$960.00
Total barrels of fuel used per round trip of 40 days	10,920	19,200
Cost of fuel per round trip of 40 days	$21,713.60	$38,400.00
Total weight fuel oil for trip in tons	1,533	2,700
Cost of lubricating oil per gallon	.29	.43
Number gallons lubricating oil per day	180	70
Cost of lubricating oil per day	$52.30	$30.10
Cost of lubricating oil per round trip	$2,092.00	$1,204.00
Fuel used per day in port in barrels	10	30
Cost of fuel per day in port	$20.80	$60.00
Days at sea	240	240
Days in port	125	125
Water used per day, power plant, tons	0	20
Water carried in tons, power plant, trip	0	400
Fuel used per year in barrels at sea and in port	66,720	118,950
Cost of fuel per year	$138,881.10	$236,900.00
Lubricating oil used per day in port	10	3
Cost lubricating oil used per day in port	$2.90	$ .96
Total cost of fuel and lubricating oil used in one year	$151,796.10	$245,244.00
Extra profits of ship in year due to saving of weight in fuel and water based on $40 per round trip ton	$508,680.00	....
Amount saved in fuel and lubricating oil for one year	$93,439.90	....

Over a period of a year in operation of the vessel. taking the present cost of fuel and lubricating oil and the increased carrying capacity due to the saving in the weight of fuel and water, the vessel would earn $602,119.90, equipped with the Diesel electric drive, to say nothing of the saving in upkeep due to permanent overhauling work being done at sea, thus saving most of the upkeep repairs which would have to be done at shop rates if carried out in port.

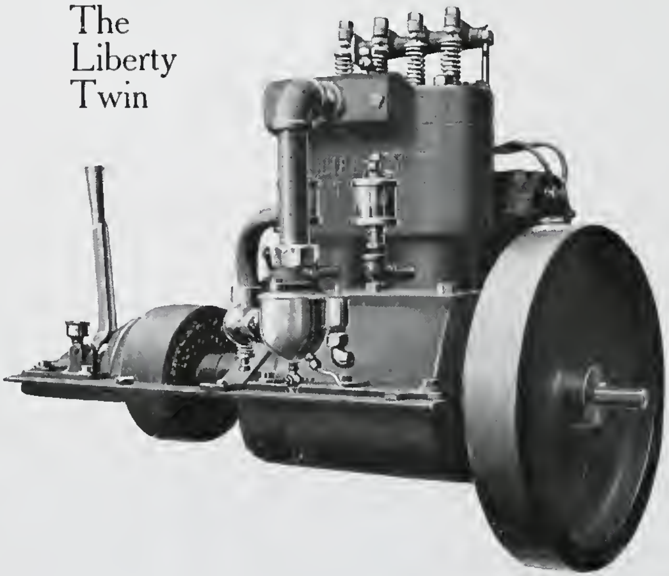
Two Economical and Reliable Engines

The Liberty Kid



3½ to 4 H. P., 4 Cycle

The Liberty Twin



8-10 H. P., 4 Cycle, 850 R. P. M.

Liberty Kid and Liberty Twin medium duty four cycle valves in the head motors burn either GASOLINE OR KEROSENE. Hundreds of these sturdy engines are in use in fishing boats, small pleasure craft, life boats, etc.

Increase the average speed and efficiency of small boats with lower fuel cost.

Send for Catalogues

440 MARKET STREET

A. G. HEBGEN

MANUFACTURER

Agents Wanted

SAN FRANCISCO

FABRICATED STEEL BUILDINGS

THE Steel Fabricating Corporation of Harvey, Illinois, is building an enormous new plant at Michigan City, Indiana, to provide for the great increasing demand for Stefco sectional steel buildings.

These buildings should not be confused with the light portable type of buildings on the market. Stefco buildings are designed according to the best engineering practices and are built for strength, service and satisfaction. The trusses supporting the roof are of the standard Fink type, hot riveted throughout, the same as are used in the heaviest engineering jobs, such as sky-scrapers and bridges. These trusses not only support the roof but will carry extra overhead loads, such as line-shafting for running machinery, or trolley conveyors for distributing materials around the factory, up to three tons, without additional bracing.

Stefco side walls are of heavy galvanized steel and are hot-riveted every eight inches—another engineering feature of the Stefco construction, which means strength, rigidity and permanence. The strength of Stefco buildings is so well recognized among engineers that it is never questioned. A Stefco building has never been known to blow down and the significance of this fact is all the more remarkable when the wide scope of Stefco sales distribution is considered. Stefco buildings are sold throughout the world, and in the West and Southwest oil fields, noted as the cyclone areas of the United States, they have stood safely through every storm.

Stefco buildings enjoy another distinctive feature not generally understood by the ordinary layman, which can be illustrated by an incident that occurred during the war. Mr. Rowan, the vice-president, was called to Washington to aid the government in providing emergency facilities to increase the country's production. When certain plants came up for consideration, one of the manufacturers bought Stefco buildings exclusively. Another, who was interested in timber, decided to build his additional facilities with that material. The manufacturers using Stefco buildings went along during the entire period of the war giving 100 per cent service to Uncle Sam. The other had a disastrous fire, completely destroying his plant, and, of course, stopping production at a most critical time. Mr. Rowan telegraphed this manufacturer calling attention to his warning at Washington at the time, against the use of timber, and tendering the facilities of the Steel Fabricating Corporation for rebuilding his plant. This manufacturer replied by wire, acknowledging his mistake and ordered for immediate shipment more than a mile of Stefco buildings.

The outstanding feature of this incident, of course, is the fact that Stefco buildings are absolutely fire-proof. They are erected in the most congested districts of large cities without fire hazards, while wooden buildings or buildings constructed of other combustible materials are strictly forbidden by law in such neighborhoods. Stefco buildings, while cheaper, reduce insurance rates to such an extent that the saving in insurance alone justifies even a higher price than wood buildings.

With the recognized merits of Stefco construction and with the growing scarcity of lumber, and its prohibitive price beyond the reach of the ordinary pocketbook, the expansion of Stefco manufacturing amounts to a forced demand.

The half - million - dollar factory now well under way at Michigan City, Indiana, is to meet this situation and this expansion is not in any sense an ordinary business hazard, but, as already stated, is designed to meet a forced demand.

This mammoth new factory, to cover more than two city blocks, is coming along on scheduled time. A half mile of switches in and around the plant have been installed. Steel erection will have been begun by the Indiana Bridge Company of Muncie by the time this article is published. One-third of a mile of window sash installation will begin the second week in November and the brick side walls, requiring more than a million brick, to be furnished by another Indiana concern, the Risclay Brick Company of Michigan City, and the roof construction will follow as fast as the other work progresses.

Meanwhile the erection of the general office building, which will be the future headquarters of Stefco activities, the boiler house with its 175-foot high stack to be erected by the Hoosier Stack Construction Company of Indianapolis, another Indiana company, from tile manufactured by the Clay Products Company of Brazil, will keep pace with the rest of the construction work. In line with all this, W. H. Johnson & Son Company of Indianapolis are installing the heating plant and Powell & Dorste of Anderson are furnishing the electric service throughout the entire plant.

In all, more than 400 cars of materials, or ten train loads, will be required for the construction of this new Stefco plant.

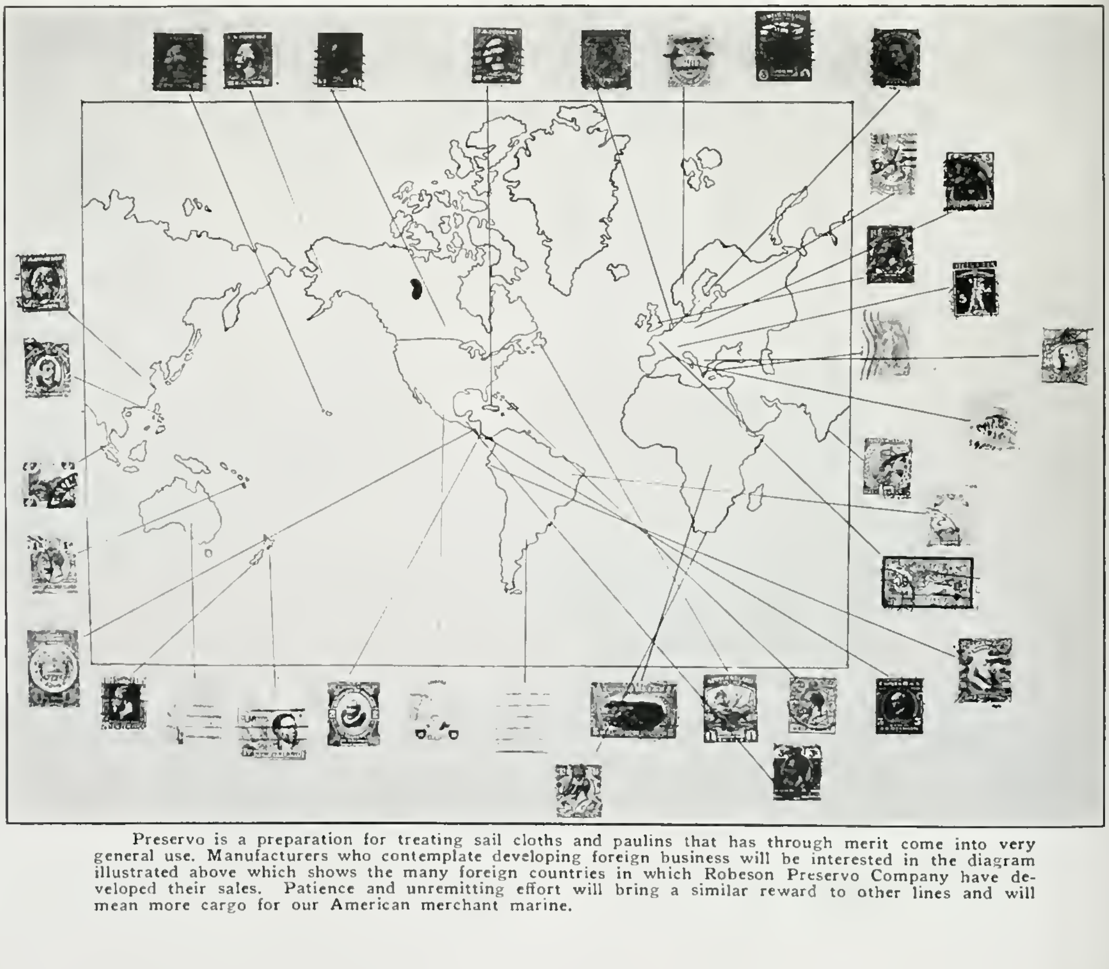
Illustrated catalog and circulars describing Stefco ready-built sectional steel buildings will be sent on application to anyone who is interested. The adaptability of these buildings to widely different lines of business, for factory expansion, warehousing, storage, foundry, implement sheds, is proven by the thousands now in use.

THE **Air Reduction Sales Company** has just printed and now has ready for distribution a booklet entitled "Cutting Cast Iron with the Oxyacetylene Torch."

This booklet, attractively illustrated, is a reprint of a paper on the subject prepared by A. S. Kinsey, professor of shop practice, Stevens Institute of Technology, for the recent meeting of the American Foundrymen's Association.

It completely covers the subject of cutting cast iron by the oxyacetylene flame, tells how the cut is made, gives necessary pressures of oxygen and acetylene for varying thicknesses of metal, describes the advantages to be obtained from the use of the torch for cast iron, the economy as compared with other methods of cutting, etc.

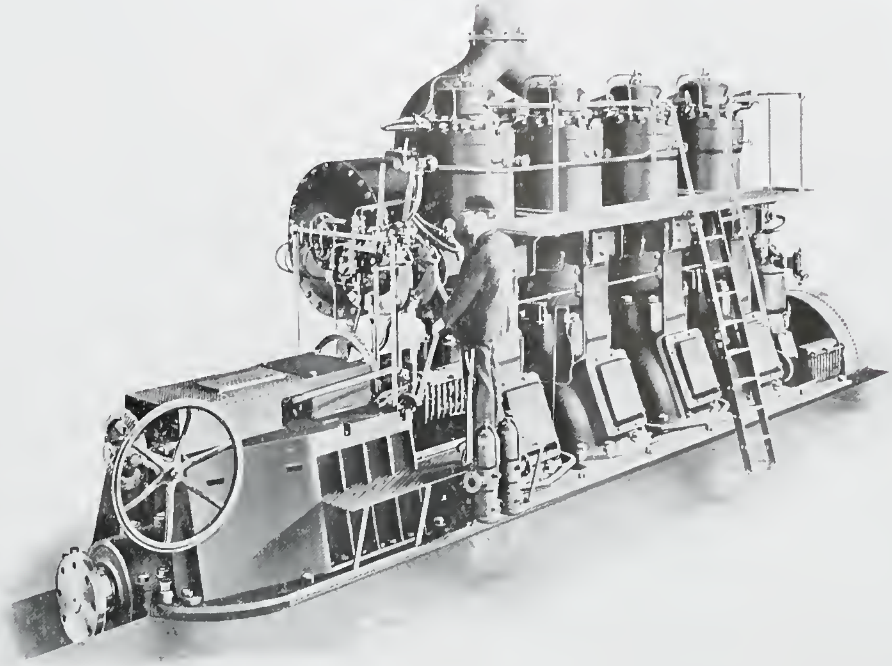
A Well Distributed Product



Preservo is a preparation for treating sail cloths and paulins that has through merit come into very general use. Manufacturers who contemplate developing foreign business will be interested in the diagram illustrated above which shows the many foreign countries in which Robeson Preservo Company have developed their sales. Patience and unremitting effort will bring a similar reward to other lines and will mean more cargo for our American merchant marine.

'ROUND THE WORLD WITH BOLINDER ENGINES

Two 500 B.H.P. Bolinder direct reversible fuel oil engines installed in the M/S Tankerville are giving continuous service and proving economy, efficiency and endurance of Bolinder engines. Note the following extract from log of M/S Katherine, another Bolinder equipt ship.



Extract from the log of M/S. "Katherine," October 20th, 1919—May 1st, 1920

Voyage	Time	Distance	Average Speed	Remarks
San Francisco—Manila	36 days 22 hours	6987 miles	7.9 knots	
Manila—Suez	37 " 22 "	6355 "	7.0 "	(unfavorable weather)
Suez—Thames Haven, Eng.	25 " 13 "	3579 "	6.0 "	(strong head winds)
Thames Haven, Eng.—New York	30 " 4 "	3882 "	5.8 "	(strong head winds)

At New York the M/S Katherine was fitted with new design of propellers of 75" dia. and 66 pitch. Sailing from New York June 10th, arrived at Balboa June 22nd, sailed thence June 23rd for San Francisco, arriving July 14th. Sailed from San Francisco July 21st, arriving at Iloilo September 1st, thence to Manila. Sailed from Manila September 26th, arriving at San Francisco November 2nd. Sailed from San Francisco November 8th, arriving at New York December 12th.

The M/S Katherine is logging from 220 to 260 miles per day and with continuous operation of her engines no delays are experienced on account of engine trouble.

Bolinder equipt tank ships of the Philippine Vegetable Oil Co. include:—M/S "NUUANU"—320 B.H.P., M/S KATHERINE—640 B.H.P., and M/S "TANKERVILLE"—1000 B.H.P. BOLINDERS

Economy Efficiency Endurance

In line with the Bolinders policy of constant refinement of detail, several improvements have been made in the Bolinders Engines now being delivered. They include:

1—Thrust blocks equipped with ball bearings
2—Improved and reinforced cylinder heads
3—Thoroughly water cooled main bearings
4—Mechanical operation of the friction clutch
5—Air injection individually adjustable for each cylinder
6—Improved pistons
7—Improved lubricating system

A great number of minor changes have also been made, with the result that Bolinders Engines are now giving even better service than ever in the hands of average operators.

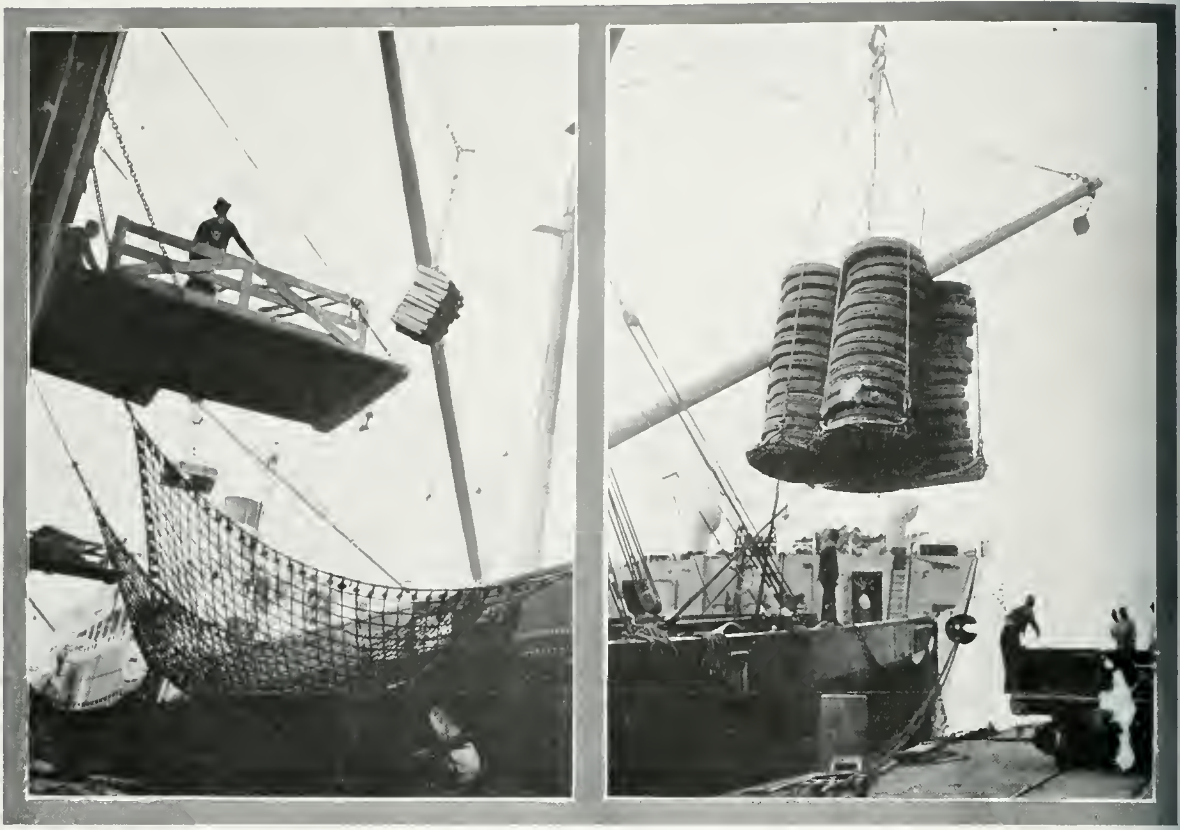
More than 14,000 Bolinder Engines now in service. The Bolinder Engines manufactured represent over 650,000 B. H. P. Sales and yearly output 70,000 B. H. P.

HENRY LUND & CO.

214 FRONT STREET, SAN FRANCISCO

New York **BOLINDERS COMPANY** **30 Church St.**

SOME HAVISIDE SPECIALTIES



THE Haviside Company of San Francisco, Calif., have, after many years of experiment and investigation, perfected a method of manufacture and treatment of cotton fabrics for marine purposes. This fabric they have placed upon the market under the trade name of "Typhoon Cloth." This material has been in use for some time on the ships of such well known companies as the Pacific Mail Steamship Company, W. R. Grace & Company, China Mail Steamship Co., Pacific Steamship Company, and American-Hawaiian Steamship Company.

It is claimed for this "Typhoon Cloth" that covers and paulins made from it do not require the constant oiling and painting which is necessary with ordinary canvas and is so injurious to all cotton fabrics. The personnel of the ordinary ship's crew has no knowledge of the proper manner in which oil should be prepared for treating canvas, and improperly prepared oil is always sure to damage the fabric. Painting these fabrics is sure to make them crack and it is then an expensive matter to repair, and repairs are in most cases of very temporary benefit. The treatment perfected by the Haviside Company for their "Typhoon Cloth" preserves the cloth and prevents cracking, thereby making the covers and paulins and tents much easier to handle. The treatment also preserves the cloth in a waterproof state and absolutely prevents mildew; in fact, "Typhoon Cloth," barring accidents, will preserve all of the qualities necessary in hatch covers and paulins until the cloth is worn out by chafing or rubbing.

The Haviside Company have back of them long experience in marine matters, and they stand ready to use this experience for the benefit of their patrons in all matters pertaining to the use of canvas on board ship and to the use of Manila or wire ropes in the handling of cargo and in standing or running rigging. They manufacture as a specialty a 5½-inch mesh 10-foot square wire rope sling net for handling miscellaneous cargo which has become very popular not only on the waterfronts of the Pacific Coast, but as far away as Panama, New York and Boston. The wire rope forming this sling is threaded at the corners of mesh in a way to insure perfect flexibility without kinking or slipping of the joints. All rope ends are spliced and this net can be folded more easily than a piece of canvas, so will stow in perfect shape.

Another specialty shown in our illustration is the sling for meal cakes which consists of a flat coiled mat of Manila rope carried on a four-part wire-rope sling.

"LITTLE DAVID" HOSE COUPLINGS

A HOSE coupling with several new and important features has recently been placed on the market by the Ingersoll Rand Company, 11 Broadway, New York. It is called the "Little David" hose coupling and will be distributed as an accessory to the line of "Little David" pneumatic tools manufactured by the same company.

Hose couplings which become leaky after short use are the cause of serious air losses, whether in the small shop or the large plant using hundreds of hose connections. Another trouble commonly experienced with many couplings is jamming or sticking through some slight injury, making them difficult or almost impossible to connect or disconnect.

The design of the "Little David" coupling has been with the view to overcoming these troubles. Its main features are its sturdiness and simplicity, and an all-around ability to stand lots of abuse without affecting its service. Actual tests over long periods of service have fully demonstrated its reliability.

The coupling consists of two parts, male and female. The female end is fitted with a V-shaped rubber gasket providing an air-tight joint. The gasket is prevented from blowing out should the coupling accidentally be disconnected under pressure, by a protective shoulder inside the coupling. The female end is exceptionally sturdy, there being no exposed parts which might be liable to injury and cause jamming or sticking.

The locking shoulders are heavy with large bearing surfaces. The locking spring is strong and durable, and can be replaced if necessary. The parts are made of a metal not subject to ordinary rusting or corrosion.

The male end has a very liberal bearing in the female end which assures alignment and long wear. Another feature is the absence of any outer sleeve exposed to injury. The air ports are straight and of uniform diameter, offering least restriction to the air.

The coupling may be connected or disconnected by a quarter turn. A groove in the hose end of each part allows using a hose clamp to attach securely to the hose.

"Little David" hose couplings are manufactured in ½-inch and ¾-inch sizes, which are interchangeable; that is, a ½-inch male piece may be used with a ¾-inch female end, or vice versa. Gaskets are also interchangeable between the different sizes.

Ross Heaters, Catalog F. Ross Heater & Manufacturing Co., Inc., Buffalo, New York.

An attractive booklet of 40 pages describing the various types of Ross heaters and coolers of the tubular type and of Ross heat exchangers, condensers, and evaporators.

The Ross heaters are made in two general types, one known as the instantaneous heater, in which the liquid is heated as it is being used; the other as a storage heater which, as the name implies, has storage capacity to be drawn on in emergencies. The standard Ross heater is made of cast iron wherever it is possible to use this metal, with the exception of the tubes which are seamless drawn pure copper or brass. The tubes in these heaters are always straight and smooth without corrugations or indentations of any kind. The tubes are expanded into a stationary tube head at one end and expanded at the other end into a floating tube head, thus eliminating all tube packings. The expansion and contraction are taken care of by the floating head, which is the only construction permitting of the use of straight tubes accessible at both ends by simply removing the covers.

The Ross Heater & Manufacturing Company produce also a surface condenser with air ejector pump, which has proven highly satisfactory in producing and maintaining high vacuum for steam engine service.

Pacific Marine Review

The National Magazine of Shipping

Isthmian Line
S.S. STEEL EXPORTER
Built by Federal Shipbuilding Company

MACHINERY SECTION - - - PAGE 192

Pacific Marine Review, Vol. 18, No. 3 Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.

Setting the broken nose of commerce

THE oxy-acetylene welding and cutting torches—those twin metal surgeons—are indispensable in ship yards.

Wherever metals must be cut or joined neatly, quickly and economically the oxy-acetylene process is invaluable.

Prest-O-Lite

DISSOLVED ACETYLENE

because of its portability, has made it possible to weld or cut in the most inaccessible places. Wherever the job may be—below or aloft, inside or out—Prest-O-Lite goes to the job!

Forty Plants and Warehouses insure a constant and unlimited supply of uniformly pure gas. Write us about the Prest-O-Lite nation-wide service plan.

THE PREST-O-LITE COMPANY, Inc.
General Offices
Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco
In Canada: Prest-O-Lite Co. of Canada, Limited, Toronto

PW-503-21

Pacific Marine Review

CONTENTS

MARCH, 1921

C. W. Jungen . . . . Frontispiece

Electricity Applied to Ship Auxiliaries, by H. L. Hibbard 133

Transfer of the Coast Guard to the Navy, II, by John W. Kean 138

Editorial 140

An American Marine Manager 144

Oil Engines and Motorships 146
Motor Shipbuilding in America; The Double Acting Diesel Engine, by A. P. Chalkley; Motor Shipbuilding in Europe; Marine Propulsion Machinery, by W. E. Thau.

Some Interiors of the Hawkeye State 156

Material Handling 157
Port and Harbor Development; Electrical Terminal Facilities, by Commander C. S. McDowell, U. S. N.; New Dry Dock at Fore River.

European Marine Developments 163

Four Notable Sea Going Tugs 165

Los Angeles' Great Drydock 167

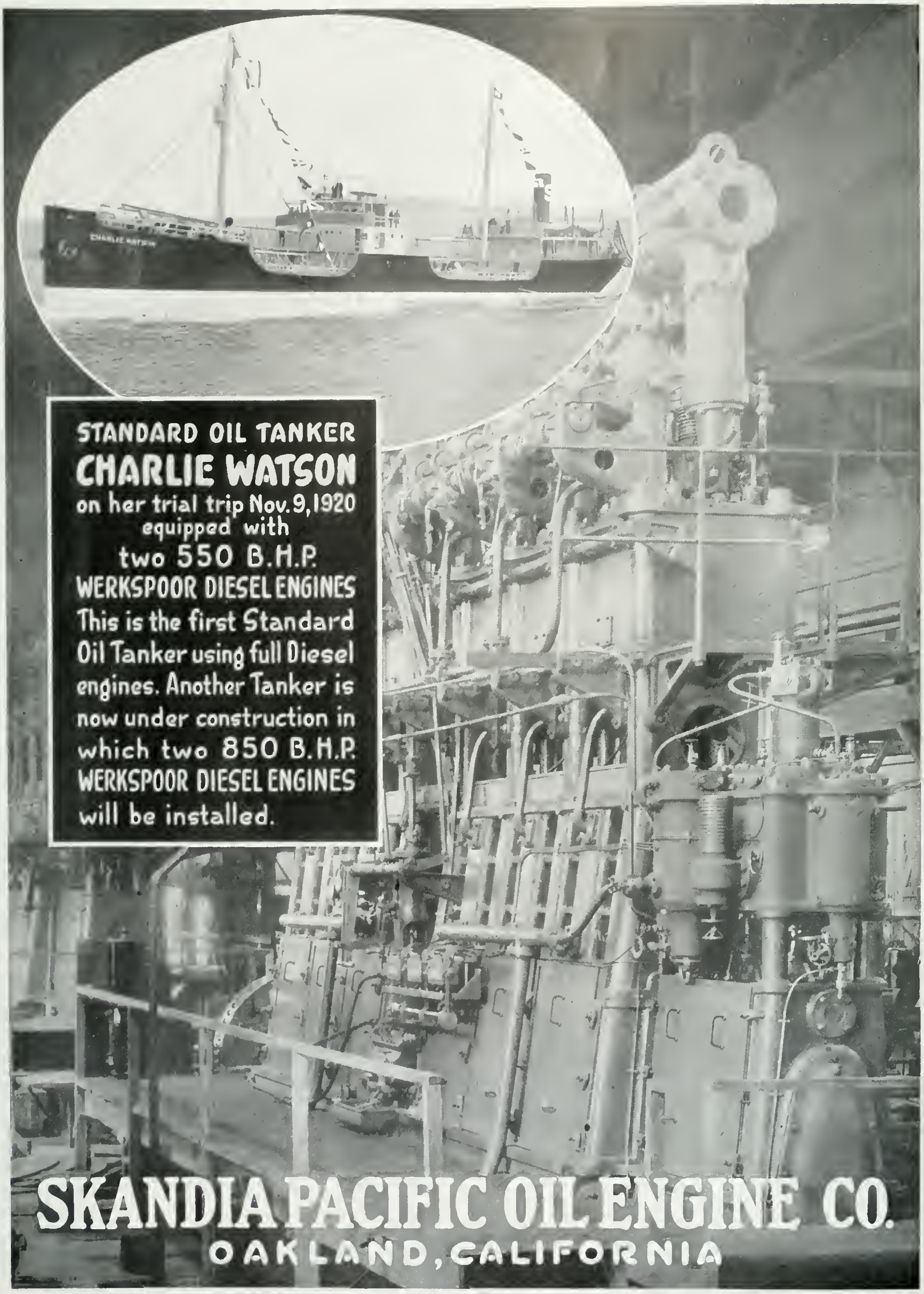
National Marine Exposition, by Myron B. Stewart 169

Federal Shipbuilding Company 170

Marine Insurance 173

Full Speed Ahead 176

Pacific Machinery 192



STANDARD OIL TANKER

CHARLIE WATSON

on her trial trip Nov. 9, 1920
equipped with
two 550 B.H.P.
WERKSPOOR DIESEL ENGINES

This is the first Standard Oil Tanker using full Diesel engines. Another Tanker is now under construction in which two 850 B.H.P. WERKSPOOR DIESEL ENGINES will be installed.

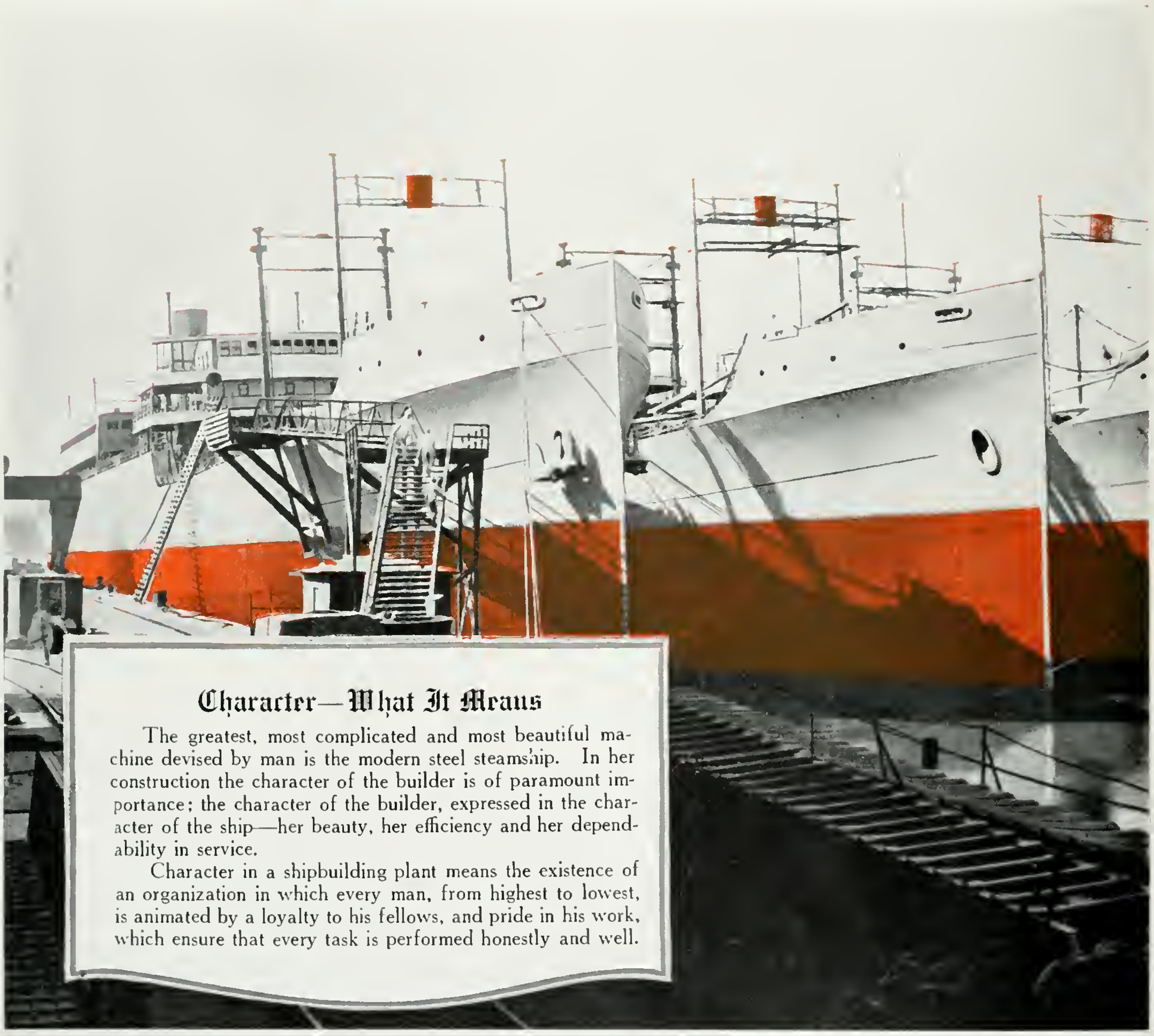
SKANDIA PACIFIC OIL ENGINE CO.

OAKLAND, CALIFORNIA

Copyright Underwood & Underwood Studios, N. Y.

C. W. JUNGEN
Manager Southern Pacific Company
Atlantic Steamship Lines
(Morgan Line)

Character Service
Craftsmanship



Character—What It Means

The greatest, most complicated and most beautiful machine devised by man is the modern steel steamship. In her construction the character of the builder is of paramount importance; the character of the builder, expressed in the character of the ship—her beauty, her efficiency and her dependability in service.

Character in a shipbuilding plant means the existence of an organization in which every man, from highest to lowest, is animated by a loyalty to his fellows, and pride in his work, which ensure that every task is performed honestly and well.

NEW YORK SHIPBUILDING CORPORATION,
120 BROADWAY NEW YORK, U.S.A.

Pacific Marine Review

The National Magazine of Shipping

March, 1921

Copyright, 1921, by J. S. Hines

ELECTRICITY APPLIED TO SHIP AUXILIARIES

By H. L. HIBBARD*

THE advent of the fuel oil engine driven ship has marked a great stepping stone in the adoption of electric power, particularly for auxiliary purposes. The first notable instance of this kind was the vessel Christian X constructed by the Burmeister and Wain Company of Copenhagen and its first voyage to this country in about 1913 or 1914 created marked attention. Since that time it is understood that 70 or more vessels of this type have been constructed or projected by that company.

In 1916 and 1917 a number of merchant vessels were built in this country including tankers and cargo vessels employing electrical auxiliaries, among others being the tanker La Brea with electrically operated pumps, and the tanker Solitaire completed last year by the Texas Company having oil engine drive and electrical auxiliaries throughout, including electric heating. Other instances were a number of tank vessels constructed by the Pennsylvania Shipbuilding Company, propelled by geared steam turbines and having electrical auxiliaries operated by a-c. motors. At the present time there are quite a number of oil engine driven cargo vessels with electrical auxiliaries and others with electric drive and electrical auxiliaries being constructed and projected in this country, and in the opinion of certain editorial writers, the outlook was never more favorable in this country, particularly for construction of oil engine driven vessels, than at the present time. Motorships are now under construction for the American-Hawaiian S. S. Co., the U. S. Shipping Board, the Standard Oil Co., the Alaskan S. S. Co. and the Submarine Boat Corporation, and quite a number more are under contemplation for this year.

Rapid strides are being made by European countries in the adoption of the use of electricity on their merchant vessels, particularly of the motorship type, and England, as well as Scandinavian countries, is now constructing many vessels of this type. One of the most recent examples was the maiden voyage of the motorship La Paz to New York which was constructed by Harland & Wolff of Glasgow, which company is also constructing five additional motorships for the same line. A visit to the La Paz showed numerous interesting features in connection with her electrical equipments.

H. L. Hibbard, the author of this comprehensive address on a very timely subject, is manager of the marine department of the Cutler-Hammer Manufacturing Company, making his headquarters in New York City.

Mr. Hibbard is a member of the American Institute of Electrical Engineers and of the American Society of Naval Architects and Marine Engineers, and is a charter member of the Marine Committee of the A. I. E. E.

He was graduated from Cornell in 1899 and shortly thereafter became identified with the Division of Construction and Repair of the United States Navy as a civilian electrical engineer. He has been associated with the Cutler-Hammer Manufacturing Company since 1907.

Mr. Hibbard has become known to the American Institute of Electrical Engineers and to the Naval Architects and Marine Engineers' Society as an apostle of electricity as the proper power for driving ships' auxiliaries. In 1914 he presented before the A. I. E. E. a masterly paper on the subject, "Electricity, the Future Power for Steering Vessels," and again in 1917 before the Naval Architects and Marine Engineers he presented a paper outlining the progress which had been made up to that time in the use of electricity in the merchant marine.

The present paper gives a very masterly outline and analysis of the results obtained by the present development of electricity as a driving force for auxiliaries in the merchant marine service.

Generating Plant and Systems of Distribution

In the selection of the generating plant for the electrically operated vessel, considerable thought is necessary as to the number and size of the units to be installed. A number, for instance, of the Burmeister & Wain vessels have three 60-kw. machines, 230-volt; the English vessel La Paz has three 100-kw., 230-volt; the tanker Solitaire has three 45-kw. and one 10-kw., 230-volt; the Cubore is provided with three 100-kw., 250-volt sets. The aim is in general to provide an equipment which is sufficiently flexible to permit of the operating of all auxiliaries and lights with one machine when cruising and to operate the vessels while handling cargo in port with two machines, or under possibly extreme emergency conditions three machines, one machine being, however, in practically all cases considered as a spare. Much division of opinion exists, however, as to the wisdom of going to as many as three units, some claiming a preference for two units of larger size.

These installations have in general provided two wire d-c. system and such vessels as the La Paz and Solitaire have furnished lights at 230 volts. Generally satisfactory results are reported from the Solitaire for lamps of this high voltage with the exception of the small instrument lamps which are frequently broken. The officers of the La Paz reported frequent breakage and rather unsatisfactory results. A practice which has been followed by the Burmeister & Wain Co. and has found general favor among engineers in this country also, is the use of a small motor generator set for reducing the 230 volts of the generators to 110 or 115 volts for the lamps and providing this small machine with sufficient flywheel effect also to smooth out any pulsations from the auxiliary oil engines and fluctuation of voltage due to sudden changes of loads on the generators; 110-volt lamps are furthermore in addition to being mechanically stronger, more universally obtainable.

---

* Address delivered before the joint meeting of the New York Section, American Institute Electrical Engineers, and the Metropolitan Section, American Society Mechanical Engineers, at New York January 28, 1921.

Direct Current Versus Alternating

A few years ago a considerable controversy existed between engineers as to the advisability of the use of alternating and direct current on shipboard, and as previously outlined in 1916 to 1917 a number of vessels were constructed in this country, including vessels of the cargo and tanker type, which had a-c. equipment. It was contended by some at that time that direct current was impracticable, particularly for tanker vessels, owing to the danger of igniting inflammable gases by sparks moving from contacts, etc. We believe, however, that later developments have quite clearly disposed of these contentions and shown the wisdom of providing in general for auxiliary equipments on shipboard, the d-c. system; and we understand that some of the vessels which were constructed in 1916 and 1917 with the a-c. outfits have not proved themselves nearly as satisfactory as d-c. installations. The direct current has a distinct and decided advantage in the flexibility and extent of speed control obtainable, and in the obtaining of speed and torque characteristics for hoisting apparatus such as deck winches, windlass and capstan, which can not be furnished by the a-c. motor. There is no advantage furthermore, on a vessel from the distribution standpoint, in the use of alternating transmission, and a three or four-wire system is more expensive and complicated than the straight two-wire d-c. distribution. We note that English authorities have recently appeared definitely in print to the above effect, recommending strongly also against the use of a voltage higher than 220 generally throughout the vessel.

With regard to tank vessels, it is possible to furnish motors entirely enclosed, gas and watertight, and where location renders the same desirable, to furnish forced ventilation through the enclosed motor cases. The experience of the tanker Solitaire, which was thus equipped, has been to date very satisfactory and two tankers, the Watson and Harper, are being constructed with d-c. equipments on the Pacific Coast for the Standard Oil Company.

Marine Types of Electrical Apparatus

Various types of electrical apparatus, generators, motors and controllers are required for the electrical auxiliaries on board ship, according to their location, duty and general requirements, which are discussed in some detail below.

Generating Plant—For steam driven vessels, steam operated generating sets are naturally employed, of the reciprocating engine type for small plant equipments in some cases, but turbo generating sets are now almost universally employed for this purpose. These are usually also of the geared turbine type, with all parts mounted on a common bedplate.

For motorships oil engine sets are naturally employed with generator mounted on a common bedplate and the fly wheel of suitable proportions to assist the regulation and smooth out the voltage fluctuations.

As previously explained, on vessels utilizing appreciable amount of electrical power these sets are provided usually two or three in number in accordance with the general requirements of the complete installation and the particular ideas of the designing engineers. These sets are now in all cases furnished with open type generators, but in many instances are protected by hoods or metal shields from drippings due to moisture condensation and throwing of oil.

Motors—For driving the various auxiliaries, motors of the open, ventilated or enclosed watertight type are employed, especially the two latter types as but few installations justify the use of entirely open motors.

For deck auxiliaries such as windlass and deck winches, entirely enclosed watertight motors are essential which must be made rugged and sufficiently watertight to withstand such submergence as is occasioned by heavy seas coming over the vessels. This condition therefore, practically necessitates the use of stuffing boxes or similar means around the motor shaft to exclude water and particular attention paid to the design of bearings to insure proper lubrication and operation under roll of the ship.

For operation of engine room auxiliaries, such as pumps, compressors, etc., open or entirely enclosed watertight motors are occasionally employed but the ventilated type of motor finds particular favor for this purpose as it provides protection against drippings and at the same time permits the use of smaller motor frames for the same duty than when absolutely watertight.

Controllers—As in the case of motors, several types of controllers are utilized, according to the installation conditions and duty to be performed. These consist of the panel, drum or contactor type, either open, enclosed non-watertight, or watertight.

For the operation of certain of the auxiliaries where watertight construction is not considered necessary but where it is desired to prevent unauthorized manipulation and render the controller drip-proof, a manually operated panel with hinged doors provided with lock and key is employed.

Where watertight or gastight protection is desired, a manually operated watertight panel type controller is frequently utilized. This motor starter and speed regulator is operated by control levers extending through stuffing boxes in the front cover. Gum rubber gaskets with clamping devices are furnished to insure watertightness.

Paticularly where installations are in somewhat inaccessible positions, automatic controllers operated by push buttons now find great favor, as the buttons can be located in a very convenient location, and furthermore, the operation of starting the motor is automatic and taken out of the hands of the operator.

For deck machinery, such as winches, windlass, capstan, etc., a manually operated watertight drum is frequently employed which, owing to its watertight construction, can be mounted at the auxiliary above decks.

Centralized Control

A method of control of the auxiliaries, particularly on tank vessels, which has found favor in some quarters, mounts the control apparatus, except for the deck winches and windlass, all on a centralized control board in the main engine room. In the case of tankers this takes the controlling apparatus away from cargo pumps, etc., where there is danger from explosive gases. With this arrangement automatic starting controllers are provided for each auxiliary at the board and with a push button station at the auxiliary itself, for signaling to the engineer to start the apparatus, and for stopping the apparatus at the auxiliary if desired. When the signal is received the operator at the switchboard closes the line switches or circuit breakers and the equipment is automatically started. Such an arrangement was installed on the tanker Solitaire and reports from officials of the Texas Co. indicate entire satisfaction with the arrangement.

Ship Auxiliary Requirements

The name auxiliaries has come to apply to practically all power driven pieces of apparatus on board ship outside of the main propelling machinery. The auxiliaries, while differing somewhat for steam and oil engine driven vessels, have many features in common, the principal difference being that in the case of the oil engine driven vessels, certain of the pumps, including feed water, condenser water, etc., are replaced by oil pumps, air compressors, etc. While there appears at the present time to be little if any argument regarding the use of electric auxiliaries on oil engine driven vessels, the question seems to be still considerably under debate as to their use with steam propelled vessels, which point we will discuss later.

In all shipboard work reliability is of the first importance and electrical apparatus for ship auxiliaries must be ruggedly constructed, yet at the same time need not be clumsy as we are frequently led to feel is the case with many of the European designs. Furthermore, each piece of electrical apparatus should be particularly designed for the service and conditions to be met. These conditions need to be carefully studied and too great emphasis cannot be laid on this point, as it is at the root of the successful operation of electrical machinery. Motors on deck will in many cases frequently be awash and hit by heavy seas, also, when the crew is washing down the deck the hose will often play over the motors. Vessels trading in tropical climates will have deck machinery subject to the excessive heat of the tropical sun and all vessels on northern routes have their deck motors at times subjected to very low temperatures. In the engine room leaky steam pipes are a danger to motors, and where Diesel engines are employed for the propelling machinery, thought should be given to the protection of motors and controllers from oil fumes and drippings.

As an example of the engine room auxiliaries which are included in a large oil engine driven vessel, we give below a list of those supplied on one of our latest motorships, the Cubore, of 11,500 tons d. w. c.

Auxiliary	No	H.P.	Location	Motors		Control	
				Type	Open or en.	Type	Open or en.
Fresh Water Pump....	1	5	Floor	Hor.	Encl. Vent	Mag.	Encl.
Turning Gear.........	1	20	“	“	“	Mult. Switch	“
Booster Compressor...	1	25	Platform	Ver.	Open	Mag.	“
Refrigerator...........	2	5	“	Hor.	“	Hand Start	“
Oil Transfer Pump	1	3	Floor	“	Encl. Vent	Mag.	“
Steering Gear	1	25	Steer Room	“	Encl.	Spec.	“
Circulating Pump	2	25	Floor	Hor.	Encl. Vent	Mag	Encl.
Lubricating Oil Pump.	1	7½	“	“	“	“	“
200-Ton Ballast Pump	1	15	“	“	“	“	“
Bilge Pump...........	1	15	“	Ver.	“	“	“
Air Compressor.......	2	125	Platform	“	Open	“	Open
500-Ton Ballast Pump.	1	50	Floor	Hor.	Encl. Vent	“	Encl.
Lub. Oil Purifier.......	2	1	For'd. Blk	“	Encl.	Hand Start	Open
Fuel Oil Pump	2	3½	Floor	Hor.	Encl.	Mag.	Encl.
Sanitary Pump	1	7½	“	Hor.	Encl. Vent	Mag.	Encl.
Lathe.................	1	1½	Platform	“	Open	Mag.	Encl.
Grinder...............	1	3	“	“	“	Hand Star	Open
Drill......	1	2	“	“	Open	“	“
Generator	2	100 k.w.	Floor	Oil engine driven			
Generator .... (Emergency Set)	1	100 kw.	“	Geared steam turbine driven			

For a steam driven vessel many of the above auxiliaries will be similarly used in the engine room with the replaceal of the several oil pumps and engine circulating water pumps by boiler feed, condenser, condensate pumps, etc. In connection with the pump equipments either piston reciprocating pumps or centrifugal are generally used with water or steam service systems, centrifugal pump being especially favored for engine circulating, condenser, and sanitary, the selection usually depending upon the opinion of the designing engineers however. Some form of rotary type pump is usually employed for oil service systems. For reciprocating and rotary pumps the constant-speed shunt-wound motor is best adapted, but for the centrifugal a wise provision includes a small percentage of series winding to prevent excess speed and loading of the motor. Field control is frequently provided for many of these pump equipments of a wide range in some instances to vary the pump delivery, but in the case of the centrifugals a small amount of field control is some times added to advantage to assist adjustment of the load and speed.

The air compressor and engine turning motors can be provided with an appreciable amount of compound winding to advantage and machine tool motors such as lathe, drill, etc., would usually require shunt-wound variable speed motors.

The control for these engine room auxiliaries would be generally by the hand operated watertight panel or the push button watertight construction unless the centralized control previously described were utilized.

Deck Machinery

The deck machinery equipments, consisting of windlass, deck winches, capstan and steering gear, may be considered separately to advantage.

Windlass—For the windlass equipment a watertight motor is essential and a manually operated drum controller, if installed on and operated from the deck. Frequently, however, control equipments are provided non-watertight and installed below deck with shaft extensions through stuffing box, or a contactor equipment remotely controlled with small watertight master on the deck and non-watertight automatic panel below deck. A compound wound motor can be used to the best advantage usually for the anchor windlass, particularly when of the spur-geared type, and provisions must be made in the control for stalling the motor on any controller point in case of fouling the anchor on the bottom or jamming of the gear.

Deck Winch—The auxiliary upon which probably more thought and study is being given at the present time from an electrical standpoint, than any other on shipboard, is the cargo deck winch. This is an especially important piece of machinery on a vessel handling miscellaneous cargo, and reliability of operation, and range of speed control in both hoisting and lowering, are of prime consideration.

Much discussion has been had of late with regard to the exact type of control to be furnished for deck winches and the results to be accomplished. One manufacturer is strongly advocating at the present time the electrically operated winch but provided with mechanical load lowering brake in place of the customary dynamic electric lowering control. While differences of opinion naturally exists on these details, one point is obvious; that the ideal electric winch is one which provides as nearly as practicable, a straight horse power curve, accommodating its speed automatically to the value of the load and permitting the handling of light and heavy loads without the necessity of changing gears; also that it gives in lowering as near as practicable, corresponding range of speeds for heavy and light loads down to the empty hook. And it must be borne in mind that time gained in the hoisting and lowering of the empty hook is that much clear gain in loading and unloading a vessel.

In the case of deck winch equipments and anchor windlass as well, it is the practice to provide a mechanical brake on the motor shaft, electrically operated, to prevent falling of the load in case of failure of voltage.

An arrangement of control for the deck winches which has been used to some extent and was recently illustrated in the case of the motorship La Paz, provides a small deck housing between or adjacent to the hatches and in the center of a group of winches. In this small deck housing is placed the main controlling apparatus of the contactor type, as well as the rheostats all of open construction. At the winch itself is provided a small watertight master controller carrying contacts only for the operation of the contactors within the deck housing. This arrangement we believe is worthy of serious consideration, as it groups the apparatus together to advantage, makes the apparatus readily accessible, and permits of good ventilation to the rheostats, thus permitting less capacity and smaller resistances.

Capstans—Capstan equipments, where used, are frequently so arranged as to permit installation of the driving motor in a compartment below decks and thus allowing an open or at least a self-ventilated motor, which is usually furnished heavily compound wound to provide the varying torque characteristics necessary with this equipment.

The control, in its simplest form, may be a plain starting hand operated or push button controller, but the best practice provides stalling features and dynamic or armature shunt control on one or more points in either direction for use in paying out cable. The motors should be usually provided with an electrically operated mechanical brake as the drive is often through gearing efficient enough to permit overhauling.

Steering Gear—The early stages of development of the electric drive as applied to steering gears, is quite generally covered by the writer's paper before the A. I. E. E. in May, 1914, which describes in detail the direct application of electric drive where a motor is geared directly to the transmission, frequently of the screw gear type. With this arrangement the motor is operated by a contactor panel remotely controlled from the bridge, usually on the non-follow-up system, although electrical follow-up control has been designed and some times employed.

This direct electric application is simple in design and effective and reliable in operation, as clearly demonstrated by extended experience which the Navy has had, and which has led furthermore by its simple and reliable arrangement of control, to the abandonment entirely of the use of the follow-up gear. Opinions among seafaring men are very much divided still however as to the wisdom of the use of the non-follow-up gear in merchant marine, although it is being tried in a number of cases with perfect success.

This direct method of drive, however, is accompanied usually by a very inefficient mechanical transmission, the screw gear, for instance, giving an efficiency usually of 30 to 40 per cent. As a means, therefore, of providing more efficient transmission, the hydraulic speed gear is now frequently employed, particularly for installations of large horse power where the saving, owing to the more efficient transmission, is very marked. With this arrangement the constant speed motor operates the hydraulic pumps which supply oil to hydraulic rams operating the rudder cross-head, this hydraulic transmission therefore entirely replacing the odinary screw or other type of mechanical gear. An arrangement of this type for U. S. Navy scout cruisers Nos. 4 to 13 has duplicate driving motors of 60 h. p. each and duplicate pilot motors for operation of the valve mechanism of 1 1-2 h. p. each. The control for the main and pilot motors is by contactor panels and the control from the bridge is furnished by operation of the small pilot motors through the control panel on the non-follow-up system.

For merchant vessel work open or ventilated motors are usually employed. If for the direct connected electrical type they would be compound wound and for the hydraulic system shunt wound. For the control of the direct electric type, contactor panel would be supplied in the steering gear room with steering stations at such points as desired, with a selective switch on the control panel to delegate the control to any one of these. For the hydraulic system the control equipment resolves itself usually to simply a starting panel for the main motor and in merchant work the control of the valve with the hydraulic gear has been frequently by means of a hydraulic telemotor or tiller rope transmission. Electric pilot motor control, however, can and has been supplied either of the follow-up or non-follow-up type.

Advantages of the Electric Drive

It has been shown by experience that the electric drive of the auxiliary machinery has resulted in a considerable saving in fuel consumption of a vessel. And, also the more efficient the propelling machinery, the greater the saving that may be obtained by the adoption of electric auxiliaries. This is due to the fact that with steam driven auxiliaries, the exhaust steam from the auxiliaries in the engine room is utilized principally for feed water heating. Where the total steam consumption, including the propelling machinery, is heavy, a larger quantity of this exhaust steam can be efficiently utilized than where the total steam consumption is not as great. This applies only to such auxiliaries as are in constant use during the voyage. It is evident, therefore, that until the limit of feed water heating has been reached, the reduction in the steam consumption taken by the auxiliaries will not have nearly as great effect on the fuel consumption as would be the case after this critical point has been passed. The limit of feed water heating is more quickly reached of course in the case of the most efficient propelling machinery. Ideal conditions would be obtained when the exhaust steam from the turbo generator, for instance, is just sufficient to obtain the limit of feed water heating during the voyage. With turbine drives the surplus of exhaust steam is sometimes turned into the low stage of the turbines, but how efficient use can be made of more auxiliary exhaust steam, than above outlined, as necessary for feed water heating and sometimes other minor purposes, is not apparent.

The above applies particularly to vessels using steam for their main propulsion. For ships operated by Diesel engines or Diesel electric drive, it is obviously of great advantage to operate all the engine room auxiliaries by electricity, as it is largely a question of the efficiency of electric transmission with a large and reliable generating unit, against a number of small, inefficient oil or steam engines, and it is naturally desired to avoid the generation of steam in any quantity on a motorship.

Aside from the engine room auxiliaries referred to above, attention is particularly drawn to the deck auxiliaries which are located some distance from the generating plant and where great losses would take place in the steam pipes feeding them. In these cases the electric drive is by far the most efficient method, irrespective of whether the vessel is steam or oil engine propelled. It has always been noted by the writer that there is an almost complete absence of reliable figures on steam consumptions of steam driven auxiliaries and inquiries usually bring out simply the information that an 8 by 10 engine, for instance, etc., is used, without any data as to its actual efficiency or steam consumption. Some idea can be obtained of the loss of steam on the steam type of auxiliary when it is remembered that it is frequently considered essential to keep steam on the winch and windlass engines in cold weather to prevent the cylinders cracking or pipes bursting from freezing. The steam steering engine is a particularly noteworthy example of the wasteful use of steam, as it is in effect only a steam ram taking steam full stroke with valves always left cracked a small amount.

The electric motor is always operating at a point of high efficiency and does not suffer in this respect from change of climatic conditions. Furthermore, the power transmitted through electric cables is practically a constant quantity regardless of temperature conditions, while steam transmission is affected very decidedly thereby.

The electric drive in addition to its convenience, adaptability and ease of operation, has the further merits of being available at any instant without preliminary warming up, or as above stated, the losses while standing idle with the steam plant.

Space, weight and first cost.—Comparative figures which have been reliably obtained indicate generally some increase in the weight and space occupied for the electric over steam drive. In some cases, however, such as the steering gear, an actual saving in space and weight is usually effected with the electric, and in other cases the difference is very slight. In the matter of first cost, it is also apparent from such figures as have been available to date, that electrical auxiliary machinery is roughly about 20 per cent more expensive than steam, except in case of desk winches where the difference is more, sometimes 100 per cent. It is also found that an oil engine propelled motorship is about 30 per cent more expensive in first cost than a steam driven vessel and that, strange as it may seem, the Diesel electric propelled ship is slightly less expensive than the straight Diesel, owing to the smaller and higher speed oil engines which it is possible to utilize. These figures of first cost, however, we feel are influenced to a considerable extent at the present time by the lack of a developed line of apparatus on the part of many manufacturers and that in many instances full development costs have been charged against the first installations of electric auxiliaries which would be absorbed in later installations.

As against these disadvantages of first cost and weight, are obtained the advantages of:

1. Suppression of heat in spaces adjacent to the gear and transmitting lines which is of importance in certain cases.
2. Elimination of accidents due to freezing and bursting of steam pipes, cylinders, etc.
3. The reduction of vibration and noise and an increase in the habitability of the ships due to these factors. This is particularly marked in the case of the steering gear.
4. The simplification and flexibility of control, operation being obtained readily from the most convenient point.
5. The obtaining of mechanisms as outlined above which are very much more efficient in operation than the steam equipments. This is the most important consideration.

Economy in operation.—That without question a very appreciable saving in the fuel consumption can be obtained by the use of electric drive, there is little doubt, and L. Miller, an English writer, has recently stated that in the modern equipment with propelling machinery consisting of double reduction geared turbines using super-heated steam, a saving of 8 to 10 per cent of the fuel bill can undoubtedly be obtained by the adoption of electric drive on the auxiliary machinery. He further states that tests recently made on a modern equipment, as far as the propelling machinery was concerned, and where steam driven auxiliaries had been adopted, the steam consumption in the main turbine was 10 pounds per shaft horsepower and the steam consumption of the auxiliaries running during the voyage was found to be 30 per cent of the total steam consumption of the whole vessel. This figure is further borne out by observance and tests in this country and shows what an important part of the total load of the vessel is made up of the auxiliaries in the case of the steam equipment, and the opportunity for economy in this department.

Another important consideration is the fact that experience shows on motorships already constructed with electrical auxiliaries, that in port the power required during the period that the deck winches are handling the cargo is about three times the amount required with the auxiliaries at sea. Investigation of cargo handling vessels in general has shown furthermore that winches are idle five to eight times the amount of time they are in operation during an eight-hour day of work. With electric drive power is completely shut off while the winches are out of operation, but in the case of the steam equipments condensation and leakage continues the same.

While we have numerous general advices to the effect that the fuel consumption of steam driven auxiliaries is at least ten times that of electric, etc., we have some specific figures from oil engine driven vessels of the Benowa and class which are in operation between Australian points and the Pacific Coast. The following figures are given for two vessels, the Benowa equipped with electrical auxiliaries, and the Cethana equipped with steam auxiliaries, as follows:

	Benowa	*Cethana*
Net registered tonnage	1788	1800
Propulsion	2-500 h. p. Diesel Eng.	2-500 h. p. Diesel Eng.
Average daily fuel consumption main engines	1350 gal.	1365 gal.
Average daily fuel consumption-donkey boiler		557 gal.
Average daily fuel consumption-auxiliary engines	42.5 gal.	
Total daily fuel consumption	1392.5 gal.	1922 gal.
Per cent of total fuel used for auxiliaries	3 4%	29%

The above shows a saving of approximately 25 per cent in fuel consumption due to electric auxiliaries. Examination of the records of other ships shows a similar percentage gain.

In conclusion, we feel that while the growth and adoption of electricity in this field was very slow for many years, that within the last three or four years in particular, definite and very rapid progress has been made. The popularity of the electric gear with those who have been concerned in its operation, would seem to have been well established where it has been given a fair and impartial trial.

The more rapid adoption of electric drive is now receiving decided impetus from the introduction of the fuel oil engine, and we now look for its very general use at a very early date.

We have incidentally, furthermore, advices that for two sister ships recently constructed and operating in the Pacific, one equipped electrically and the other with steam auxiliaries, for a period of six months the repair bill on boilers and steam winches was $3800, while repairs to the generating sets and electric equipment for the same period was only $92. We appreciate the fact, of course, that this was undoubtedly an unusual condition, some accident probably happening to the steam plant, but we emphasize the point that repairs are necessary to steam equipments and that if some repairs are occasionally necessary for the electric, it should not be considered a matter of discredit to the electric drive.

Correct Atmosphere of Thought

In the consideration of the use and adoption of electricity for ship auxiliaries, it has been necessary to develop a new line of thought in the minds of steamship owners, naval architects, marine engineers, etc., and while we believe that still more must be accomplished in this respect, considerable progress has been made.

This progress is noteworthy, especially in view of the opposition which had been encountered to the use of electricity until quite recently, from many of the above interests and manufacturers of steam apparatus in general. In some instances in the past these interests have freely stated that they would use their best efforts to defeat the use and adoption of electric auxiliaries on merchant vessels.

We have made but little reference to the wide application of electricity in the American Navy and the very satisfactory results which have been obtained from practically all of its apparatus so operated. This, at least in a general way, is known by the majority of the members of these two societies, and further, has, we believe, had a very important bearing on gradually changing the mental attitude with reference to the merchant field.

It is with a sense of gratification, therefore, that we feel our predictions of a number of years ago are rapidly being fulfilled.

THE TRANSFER OF THE COAST GUARD TO THE NAVY—II

As the Departments See It

By JOHN W. KEAN

IN the first installment of this article we briefly summarized the history of the efforts made to transfer the Coast Guard to the Navy. The subject was exhaustively treated in the reports of the secretaries both of the Navy and of the Treasury. Secretary Daniels, in fact, makes quite a feature in his report of an argument in favor of the Navy operating all government vessels. Near the beginning of his report he states:

Navy Should Operate All Government Vessels

America should have but one Navy. At present there are various "little navies," seagoing activities conducted under the supervision of different departments whose vessels could be far more advantageously operated under a single control.

Economy and efficiency in government are the ends we are all seeking—the placing of governmental activities where they can be most effectively operated, preventing duplication of effort and material, eliminating lost motion, and insuring the best possible service at minimum expenditure. One of the basic principles in operation is that all the forces engaged in the same kind of work should be concentrated under one head and in one organization, and the logical application of this principle would place under the Navy Department all government seagoing vessels and, except where there is some particular and compelling reason to the contrary, all public harbor craft.

The report next gives the following list of vessels under the different departments:

Navy Department		979
War Department		730
Treasury Department—		
Coast Guard	52	
Public Health Service	49—	101
Department of Commerce		147
Department of Labor		12
Department of the Interior		13
Shipping Board		1510
Panama Canal		212

Such a concentration of government vessels under one marine department could "not be considered a radical departure or experiment," the report states, "as its worth and practicability were thoroughly demonstrated under the severe test of war."

As the merchant marine is especially interested in the question of the protection of shipping involved in the controversy, the section of the report dealing with this subject is also quoted:

Rendering Assistance

"This duty is now carried on by the Coast Guard, the merchant marine and the Navy. When a ship in distress sends out calls for help, all naval and merchant vessels nearby, as well as Coast Guard cutters, proceed to its assistance. In such operations accurate and rapid radio and telegraphic communication is indispensable. The Navy has already such a communication service, and it is used almost altogether by Coast Guard vessels when at sea.

"When vessels are stranded, the life-saving stations along the coast are assigned the duty of saving the personnel. Often the Navy co-operates in this work; for example, in the case of the transport Northern Pacific, when the Navy did far the greater part of the life-saving and with complete success.

Wrecks and Derelicts

"During the war the Navy took over all vessels and equipment of the leading salvage companies and maintained a naval salvage service which operated very successfully until May 15, 1919, when the salvage equipments were returned to their owners. In assisting vessels in distress and floating ships from rocks or shoals immediately after stranding, the naval districts are in a position to render excellent service in view of the many lines of communication and the various sizes and types of vessels available for this duty. The Navy is well equipped with divers, explosive material, suitable vessels, and skilled personnel."

The report next states that it was necessary to make a number of changes in the forty-one Coast Guard vessels when they were turned over to the Navy upon our entrance into the war. Guns had to be installed and radio equipment enlarged and improved. The statement is made that "A service which automatically reverts to the Navy in time of war should by all means be ready for immediate naval duty upon the declaration of war."

Under the subject of duties performed by the Coast Guard the report states that in 1919 in 29 out of 42 of the principal ports the customs officials operated their own vessels with civilian personnel and that the Navy has available in each naval district many small craft which would be suitable for this purpose. Attention is invited to the fact that the Navy has employed submarine chasers along the Florida coast to prevent smuggling and this system could be extended. Other duties performed by the Coast Guard, the control of anchorage grounds, the giving of medical aid to deep-sea fishermen and the collection of statistics regarding loss of life on vessels, none of which are of a fiscal character, can logically and easily be performed by the Navy, the report states.

The final paragraph of the report on this particular subject reads:

"Placing the Coast Guard under the Navy would put under one administrative control all the maritime forces whose duty it is to save life and property at sea, avoiding duplication, reducing administrative expenses, and preventing conflict or friction in operation. The performance of these duties will put the Navy in more intimate touch with the merchant marine and bring about a sympathy and understanding most desirable in peace as well as in war, as our recent experiences have demonstrated."

Treasury Views

And, finally, we have Secretary Houston's last words on this subject as contained in his annual report. Persons of a legal turn of mind interested in this dispute certainly have a good opportunity to exercise their judicial qualities. Secretary Houston states:

"The transfer of the Coast Guard from the jurisdiction of the Treasury to the jurisdiction of the Navy has been periodically agitated for many years. The proposal was revived shortly before the Coast Guard was returned to the Treasury under the executive order of August 28, 1919, and its consideration has been continued since. In the past the Treasury has opposed almost uniformly the enactment of legislation for this purpose and the Congress always has refused to sanction the proposal. In the present consideration of the matter, the views of the Treasury have been made known to the appropriate committees of the Congress. Recent discussions of the subject have brought forth no new material facts which in any way would warrant the Treasury in departing from its position. After very careful consideration of the matter, I am of the firm opinion that the Coast Guard in time of peace has no relation to the Navy and should not be transferred to the Navy, but should remain in the Treasury.

"The department is attached to this historic service which has come down through the years with fine traditions and achievements. It has made a noble record under the Treasury. The department's position in this matter, however, is not based upon any selfish reluctance to be relieved of duties it has performed and powers it has exercised for so many years, for, as pointed out elsewhere in this report, the Secretary is willing that services that have no direct relation to the Treasury be released from the department and transferred to other jurisdictions. It is based, on the contrary, upon what is believed to be the best interests of the public service as well as of the Coast Guard.

"A brief discussion of the origin and activities of the Coast Guard may serve to show why this establishment should not be transferred to the Navy. The Coast Guard is a consolidation of the old Revenue Cutter and Life-Saving Services, and as the successor to the Revenue Cutter Service is older than the Navy and almost as old as the government itself. It was created in 1790 at the second session of the First Congress, upon the recommendation of Alexander Hamilton, the first Secretary of the Treasury, as the result of the need for the services of a coast patrol for the enforcement of the customs laws and as an organized armed force for the protection of the seacoast. During its life of 130 years its functions have been increased, and today they may be summarized as follows:

1. Protection of the customs revenue.
2. Assistance to customs officers in the performance of their duties.
3. Aid to vessels in distress and the saving of life and property.
4. Destruction or removal of wrecks, derelicts, and other floating dangers to navigation.
5. Medical aid to American vessels engaged in deep-sea fisheries.
6. Enforcement of laws and regulations governing anchorage of vessels in navigable waters.
7. Enforcement of laws relating to quarantine and neutrality.
8. Suppression of mutinies on merchant vessels.
9. Enforcement of navigation and other laws governing merchant vessels and motorboats.
10. Enforcement of law to provide for safety of life on navigable waters during regattas and marine parades.
11. Protection of game and the seal and other fisheries in Alaska, etc.
12. Enforcement of the sponge-fishing law.
13. International ice patrol off the Great Banks.
14. Service as a part of the Navy in time of war or when the President shall direct.

"Many additional tasks fall to the Coast Guard, and it is generally recognized that all departments may call upon it for any special work of a maritime nature which is not especially assigned or for which resources are not elsewhere obtainable.

"From the beginning the Coast Guard has been an invaluable part of the Treasury organization in connection with the collection of the customs revenue and in the administration of the Customs Service. Apart from the humanitarian nature of other important duties of the Coast Guard, it may be stated that the Customs Service has at least an indirect interest in the relief of distressed vessels laden with importations for the United States. Furthermore, it should be said that while nowadays there is little or no smuggling in large cargo lots, it is believed that the very existence of the Coast Guard prevents such smuggling. With the advent of prohibition, it has been found necessary for the Coast Guard to be very vigilant in connection with smuggling by means of small boats. If this service is withdrawn from the Treasury and placed under the control of another jurisdiction where it may disappear as a separate unit or not always be subject to the request of the Treasury for specialized service, it is possible that smuggling might be resumed on a large scale, thereby causing loss to the revenue. In that event it is also likely that smugglers might be particularly active with respect to violations of the prohibition act, the enforcement of which is imposed upon the Treasury.

"It is true that some of the functions of the Coast Guard have no direct relation to the Treasury, but it is also true that such functions have no relation to the Navy. The Coast Guard is not a naval service in any sense, except in time of war, when properly the law provides that it shall be transferred to the jurisdiction of the Secretary of the Navy. The functions of the Coast Guard and those of the Navy normally are fundamentally different. The similarity ends when it is stated that the Navy is a fleet under military discipline and the Coast Guard possesses a fleet under military discipline. The question must be determined, not by the fact that both are floating services, but by the character of their duties. In the judgment of the Treasury there is no more reason to transfer the Coast Guard to the Navy in time of peace than there is to transfer the merchant marine to the Navy in time of peace.

"The Coast Guard is an intensive organization and, particularly in its work relating to the conservation of life and property from the perils of the sea, demands special equipment, special training and special qualifications. Its duties are not of an occasional nature, but call for vigorous prosecution at all times. I believe that they are of such a character as to dictate that they remain under the supervision of a civilian department. It is very greatly to be feared that the absorption of the Coast Guard by the Navy in all probability would result eventually in the extinction of essential Coast Guard duties, to the great disadvantage and loss to the government and the maritime interests of the Nation. It is obvious that the Navy does not need the Coast Guard in time of peace; it is equally obvious that the Treasury does need it in the performance of duties vested in this department by law. It seems clear that the permanent union of the two services would be an anomaly. The Congress is earnestly requested to withhold approval of any legislation designed to effect such a transfer.

"In submitting this recommendation, I desire to enter an urgent plea that the Congress grant the authority and appropriations which are necessary to increase the efficiency and to extend the usefulness of the service. It appears to be felt by some proponents of the transfer that the Coast Guard would fare better at the hands of the Congress if placed within the jurisdiction of the Navy Department instead of the Treasury Department. I do not entertain that notion in any degree. I do not believe that the Congress would look with any more favor upon requests for appropriations coming from the Coast Guard as a part of the Navy than from the Coast Guard as a unit in the Treasury. In this spirit I invite attention to imperative needs of the service, with the confident hope of favorable action. The Coast Guard contributes most essential and important service to the welfare of the Nation, accentuated and increased in value at the present time by the great growth of our commerce and merchant marine. Unless its obvious requirements are met in the near future, it cannot be expected to fulfill its mission with the same degree of efficiency and effectiveness that characterized its performances in the past.

Former Coast Guard Cutter Bear

Pacific Marine Review
The National Magazine of Shipping

576 Sacramento Street
SAN FRANCISCO, CALIFORNIA U. S. A.

Official Organ of the Pacific American Steamship Association

Subscription Price, per year (Domestic) $3 00
(Foreign) $3 50
Single Copies . . . . 35 cts

J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . Associate Editor
J. G. BRAY . . . . Pacific Coast Adv. Mgr.
E. R. HARRIS . . . . . Northwestern Representative

NEW YORK OFFICE
359 at 30 Church Street
M B. STEWART, Manager

Pacific Marine Review is sold at all leading News Stands
Entered as second class mail matter at Postoffice
San Francisco, California

Published on the First of Each Month. Copyright 1921 in the United States by J. S. HINES

SHIP PRICES

THOSE who are familiar with the shipping business in Britain have witnessed during the last twelve months a very remarkable volte-face in the matter of ship prices, and let it be understood that when we are talking of ship prices we are talking of the price at which a new, ready-for-sea steam freighter of medium tonnage can be bought in the open market. We are not talking about shipbuilding costs, which is a very different matter, although some types of mind—notably those connected with the Shipping Board—seem to be unable to separate these two items.

A very comprehensive chart was recently issued by Fairplay of London showing the price of a 7500 deadweight ton ordinary steam freighter ready for sea as it varied from the year 1898 to the year 1921. The low point on the curve was in the year 1908 when this freighter could be bought for £36,000. The high point was at the beginning of the year 1920, when the freighter would bring £235,000. From that point the line drops with great rapidity—in fact, almost vertically—until on January 1, 1921, the price has become £105,000. Bear in mind that this is not the cost of shipbuilding but the price of the finished article as regulated by the market and the old law of supply and demand.

Now, any reader can take pencil and paper and do a little figuring on these prices and arrive at some very interesting conclusions. He would note that at the present rate of exchange on pounds sterling, say $3.80, the price per deadweight ton of the British freighter on January 1, 1921, would be $53.20, and if he would compare this price mentally with that of the United States Shipping Board, now holding its vessels at $165 to $185 per deadweight ton, he would see one of the many reasons why Shipping Board vessels are not sold more rapidly.

Now, figuring again from the 1908 price, we find that at normal exchange the price of the British freighter at that time would be $22.80 per deadweight ton, and figuring 5 per cent depreciation over the twelve years the book value of that 1908 freighter, which with ordinary maintenance would be for commercial purposes a fairly good rival for the ordinary freighter of today, has come down to about $14 per deadweight ton. This latter is an important figure to bear in mind because it has a very intimate connection with the present drop in ship prices.

All old shipowning and operating companies of any size have in their fleets quite a number of these 1908 vessels or vessels built prior to that time which they are carrying on their books at figures around $14 a deadweight ton. Knowing that to be the case, we can easily see why it is impossible for American capital to invest in ships at $165 a deadweight ton to enter in the foreign trade against such competition. Under the ordinary and only safe bookkeeping methods of ship operating companies the standing charges against the new tonnage at the Shipping Board figures would be a considerably larger amount per annum than the total book value of these older ships. But our readers will say, "These ships are not as good as the Shipping Board freighters," and we will readily grant that to be so as far as equipment, finish of engines, quarters for crew, and everything that makes or would tend to make a seaman proud of his floating home, is concerned. There is no comparison between these old freighters and Shipping Board ships, but on the other hand there is nothing in the extra cost of the Shipping Board ship which makes her any more economical in operation, and if she starts with a handicap of standing charges so great, no amount of white enamel paint on her crew's quarters, no amount of convenience in her galley equipment, and no superiority in her bathtub arrangements is going to make any money for her owner or enable him to operate against his foreign competitor.

Shipping Board Commissioner Goff some time ago recognized these facts and proposed to his fellow commissioners that the value of the fleet be written down to a point where the vessels could be sold at $67.50 a deadweight ton. He was laughed out of court for his pains and was criticised by such authorities as the New York Journal of Commerce, but if Commissioner Goff were making his figures today he would probably have to write off another 10 to 15 per cent in order to meet the market.

These are facts which must be faced and not theories. They are faced by every manufacturer of goods in the United States, and many of those gentlemen have had to take losses as large in proportion as those which would now face the Shipping Board if it sold at the present market value.

The Shipping Board has, considering the size of its fleet, consistently held its selling price at over 100 per cent above the market value, and that is the reason that it has the ships on its hands today.

Another feature of this matter which should not be lost sight of is that it is necessary to keep busy the industrial and manufacturing population. Undoubtedly if the huge fleet of ships in possession of the Shipping Board was marked down to a point where private capital could afford to invest therein, the shipyards and machine shops of the country would be kept busy for a number of years to come altering and repowering these ships to suit the requirements of the various routes and trades in which they would be operated.

A NEW SHIPPING BOARD

BY the time this reaches our readers a new pilot will have taken charge of the ship of state. We are hoping great hopes for the progress of the ship under this new pilot, for no pilot has ever taken charge under more favorable auspices or with a more wholehearted support from his crew.

Naturally we of the marine world are interested in the choice of Shipping Board commissioners that Pilot Harding will make, and although we are not advancing the cause of any particular candidate for the chairman of this board, we would like to make one specification as to his qualifications. The new chairman should be a man of shipping experience, and that experience should include a considerable amount of those lean years before the war when cut-throat competition and very low returns were the rule. He should be of such independence and maturity that political influences would not sway him from his course.

Given such a man and taking his advice about the choice of other commissioners, there should be a great improvement in Shipping Board affairs.

But should this man combine the patience of Job with the wisdom of Solomon, and should there be associated with him the most efficient and able coworkers that the nation can produce, he will be powerless to improve maritime conditions unless Congress and the

American people back of Congress can be shown truthfully just how matters stand and are able to accept the facts at their face value and sanction action based on those facts. The great mass of propaganda emanating from past Shipping Boards has been of a very misleading nature and has built up a very false feeling of optimism regarding the future of the American merchant marine. This will greatly increase the difficulties of the new board, and there will be need of a firm hand and a wise head to guide the destinies of the Shipping Board and keep the confidence of the American people during the troublous years ahead.

A BOOST

JUST now it is the fashion to boost for San Francisco, a fashion which we are very willing to follow.

We love San Francisco. She is the place of our birth and has always been kind to us. She occupies a position of great natural beauty which has been much enhanced through the efforts of her worthy sons.

San Francisco has the finest landlocked harbor in the United States, and that harbor is so ably administered that while enjoying the lowest port charges of any port in America it is absolutely self-supporting, and in addition to paying all operating expenses, overhead, maintenance, interest and sinking fund, provided in 1920 a surplus of $1,200,000, which was turned into the permanent improvement fund.

Although commerce is growing rapidly, the permanent improvements on San Francisco's waterfront have been pushed way ahead of that growth, and notwithstanding this fact, there are more than $8,000,000 in authorized bonds that have never been placed on the market and are available immediately if need should arise.

San Francisco, backed by the great variety and volume of the products of Central California, is the financial center of the Pacific Coast. She finances the great valleys that pour their products down the rivers into her wonderful harbor and in turn nourish the cities which border its shores.

That her children love her is attested by many stately architectural monuments that crown her hills and adorn her magnificent parks, and by the treasures brought from the ends of the earth to embellish her museums. Her climate has the potent charm of variety and is enticing to redblooded men and women: winter nights so balmy that great vocal artists herald the coming of the New Year in song from her street corners, and midsummer evenings so cooled by the ocean fogs and the northwest trades that heavy furs are comfortable.

It is difficult to avoid superlatives in talking about San Francisco. When in 1906 she rose from her ashes like a modern phoenix, the world acclaimed her the bravest city. Many travelers, poets and authors have dubbed her the city of the greatest charm. She has the best harbor, the lowest port charges, the largest commercial drydock, the best system of port management, the least slums, the most fresh air, the biggest rival, the most loyal population, the largest, safest and cheapest ferry service, of any city in America.

She is our Home Port and we are proud of that fact.

Foreign Trade Renders a National Service

Seventeen percent of our total commerce is FOREIGN TRADE.

One-fifth of our industrial and agricultural population depend for their livelihood on FOREIGN TRADE.

The profits of both farms and factories depend for their maintenance upon FOREIGN TRADE.

Every man, woman and child in the United States has a vital personal interest in FOREIGN TRADE.

You can assist in this service by attending

THE EIGHTH NATIONAL
FOREIGN TRADE CONVENTION
CLEVELAND, OHIO, MAY 4-5-6-7, 1921.

Full information can be obtained from O. K. Davis, Secretary, National Foreign Trade Council, 1 Hanover Square, New York, or Cleveland Convention Committee, 207 Chamber of Commerce, Cleveland, Ohio.

FOREIGN TRADE CONVENTION

THE Eighth Annual Convention of the National Foreign Trade Council meets at Cleveland, Ohio, May 4-7, 1921. Its consideration of and conclusions on questions affecting foreign trade will be looked for with a very considerable amount of interest by manufacturers, shipping men and shipbuilders, importers and exporters in all parts of the United States.

There has probably never been a time in the history of the United States when those who have the interests of her foreign trade at heart have been faced with more delicate problems for solution. All of those parts of the world with which we have been wont to carry on our largest foreign trade dealings in the past are in a more or less chaotic state politically, industrially and financially and many of the wisest heads in our own nation are fearful lest we fall into the same condition ourselves.

It has been thoroughly demonstrated in the past conventions of the National Foreign Trade Council that the men in charge of the arrangements for these conventions are willing and anxious to thoroughly thrash out all problems connected with the foreign trade of America and to do so in a sane and reasonable manner, and we are hoping that in this eighth convention the Foreign Trade Council will be able to impress upon our Federal government the necessity for the same line of action from our government bureaus.

We have every reason to expect that foreign trade will receive full co-operation from the incoming administration and that many of our ocean-going ships now laid up in the mud will in the coming months be in demand for profitable cargoes of American goods.

STATE NAUTICAL SCHOOL

THE Pacific American Steamship Association has endorsed Senate Bill 339, California Legislature, which would provide for a state nautical school. "The Pacific American Steamship Association, including in its membership twenty-two American steamship operators and owners on the Pacific," says a statement of the association, "endorses the urgent need for favorable passage by the state legislature of Senate Bill 339, introduced by Senator Flaherty January 20, 1921, and referred to the committee on education, entitled 'An Act to make an appropriation to carry out the provisions of "An Act to establish a natutical school at the port of San Francisco, to provide for the conduct and maintenance thereof, to make an appropriation therefor and to authorize the governor to request and to receive aid from the United States in compliance with the provisions of an act of Congress, approved March 4, 1911," approved May 14, 1917.'

"State schools to provide nautical education for their students of universities and high schools have been successfully conducted by state appropriations for some time past on the Atlantic Coast, at Boston and New York, and on the Pacific Coast, at Seattle. The favorable passage of an appropriation for the California State Nautical School will place this state and the port of San Francisco on a par with other large seaport states and cities, in furnishing officer material for, and in furthering the welfare of, our growing American merchant marine on the Pacific.

"This association appointed a committee to investigate the work accomplished by state nautical schools on the Atlantic and at Seattle, and after an exhaustive study of the reports of such schools, our committee found that the work has been effective and instructive. Our association, therefore, earnestly solicits your favorable support in having passed the appropriation necessary for the establishment of a California State Nautical School, which we strongly recommend.

"The board of trustees of the California State Nautical School consists of the governor of the state, the president of the State Board of Education, and the president of the Board of State Harbor Commissioners."

DUTY, RIGHT AND PRIVILEGE

THERE has been, is, and still will be much talk about "rights" and "privileges," but not so much talk about "duties" and "obligations." Some of this talk has been, and continues to be, reasonable and wise, but by far the great bulk of it has been loose, irrational and most distinctly unwise.

In determining what are our rights and privileges and duties and obligations as citizens of this republic, most of us go at the matter from the wrong end of the line. We first try to find out what are our rights and privileges, leaving till some future day the consideration of our duties and obligations.

The immigrant who lands on our shores is not here many hours until some one—and usually one of his own tongue—has informed him in glowing terms that he is now the direct and immediate heir to certain "natural and inalienable" rights. Among them may be mentioned the right to happiness, the right to a living, the right to his full share of the "good things of life," the right to organize so that he may get a job, and the right to strike on that job for any reason or for no reason at all.

Later, perhaps, after he has been here long enough to secure the right to vote, he may hear a few vague remarks about the duties and obligations which are supposed to go before his rights and privileges, but often by that time he has come to feel himself so strongly entrenched in his rights and privileges that he does not deem it essential to pay any attention to his duties and obligations.

Our methods of teaching citizenship to the alien have been, and still are in large part, on the cart-before-the-horse order. Whether or not we have "natural" rights and privileges, there can be no question that we do have natural and fundamental duties and obligations, and any method of teaching citizenship that does not first of all make these clear and insist upon their observance, preaches rights and privileges on a very shaky and unsubstantial foundation, or on no foundation at all.

Let us be concerned about our duties and obligations as citizens and about discharging them faithfully, and our rights and privileges will come to us automatically and will abide with us, because of the firm foundation we have builded for them.—The Valve World.

EVILS OF DOUBLE TAXATION

AMERICAN business men from thirty-five foreign countries have been invited by the National Foreign Trade Council to present, during the Eighth National Foreign Trade Convention, their views on the taxation of American citizens living abroad. This important meeting will be held in Cleveland, Ohio, May 4, 5, 6, 7, 1921.

Serious efforts are already being made by the American Chambers of Commerce of Rio, Buenos Aires, Mexico City, Shanghai, London, Sao Paulo and Barcelona to obtain from Congress the elimination of American taxes now levied on the income received by Americans living abroad and derived from foreign sources.

This taxation has put American foreign traders at a great disadvantage in competition with their foreign rivals, who pay no taxes to their home governments on income derived from foreign sources.

In the Philippines, for instance, an American conducting a business in the city of Manila and realizing a net profit of $50,000 therefrom, pays a combined Philippine and United States income tax of $9,190. A Filipino, Britisher, Spaniard, Chinaman, Japanese or citizen of any country except the United States, conducting a like business and earning a like profit, pays only the Philippine tax, which amounts to $2535. In other words, the American merchant would have to pay $6655 more than his foreign competitors. Should the net income be $100,000, then the margin against the American mechant is $24,205.

MINISTERS FROM DIPLOMATIC SERVICE

IN an effort to make of the foreign service of our government a career which will attract the services of able and ambitious men, the National Foreign Trade Council has written to President-elect Harding urging that a generous portion of the appointments to the rank of ambassador and minister be reserved for well-qualified officials already in the diplomatic and consular services.

The letter, which is signed by James A. Farrell, chairman of the council and president of the United States Steel Corporation, states:

"The importance to American foreign trade of able and experienced diplomatic representation is too apparent to require exposition.

"The practice of appointing ambassadors and ministers from the country at large has given this government some of its ablest diplomats.

"As the secretarial grades of the diplomatic service and the entire consular service have for ten years been conducted on the merit system and a large number of well qualified officials therein desire to make the foreign service their life work, the country possesses a resource of experience and ability which should be fully utilized.

"As a means of practically combining the method of general appointment with the principle of a permanent diplomatic service, we venture to suggest that in the forthcoming appointments a generous proportion of the embassies and legations be reserved for appointments from the diplomatic and consular services, or those with previous creditable service therein."

WAGES AND COSTS

REDUCTIONS of wages of deck and engine departments are forecast by the abrogation of agreements between steamship operators and the Shipping Board on the one hand and the unions on the other; or, in case agreements have some time to run, by the effort of the operators to secure consent of the men to reductions prior to the expiration of the agreements.

Operating companies of the Pacific, acting individually, abrogated their agreements in January, effective in February; and the Shipping Board, under date of February 2, served notice of abrogation thirty days from date. On the Atlantic the lead was taken by the American Steamship Owners' Association, which, although numbering among its members most of the prominent operators of the Pacific, in this case was considering the Atlantic scale only.

Proposals made by the Atlantic shipowners and the Shipping Board looking toward modifications of the agreements prior to expiration have been unsuccessful, but further conferences may be held. The American Steamship Owners' Association said that agreements would be continued until the dates of expiration, May 1 and August 1, unless some common understanding can be reached sooner with reference to wages and overtime. Tentative proposals have been made looking toward a reduction in the manning scale of American vessels also. A typical American 8800-tonner, it was stated, would carry a crew of 48, whereas a British vessel of the same size would have 45 and a Norwegian only 40; a Japanese, however, would have 59, but their wages are much lower than those of the whites.

Following the abrogation of agreements by the Shipping Board, Darragh Delancey, director of industrial relations, departed from Washington for Seattle and San Francisco, where he intended to hold conferences with operators and seamen regarding a new wage scale and working conditions.

Agreements have been cancelled by operators on the Pacific, but the old scales remain in effect pending action by owners.

The shipowners' attitude in insisting upon the necessity of reducing wages is stated in an address by J. Parker Kirlin, general counsel of the American Steamship Owners' Association, before the annual meeting of the Academy of Political Science: "Wages for officers and men on the typical American steamer of 8800 tons deadweight . . . amount, at the present standard of wages, to $5315 a month. The wages of an identical British steamer amount to $3924 a month. The excess cost to the American vessel is $1391 a month, or $16,692 a year."

Wage reductions in shipbuilding also are under way. The Bulletin of the Atlantic Coast Shipbuilders' Association summarizes the situation in Atlantic yards by saying that "the Atlantic Coast Shipbuilding Industrial Board had met and taken steps to introduce in all shipyards signatory to the agreement with the metal trades department of the American Federation of Labor a 10 per cent wage reduction effective March 1, 1921, as the initial move in a program to bring down labor costs. At the board meeting it was arranged that the international officers of unions parties to the agreement would conduct a general referendum at which the shipyard workers will be given the opportunity to vote on the proposed reduction, same applying to both the day and piece work schedules originally established by the Macy Board. It was further explained that this proposition is identical with that of the Bethlehem Shipbuilding Corporation except that the Bethlehem yards intend to put the new wage scale into effect February 14."

A statement as to wages is expected from the California Metal Trades Association about March 1. In the Northwest, 3500 employes of the G. M. Standifer Construction Corporation accepted a cut of 10 per cent in January rather than witness the discharge of 500 men whom the company found it necessary to discharge in default of a wage reduction. The new scale is equivalent to the old Macy award.

MEMORANDUM TABLE OF COMPARISON OF
WAGE SCALES AND WORKING CONDITIONS
ATLANTIC-GULF and PACIFIC AGREEMENTS

POWER TONNAGE	(A)	(B)	(C)	(D)	(E)
Single Screw	OVER 20,001	12,001 to 20,000	7,501 to 12,000	5,001 to 7.500	Below 5,001
Twin Screw	OVER 15,001	9,001 to 15,000	5,501 to 9,000	3.501 to 5,500	Below 3,501

	(A)		(B)		(C)		(D)		(E)		OVERTIME		MEAL ALLOW. PER DAY		ROOM ALLOW. PER NIGHT		TRAV. ALLOW. (incl.Trans)	
	Atl.& Gulf	Pac.	Atl.& Gulf	Pac.	Atl.& Gulf	Pac.	Atl.& Gulf	Pac.	Atl.& Gulf	Pac.	Atl. & Gulf	Pac.	Atl.& Gulf	Pac.	Atl.& Gulf	Pac.	Atl.& Gulf	Pac.
DECK DEPARTMENT																		
Master	412 50	(Same)	371.25	(Same)	357.50	(Same)	343.75	(Sme	330.00	(Same)		.	4.50	3.50	2.50	1.50	5.00	(Full
1st Officer	241.25	(as)	235.00	(as)	228.75	(as)	222.50	(as	216.25	(as)	.80	.80	3.00	3.00	2.50	1.50	5.00	(Trav.
2nd Officer	212.50	(Atl.)	206.25	(Atl.)	200.00	(Atl.)	193.75	(Atl	187.50	(Atl.)	.80	.80	3.00	3.00	2.50	1.50	5.00	(expenses
3rd Officer	186.75	(&)	182.50	(&)	176.25	(&)	170.00	(&	163.75	(&)	.80	.80	3.00	3.00	2.50	1.50	5.00	(
4th Officer	165.00	(Gulf)	158.75	(Gulf)	--	(Gulf)	--	(Glf		(Gulf)	.80	.80	3.00	3.00	2.50	1.50	5.00	
Carpenter	100.00	105.00									.60	.75*	2.25	2.00	.75	.75	4.00	5.00
" Mate	95.00	--									.60	.75*	2.25	2.00	.75	.75	4.00	5.00
Boatswain	95.00	95.00									.60	.75*	2.25	2.00	.75	.75	4.00	5.00
" Mate	90.00	--									.60		2.25		.75		4.00	
Quartermaster	87.50	--									.60		2.25		.75		4.00	
Q.M.,Stationman, Sailor,Watchman		90.00									.60	.75*		2.00		.75		5.00
Able Seaman	85.00	--									.60		2.25		.75		4.00	
Ordinary Seaman	65.00	--									.60		2.25		.75		4.00	
Boy	40.00	--									.60		2.25		.75		4.00	
ENGINE DEPARTMENT																		
Chief Engineer	387.50	(Same)	346.25	(Same)	332.50	(Same)	318.75	(Sme	305.00	(Same)		.80	3.50	3.50	1.50	1.50		(Full
1st Asst "	241.25	(as)	235.00	(as)	228.75	(as)	222.50	(as	216.25	(as)	.80	.80	3.00	3.00	1.50	1.50	4.00	(Trav.
2nd " "	212.50	(Atl.)	206.25	(Atl.)	200.00	(Atl.)	193.75	(Atl	187.50	(Atl.)	.80	.80	3.00	3.00	1.50	1.50	4.00	(ex-
3rd " "	188.75	(&)	182.50	(&)	176.25	(&)	170.00	(&	163.75	(Gulf)	.80	.80	3.00	3.00	1.50	1.50	4.00	(penses.
4th " "	165.00	(Gulf)	158.75	(Gulf)	--	(Gulf)	--	(Glf	--		.80	.80	3.00	3.00	1.50	1.50	4.00	(
Junior "(Lic.)	135.00	( )	--	( )	--	( )	--				.80		3.00		1.50		4.00	
Refrig. "	110.00	--									.60		2.25		.75		4.00	
Asst Refrig Eng.	100.00	--									.60		2.25		.75		4.00	
Electrician	110.00	--									.60		2.25		.75		4.00	
Deck Engineer	100.00	--									.60		2.25		.75		4.00	
Pumpman	100.00	--									.60		2.25		.75		4.00	
Oiler	95.00	90.00									.60	.75	2.25	2.00	.75	.75	4.00	5.00
Watertender	95.00	90.00									.60	.75	2.25	2.00	.75	.75	4.00	5.00
Storekeeper	95.00	90.00									.60	.75	2.25	2.00	.75	.75	4.00	5.00
Fireman	90.00	90.00									.60	.75	2.25	2.00	.75	.75	4.00	5.00
Wiper	75.00	90.00									.60	.75	2.25	2.00	.75	.75	4.00	5.00
Coal Passer	75.00	90.00									.60	.75	2.25	2.00	.75	.75	4.00	5.00
Donkeyman	95.00	--									.60	.75	2.25	2.00	.75	.75	4.00	5.00

STEWARD'S DEPARTMENT	ATLANTIC & GULF				PACIFIC	OVERTIME		MEAL ALLOW. PER DAY		ROOM ALLOW. PER NIGHT		TRAV. ALLOW. (incl.Trans)	
	Class 1.	Class 2	Class 3	Class 4		Atl. & Gulf	Pac.	Atl.& Gulf	Pac.	Atl.& Gulf	Pac.	Atl.& Gulf	Pac.
Chief Steward	160.00	145.00	135.00	115.00	130.00	.60	.60	3.00	2.00	2.50	1.50	5.00	5.00
2nd Steward	95.00	95,00	--	--	--	.50	.60	2.25	2.00	.75	.75	4.00	5.00
Chief Cook	135.00	125.00	115.00	110.00	110.00	.60	.60	2.25	2.00	.75	.75	4.00	5.00
2nd Cook & Baker	--	--	100.00	100.00	90.00	.50	.60	2.25	2.00	.75	.75	4.00	5.00
2nd Cook	100.00	100.00	85.00	85.00	--	.50	.60	2.25	2.00	.75	.75	4.00	5.00
3rd Cook	90.00	70,00	--	--	75.00	.50	.60	2.25	2.00	.75	.75	4.00	5.00
Vegetable Cook	75.00	--	--	--	--	.50		2.25		.75		4.00	
Cooks Mate	70.00	70.00	--	--	75.00	.50	.60	2.25	2.00	.75	.75	4.00	5.00
Baker	115.00	105.00	--	--	--	.50		2.25		,75		4.00	
2nd Baker	85.00	--	--	--	--	.50		2.25		.75		4.00	
Steam Cook	85.00	85.00	--	--	--	.50		2.25		.75		4.00	
Butcher	95.00	95.00	95.00	--	--	.50		2.25		.75		4.00	
2nd Butcher	85.00	--	--	--	--	.50		2.25		.75		4.00	
Storekeeper	85.00	--	--	--	--	.50		2.25		.75		4.00	
Pantryman	75.00	--	--	--	--	.50		2.25		.75		4.00	
Scullion	70.00	--	--	--	--	.50		2.25		.75		4.00	
Endman	70.00	70.00	70.00	--	--	.50		2.25		.75		4.00	
Messman	70.00	70.00	70.00	70.00	80.00	.50	.60	2.25	2,00	.75	.75	4.00	5.00
Deck Messboy	65.00	65.00	65.00	65.00	70.00	.50	.60	2.25	2.00	.75	.75	4.00	5.00
Engine Messboy	65.00	65.00	65.00	65.00	70 00	.50	.60	2.25	2.00	.75	.75	4.00	5.00
Stewards Messboy	65.00	65.00	65.00	65.00	70.00	.50	.60	2.25	2.00	.75	.75	4.00	5.00
Steward Apprentice	40.00	40.00	40.00	40.00	40.00	.50	.60	2.25	2.00	.75	.75	4.00	5.00
Doctor	150.00	150.00	--	--	--								
					--								
Chief Radio Oper.	125.00	125.00	125.00	125.00	--								
Asst. " "	100.00	100.00	100.00	100.00	--								

*Pacific Coast Overtime
.75 Ship per hour
1.00 Cargo " "

Atlantic and Pacific wage scales and working conditions compared

Robert L. Hague

AN AMERICAN MARINE MANAGER

THE announcement in December of the appointment of Mr. Robert L. Hague as manager of the marine department, Standard Oil Company (New Jersey), succeeding Mr. D. T. Warden, has been a matter of interest and great satisfaction to his many friends in the shipping world on the Pacific Coast as a further recognition of his ability and talent.

While the marine department of the Standard Oil Company (New Jersey) is only one of the departments in that vast concern, it is in fact one of the largest steamship operating companies in the United States, and next to the Shipping Board has more tonnage under its direct control than any other operator in the United States. In addition, it is the largest single owner of tonnage under American registry, and the largest single owner of tank steamers in the world.

Mr. Hague was born on March 2, 1881, in New England. He received his technical training at Worcester Polytechnic Institute. As a young man the sea attracted him and he shipped before the mast on sailing vessels. Later he became a railroad locomotive engineer and then served his time as a machinist. Subsequently starting as an oiler, he advanced through the various grades of the ship's engine department to the position of chief engineer.

This training undoubtedly laid the foundation for his broad practical experience and sympathetic understanding of the viewpoint of all classes of labor, which are so essential to those in administrative positions under present-day conditions.

It was his service on ships running to the Pacific Coast which caused him to ultimately settle there.

As an officer on its vessels he became associated with the American-Hawaiian Steamship Company, and later supervised the construction of several ships built for that company.

Afterwards he joined the Standard Oil Company (California) as assistant superintendent engineer, and later was appointed superintendent engineer and naval architect. It was under his direction that many of the tankers and other tonnage of the Standard Oil were designed and built, and he has been responsible in a large measure for the high standard in construction and maintenance which characterized the fleet of that company.

Mr. Hague, as well as many others who were recognized authorities in their respective professions, was called upon during the war emergency to serve the government. It was the untiring effort and practical experience of such men that contributed so largely to the successful conduct of government activities during the war.

In July, 1918, he was appointed assistant manager in charge of steel ship construction on the Pacific Coast for the United States Shipping Board Emergency Fleet Corporation, with headquarters at San Francisco.

When Mr. J. H. Rosseter was appointed director of operations he recognized that one of the greatest problems before him in the successful operation of the enormous Shipping Board fleet was proper control of maintenance and repairs, and in the selection of the man best qualified for this work he chose Mr. Hague, who went to Washington in October, 1918, when he assumed position as manager of the construction and repair department, division of operations of the United States Shipping Board Emergency Fleet Corporation.

The rapidity with which Hague built up and created, amid the almost chaotic conditions existing at that time, an efficient organization with representation at the principal ports throughout the United States to handle this work stands as a practical demonstration of his remarkable ability as an organizer in addition to his technical qualifications.

Through his field forces he instituted an immediate survey of the tonnage then under construction for the board, as a result of which innumerable alterations and changes, based upon practical experience, were made, which resulted in more economical and satisfactory operation of these ships. Furthermore, to prevent the prevailing tendency to deliver vessels before they were completed and in a seaworthy condition he instituted a method of trial trips which immediately resulted in a much higher standard of workmanship, and facilitated the subsequent operation of this tonnage.

In May, 1919, his department assumed complete control and supervision over repairs to all Shipping Board vessels. It was upon Hague's recommendation that the board at that time abolished the cost plus system of performing repairs which had proven most pernicious and wasteful, and adopted instead the commercial practice of having work performed on competitive bids or a commercial rate basis.

In the fall of 1919, when the ex-enemy tonnage was turned back to the Shipping Board from the Army and Navy, the responsibility for reconditioning of this fleet for passenger service was entrusted to Hague. This included the preparation of plans and specifications for the reconditioning of the steamship Leviathan, which represents probably the largest reconditioning and repair job in history and one of the biggest problems ever presented to American shipping. No plans of the ships were available, and the extortionate demand of the German builders of the ship of a million dollars for same was declined. Therefore it was necessary to first make complete plans of the ship in her original condition and then plans and specifications for the reconditioning, including conversion to an oil burner, which were completed within five and one-half months from the time the vessel was turned over to the Shipping Board, and submitted to contractors for competitive bidding.

In March, 1920, Chairman Payne requested Hague to take charge of construction in addition to supervision of repairs and the reconditioning of the ex-enemy tonnage. As a result of this action the repair department of the division of operations and former construction division were consolidated to form the division of construction and repairs, of which Hague was appointed director, which position he occupied until July 1, 1920, when he resigned from the board. He had the distinction of receiving the highest salary ever paid by the Shipping Board to any of its officials.

Clear-sighted vision and rare judgment soon won for Hague the confidence of the board and other officials of the corporation; consequently there was probably no one individual who exercised a more potent influence in the formulation of Shipping Board policies during his association with the board.

The splendid results which were accomplished in spite of the handicaps which invariably follow governmental activities are well known to all those in the shipping world.

Conspicuous among these should be mentioned the adoption of an electric propulsion in merchant vessels and the unique features in passenger ship accommodations, both of which mark a new epoch of progress in shipping.

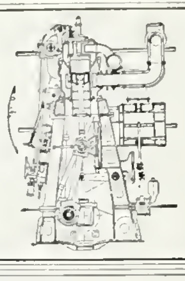
When the problem of substitution of suitable motive power for a large number of Shipping Board vessels built during war emergency and equipped with turbine reduction gears was being considered, it was as the result of Hague's recommendations based upon his recognition of the advantages and practicability of such propulsion that the board determined to equip twelve of these vessels between 11,000 to 12,000 deadweight tons with the electric drive. These constitute the first electrically-driven merchant vessels. The successful performance of the steamship Eclipse, the first of these ships, recently placed in operation, has demonstrated definitely the practicability of this type of marine propulsion.

The ocean traveling public will long have occasion to appreciate the pleasure and comfort afforded by the many features which Hague has embraced in the design for passenger vessels reconstructed under his direction as well as for new vessels built for the board. For instance, the substitution of individual brass beds for the old-fashioned built-in berths, a private bath or shower with every room, small dining tables in lieu of the customary large type and other novel features in interior design and decoration which is marked with the simplicity of good taste, will make these ships seem more like floating hotels of the most modern type, and remove from ocean travel the distaste which many have for the old conventional passenger ships.

In addition, as a result of careful analysis undertaken, a definite recommendation was made by Hague to the Shipping Board in connection with the preparation of plans and specifications covering vessels ranging from 10,000 to 15,000 deadweight tons which it was anticipated might be constructed to balance the Shipping Board fleet, that an equal number of 10,000-ton ships should be equipped with Diesel engines and with reciprocating engines and Scotch boilers, respectively. These vessels to be, with this exception, in every particular identical, in order that a fair comparison could be made of the relative merits of the internal combustion engines and the well tried out propulsion.

Upon termination of service with the Shipping Board, there were many rumors current of Mr. Hague assuming control of various large shipping enterprises in the United States, but his return to the Standard Oil service was no surprise to his friends.

Oil Engines and Motorships



MOTOR SHIPBUILDING IN AMERICA

THE interest of the proponents of Diesel engine marine propulsion in the United States is centered at the present time on two notable motorships building on the Pacific Coast and on the recent very excellent performance of a third Pacific Coast motorship tanker, the Charlie Watson, the details of which are given in abstracts from the captain's and engineer's logs at the close of this article.

The two motorships under construction are the Kennecott, building for the Alaska Steamship Company at the Tacoma yard of the Todd Dry Dock & Construction Corporation, and the H. T. Harper, building for the Standard Oil Company of California at the Oakland yard of the Moore Shipbuilding Company.

The Kennecott will be an all-steel hull built to Lloyd's one hundred A-1 classification, with an over-all length of 360 feet, a beam molded of 49 feet 6 inches, a depth molded of 26 feet 9 inches, and a loaded draft of 22 feet. She is to be fitted with tanks and storage in the double bottoms to provide space for 1500 barrels of fuel oil and 4500 barrels of cargo oil. This total of 6000 barrels will be sufficient at her estimated consumption to carry the vessel a distance of 26,000 miles. She is engined with two McIntosh & Seymour four-cycle direct - reversible marine Diesel engines, each having six cylinders and developing 1200 I. H. P. at 140 R. P. M. Sectional bronze propellers are to be used and are designed to develop a speed of eleven knots or better at the capacity of the main engines. No steam whatever will be used on this vessel. All auxiliary machinery and equipment will be electrically operated with energy developed by two 100 horsepower McIntosh & Seymour engines direct connected to d-c generators. The hull is being constructed on the Isherwood longitudinal system with four cargo holds and three between-deck spaces. There will be two masts and two derrick posts fitted with eight booms of a capacity up to ten tons each, and one special boom designed for lifting thirty tons. Four large cargo hatches are arranged for, 18 feet wide by 28 feet long. The main engines are set about two-thirds aft, and one notable feature about the engine room of this motorship will be the free and open space on her engine room platforms. The entire engine room and engines will be finished in white enamel, and the conduits for electric wiring and the oil and water piping will be colored in the manner customary in the United States Navy. No expense or care is being spared to make the electric end of this job perfect, and it is expected that the Kennecott will be the most perfect motorship yet produced in America. Pacific Marine Review expects very shortly to publish pictures and complete detailed plans of this notable vessel.

The H. T. Harper is a steel tanker 342 feet long over-all, 46 feet beam, and 27 feet molded depth, with a deadweight carrying capacity of 5010 tons and 21 foot 6 inch draft. She is built on the transverse system of framing with engines aft, seven deep tanks amidships, with pump room forward of No. 1 tank, cargo holds between decks forward of the pump room with a deep tank for fuel oil just aft of the forepeak, and the double bottom under the engine room used as a fuel oil tank. She is being powered with two 1100 I. H. P. Skandia-Pacific Werkspoor direct - reversible marine Diesel engines built by the Skandia-Pacific Oil Engine Company at Oakland, California. These engines will drive the hull loaded at a speed of eleven knots. Power for auxiliaries, which are all electrically driven, will be generated by two 200 B. H. P. and one 150 B. H. P. Dow four-cycle Diesel engines direct connected to General Electric d-c 250-volt generators.

A new ship-owning company has recently been organized in New York, known as the Emerald Motorship Company, and the directors are now inviting tenders for a Diesel driven tanker. Word comes from the New London Ship & Engine Company that twelve of their 700 B. H. P. Nelseco Diesel engines are being installed in six submarines now under construction at Cartagena for the Spanish government.

In our first paragraph we referred to the experience of the Charlie Watson. The storms mentioned in the following extracts from her log were among the most severe that have been experienced on the Pacific Coast for many years. The storm alluded to on the southern trip, in which the wind is said in the log to have reached a velocity of one hundred miles per hour, is the same storm which devastated a large area of virgin forests along the coast near the mouth of the Columbia River. The instrument tower at the weather bureau station at North Head at the mouth of the Columbia was blown down during this storm, and it is said that the recorded velocity of the wind at the time of the destruction of the tower was one hundred and thirty-two miles per hour, the estimated highest velocity being around one hundred and fifty. The weather recorders at this northwest station claimed that the wind was the highest which had been recorded at any weather station on continental United States during the history of the weather bureau, so that it may very fairly be stated that this storm was really a severe test for ship and engines.

It will be noted, too, by all of those who are familiar with maneuvering of main engines that the captain of the Charlie Watson, as judged by the recorded signals to the engine room, was simply trying out these Diesels to see what they could do; in fact, he has been pursuing that policy ever since the ship has been in operation, and he evidently has become thoroughly converted to the Diesel idea. However, the log had best be left to tell its own story.

Comparison Between Logs of a Diesel Motor Tanker and a Steam Tanker Operating on Pacific Coast

Herewith we submit two abstracts from the log of the tank motorship Charlie Watson, together with a few notes of comparison with the steam tanker Atlas, both owned by the Standard Oil Co. (California). These log abstracts are in the form of letters to the manager of the Marine Department, and are submitted verbatim.

Voyage commenced on leaving the Union construction yard, Oakland, where the Charlie Watson had been sent for installation of additional lifeboat capacity.

The bell signals leaving the Union Construction Company pier for Point Richmond, the loading point, were as follows:

January 10, 1921

Leaving Union Construction Co.

		Engines
8:31	Stand by	
8:27	Half ahead	—Port
8:28	Stop	—Port
8:48	Half ahead	—Both
8:50	Full ahead	—Both

Arriving at Richmond

9:35	Stand by	—Port
9:40	Stop	—Port
9:41	Stop	—Stbd.
9:43	Full astern	—Stbd.
9:43	Stop	—Stbd.
9:46	Slow ahead	—Port
9:47	Slow astern; half astern	—Stbd.
9:48	Full astern	—Stbd.
9:48	Stop	—Port
9:48	Stop	—Stbd.
9:49	Slow ahead	—Stbd.
9:50	Full astern	—Stbd.
9:51	Half ahead	—Stbd.
9:52	Full astern	—Stbd.
9:52	Stop	—Stbd.
9:56	Finished	

All of the foregoing signals were answered without delay; truly a remarkable test.

The log abstract from the master's book reads as follows:

January 20-31, 1921

January 20, 5:55 P. M.—Left Long Wharf, Richmond; mean draft 18 feet. After rounding Pt. Reyes, encountered northwesterly gale with large head sea and swell.

January 21, 6:45 A. M.—Off Pt. Arena: Slowed down five revolutions on main engines account shipping heavy seas over bow. This weather continued to Cape Mendocino. Although slowed down, vessel made distance from Pt. Reyes to Cape Mendocino, 163 miles, in 19 hours 21 minutes, an average of 8.4 knots per hour.

January 22—Weather moderated and at 3 A. M. came up to our regular speed. From Mendocino to Cape Blanco, with fresh northwest wind and moderate head sea, a speed of 9.1 was maintained. At Cape Blanco overtook Union oil tanker S. S. Lyman Stewart, bound for Vancouver, and passed in at Cape Flattery four hours ahead of her. From Cape Blanco to Cape Flattery, with moderate to strong southeast wind, averaged 10.4 knots per hour.

January 24, 6:10 A. M.—Arrived at Pt. Wells, steaming time, 84 hours 34 minutes. Average speed of passage 9.4 knots per hour. Delivered according to shore gauges: 531,996 gals. (12,666 bbls.), at 42, Pearl Oil; 52,931 gals. (1260 bbls.), at 42, Zerolene. Total: 584, 927 gals. (13,926 bbls.), at 42, bulk cargo. Also, approx. 35 tons package freight. Discharging time: Pearl Oil, 11 h. 36m.; Zerolene, 5h. 30 m.

January 26, 5:55 P. M.—Left Seattle for Richmond.

January 28—Encountered whole southeast gale and tremendous head seas; forced to heave vessel to, as gale increased to approximately 100 miles per hour. Main engines turning 138 revolutions per minute for 25 hours. Vessel rode out gale, shipping comparatively little water.

January 29, 1 P. M.—Gale shifted to southwest, weather moderating. As soon as weather conditions allowed, engines were brought back to normal speed; at midnight back to 165 revolutions per minute.

January 31—Arrived at Long Wharf, Richmond, Cal. Time on passage, 105 hours 24 minutes. Hove to in southeast gale, 25 hours. Average speed for passage, 7.7 knots per hour.

Note—Total time on voyage, 10 days, 9 hours, 45 minutes. Detention account repairs to windlass and winches, 45 hours. The vessel, after being through practically every gale this winter, has proved to be an exceptionally fine sea boat, either loaded or in ballast. The main engines have worked very reliably, even under the worst weather conditions, and since leaving the shipyard January 10, have been very satisfactory in maneuvering. Electric steering gear and telemotor are working satisfactorily. Electric galley equipment is in perfect order. The new air whistle is very efficient. Although made to operate on 100 lbs. pressure, gives good service at 50 lbs. pressure and uses, according to engineer's report, very little air. Since alterations were made on rudder the vessel answers the helm promptly. With main engines stopped and barely any headway, vessel will answer helm, which is rarely the case with a loaded tanker. At full speed ahead, vessel can be kept from three to five degrees on either side of the course.

Report of Engineroom Signals, Voyage No. 5—January 20, 1921, Leaving Richmond Long Wharf

Port Engine	Starboard Engine
5:30 P.M.—Stand by	5:30 P.M.—Stand by
5:32 Half ahead	5:34 —Full astern
5:34 —Stop	5:36 —Stop
5:35 —Full ahead	5:37 Full ahead

January 24—Arriving at Pt. Wells, Docking

5:46 A.M.—Stand by	5:46 A.M. Stand by
5:48 —Slow	5:48 —Slow
5:51 —Stop	5:51 Stop
6:17 —Finish	6:17 —Finish

January 25—Leaving Point Wells, Wash.

5:52 A.M.—Stand by	5:52 A.M.—Stand by
5:55 —Full ahead	5:55 —Full ahead

January 25—Docking at Todd's Shipyard, Seattle

7:03 A.M. Stand by	7:03 A.M.—Stand by
7:12 —Slow	7:12 —Slow
7:13 —Stop	7:19 —Slow ahead
7:18 —Full astern	7:18 Full astern
7:19 —Stop	7:20 —Stop
7:24 —Full astern	7:38 —Finish
7:25 —Slow astern	
7:26 —Stop	
7:29 —Full astern	
7:30 —Stop	
7:38 Finish	

January 26—Leaving Todd's Shipyard, Seattle

5:54 P.M.—Stand by	5:54 A.M.—Stand by
5:55 —Full astern	5:55 —Full astern
5:58 —Stop	6:00 —Stop
5:59 —Full astern	6:02 —Full ahead
6:06 —Stop	6:06 —Slow ahead
6:22 Full ahead	6:23 —Full ahead

January 31—Docking at Long Wharf, Richmond

2:52 A.M. Stand by	2:52 A.M.—Stand by
3:17 —Slow	3:17 —Slow
3:19 —Stop	3:19 Stop
3:24 —Half ahead	3:34 —Half astern
3:25 —Stop	3:35 —Stop
3:30 —Half ahead	3:41 —Finish
3:31 —Stop	
3:41 —Finish	

It will be noticed that in this abstract are given all the various signals used from the time the vessel left Richmond wharf until the return to that point. The chief engineer's report, which follows, contains various items pertaining to the ship's operation in general.

Chief Engineer's Report

The motorship Charlie Watson sailed from Pt. Richmond, Cal., Thursday, January 20, 5:51 P. M. In leaving dock, four signals were answered on the port main engine and three on the starboard engine with ease and dispatch. Average revolutions up to midnight per minute, 166; speed of vessel, 10.6 knots per hour. Conditions below good.

January 21—This day's run was made against heavy seas and head winds. Engines were slowed down to 160 revolutions per minute during the greater part of this day, average speed 8.7 knots. No trouble of any kind below. Cooling water for the ice machine required constant attention while in operation, as it would splash out of tank at each heavy roll of vessel. Tank has splash plates installed at this time, and no further trouble from that source has developed.

January 22 — Weather conditions much better, and main engines were brought up to speed and an average of 166 R. P. M. was maintained throughout the twenty-four hours, giving a speed of 10.1 knots per hour. Repairs were made during the day as follows: A new leather distance piece fitted in between flanged coupling on starboard cir. pump to take up excessive lateral motion; a new valve cap fitted to after cylinder of rix air compressor and valves ground in; changed reducing valve on air tank to whistle from 150 lbs. square inch to 100 lbs. square inch.

January 23—Average speed this day was 10.4 knots, and 166 R. P. M.; conditions below, good.

January 24—Stand by for Pt. Wells at 5:46 A. M. Landing made with only two bells given. Machinery below in good shape and outside of general engine room work we are ready for return trip. Time of passage, 83 hours 57 minutes. While at Pt. Wells discharging cargo found anchor windlass and winches out of running condition. Electric motor damaged by salt water getting inside of casings.

January 25—Sailed Pt. Wells for Todd's drydock, Seattle, at 5:55 A. M.; arrived at drydock and fast alongside of steam schooner Forest King at 7:38 A. M. Engines responded to signals without any trouble.

January 26—Sailed Seattle 6 P. M. In leaving drydock there was no chance to warm up engines and try out, as we were fast alongside steam schooner. Main engines handled well, and had both engines full ahead twelve minutes when a high pressure gasket on fuel block, port engine, started blowing through. Called up captain and asked if vessel was in "the clear"; being so, port engine was stopped and starboard engine put on slow bell until gasket was renewed, which took twelve minutes. All okeh the rest of the day.

January 27—Operation below good, and for the first 18 hours out vessel averaged a speed of 10.2 knots at 166 R. P. M. of main engines.

January 28—Strong head winds with seas getting larger, gradually lowering revolutions of engines to prevent racing, and at 11 A. M. set engines at an average of 138 R. P. M. throughout the rest of the day. Southeast gale increasing, operation below good.

January 29—Southeast gale still on, and seas increasing; vessel shipping considerable water. Everything below standing the weather well. Toward midnight wind and sea moderating, brought main engines up to 160 R. P. M.; only made 90 miles last 24 hours; average speed 3.75 knots per hour.

January 30—Seas still heavy and revolutions per minute of main engines were kept at from 160 to 162; average speed 8.8. knots. All okeh below.

January 31—Arrived at Pt. Richmond 3:17 A. M. Vessel was docked with few bells. Voyage No. 5 completed.

No special repairs to main engines or auxiliaries except two new valve caps for Rix air compressor and Skandia Engine Works changed indicator cocks on main engines.

Time of Passage—Point Richmond-Seattle, 84 hours 34 minutes.

Time of Passage—Point Wells-Point Richmond, 105 hours 19 minutes.

Fuel used round voyage: Main engines, total, 13,283 gallons.

As will be noted from the above report, the fuel oil consumption per day of the motorship Charlie Watson is forty barrels, and as the vessel passed through various storms and heavy weather and still made exceptional speed, it may well be called a good 10 1-2-knot boat on such a daily consumption.

In comparison, we quote below extracts from the log of the steamship Atlas, which vessel has regular Scotch boilers and triple expansion engine:

Steamship Atlas, Voyage No. 482—San Pedro, Cal., to Seattle, Wash.: Average fuel consumption per day, 136 bbls.; average speed, 10 knots. Weather smooth and calm.

Steamship Atlas, Voyage No. 483—San Pedro, Cal., to Seattle, Wash.: Average fuel consumption per day, 145.44 bbls.; average speed, 10.6 knots. Weather smooth.

The motorship Charlie Watson and the steamship Atlas compare very closely in size and speed, and for that reason the above comparison is interesting. The indicated horsepower of the steamer Atlas on the above voyages was 1460 and that of the motorship Charlie Watson 1200.

Pertaining to stopages at sea for minor repairs, quoted below are remarks from engineer's log of a new 10,000-ton steam tank vessel which recently left the yard of the builder on its first voyage—San Francisco to Philadelphia:

Richmond, Cal.

December 23—8 A. M., steering engine control valve stuck due to sand and chips in same; 2:30 P. M., all cleared and in working order; 2:56 P. M., departed; 5:08 P. M., anchored off San Francisco.

December 24—7:54 A. M., departed; 9:45 A. M., let pilot off, detention 11 minutes.

December 26—5:28 P. M., stopped account IP relief valve leaking due to chips and sand, detention 38 minutes; air pump rod scored due to dirty packing, etc.

December 27—2:15 P. M., stopped account LP ahead slipper gibs coming apart, detention 5 minutes.

January 2—5:55 P. M., stopped account HP bottom cylinder joint leaking, detention 40 minutes.

January 4—7:50 A. M., joint blew out of ammonia discharge.

Panama Canal

January 6—Installed retarders in boilers, blew tubes, filled double bottoms with water from Gatun Lake; starboard and center boilers 25 grains per gal. chlorine; port boiler, 35 grains chlorine per gal.

January 9—12:39 A. M., stopped to repair oil feed pipe to IP aft side crank pin, detention 15 minutes; 11:30 A. M., top stud broken off from HP aft side gib.

January 13—7:30 P. M., aft side HP slipper gib came adrift.

January 14—3:31 P. M., arrived off Overfall lightship, anchored account heavy rain squalls and mist, detention 6 hours 42 minutes; 9:50 P. M., departed L. stand by. Various bells from Overfall L. to anchorage off Delaware breakwater waiting for pilot; detention 11 hours 16 minutes.

January 15—10:38 A. M., pilot aboard; 4:41 P. M., picked up doctor, detention 9 minutes; going up river, detention 1 minute.

The comparison of minor annoyances at sea causing complete stops of motive power appear to be greatly in favor of the Diesel motor-driven vessel.

Dutch Launching

Werf Gusto, Firma A. F. Smulders, Schiedam, Holland, have launched the steel cargo steamer Vechtdyk, built for Messrs. Solleveld, vander Meer & T. H. van Hattum's Steamship Company, Rotterdam. She is the third of four vessels of the same type under construction for the same firm; is of the shelterdeck type and has a carrying capacity of about 6500 tons deadweight.

The propelling machinery consists of triple-expansion condensing engines of about 1800 I. H. P. which give the vessel a speed of about 10 knots. Steam is supplied by three single ended return tube boilers of about 5450 square feet heating surface and a working pressure of 180 pounds.

THE DOUBLE ACTING DIESEL ENGINE

By A. P. CHALKLEY

SO far as any practical results are concerned, all the useful work in connection with the development of the double-acting Diesel engine has been carried out in Germany. Some nine or ten years ago the M. A. N. Company of Nuremberg built large horizontal double-acting Diesel motors of the four-cycle type and in 1912 this firm, as well as Krupps and Blohm and Voss, the well known Hamburg shipbuilders, constructed experimental engines of this class. Many difficulties were experienced, and with the three-cylinder set of 6000 horsepower which was erected at the M. A. N. works, an unfortunate accident occurred, attended by fatal results, which put back progress in double-acting Diesel engines for a considerable period. At Krupps a three-cylinder double-acting motor of their own design was completed developing 6000 horsepower, and it is stated that during the war a six-cylinder engine was built of 12,000 horsepower, but this has been dismantled.

It was the intention of Blohm and Voss to standardize double-acting engines for installation in large vessels, and after a prolonged series of trials they built a vessel in which two engines of their construction, but of M. A. N. design, were installed. This vessel was not destined to be completed before war broke out, although very little work had to be done, and when peace was concluded she was handed over to the British authorities with many other ships.

Whatever may be the future of the double-acting engine, it is significant that all British engineers who have had to run this vessel admit that the operation of the engines leaves little to be desired. Having been built in 1914, they are in many respects up to date, but it is probable that the general design will be continued in the new double-acting engine which will be built by the same manufacturers.

The three most important points in the design of a double-acting engine are, first, the method employed for the admission of scavenging air; secondly, the means adopted for injecting the fuel into the bottom of the cylinder; and thirdly, the construction of the gland through which the piston rod passes. In regard to scavenging, either valves may be utilized or ports adopted, and while in the engine built by Blohm and Voss, two scavenging valves were fitted both top and bottom, it is understool that Krupps, after experimenting with this design, abandoned it in favor of port scavenging, while a British double-acting Diesel engine which will be described later and which is now being developed, also uses ports instead of valves.

The presence of the piston rod in the lower half of the cylinder naturally prevents the admission of the fuel at the most suitable point, namely, the center, and in the Blohm and Voss engine, in order to give regularity of combustion, there are two fuel valves not directly opposite each other, but at an angle so that the fuel oil from one atomizer is admitted on one side of the piston rod and that from the other on the opposite side. In the British engine the difficulty is overcome in another and perhaps more ingenious manner.

The adoption of scavenging valves in the Blohm and Voss engine naturally led to a good deal of complication. While the two valves at the top of the cylinder are arranged vertically, as in the normal two-cycle single-acting design, those at the bottom have to be horizontal, one on each side. In addition, there is a fuel valve on each side, also horizontal at the bottom of the cylinder, one fuel valve at the top of the cylinder, together with starting air valves both at the top and the bottom. For the operation of all these valves and for carrying out the necessary movements when reversing, there are no fewer than three camshafts. Two of these are on the same level at the bottom of the cylinder, but on opposite sides, the foremost operating one scavenging valve, one fuel valve and the starting valve, while the other actuates a fuel valve and a scavenging valve. The camshaft at the top is provided with cams for the movement of the three pairs of scavenging valves, the fuel valves and the starting valves. The arrangement can be seen by reference to the illustrations. Figure 1 (taken in the engine room of the motorship Assyrian) shows the method of drive for the three camshafts, the forward one of which which is seen. The vertical spindle in the center drives the top camshaft through bevel gearing. Figure 2 indicates the arrangement of

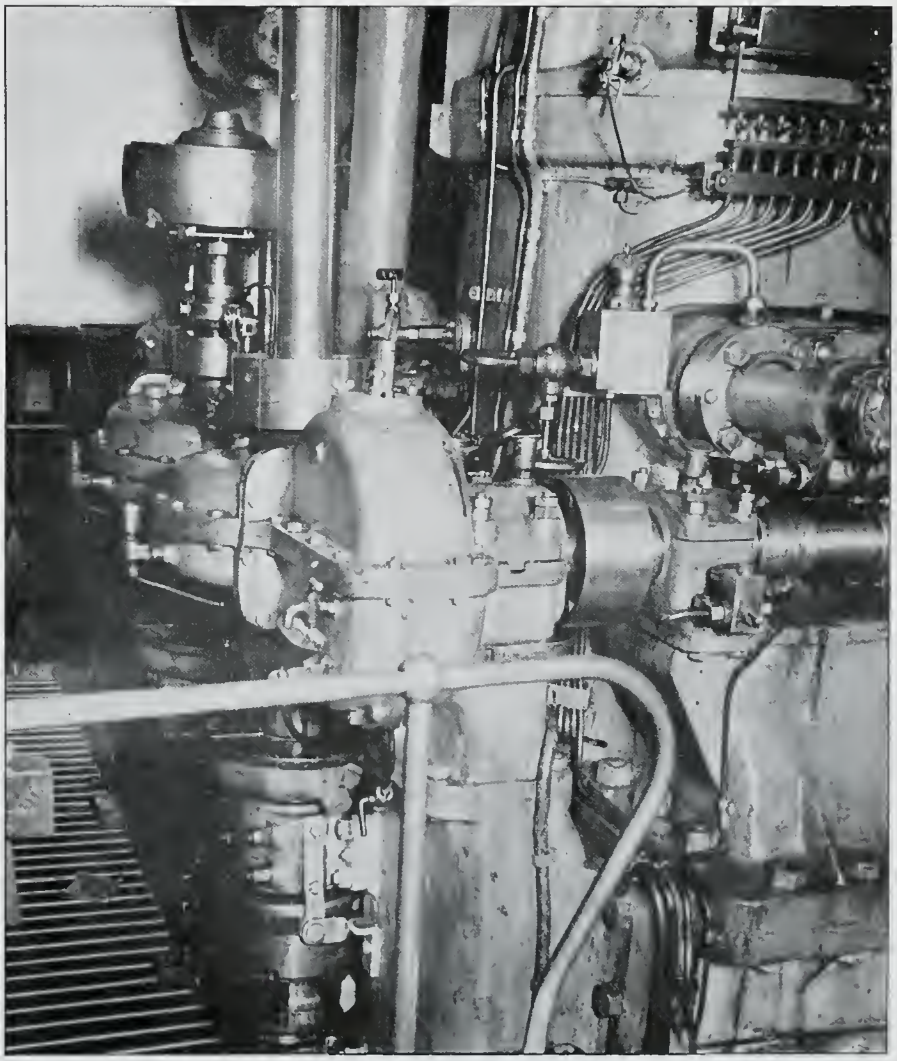


Figure 1. A view taken in the engine room of the motorship Assyrian, showing the method of driving the three camshafts as explained in the text

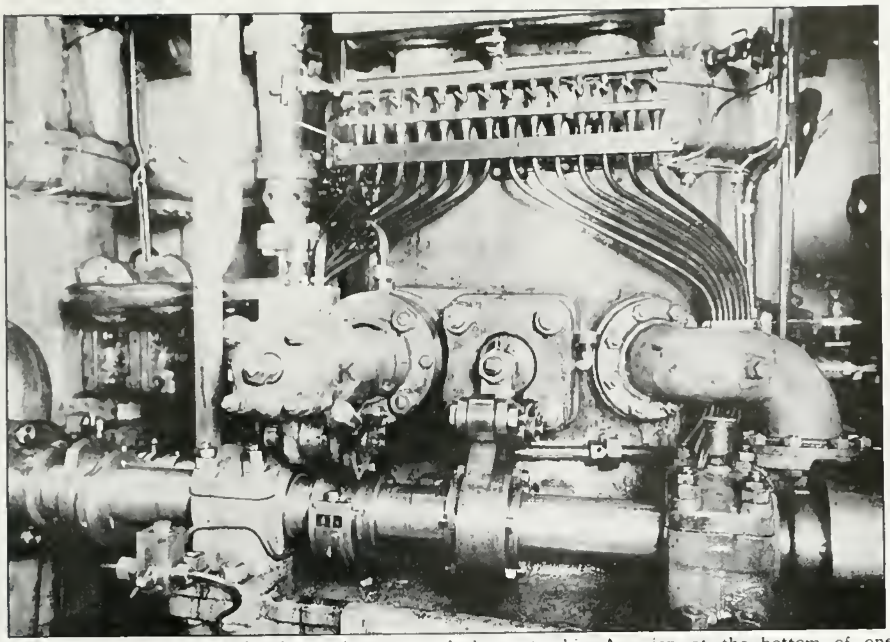


Figure 2. View taken in the engine room of the motorship Assyrian at the bottom of one cylinder, showing arrangement of scavenging and fuel valves

the valve at the bottom of the cylinder, the valve on the left being for fuel admission, while on the immediate right is one of the scavenging valves, both of these valves being operated from cams which will be seen on the camshaft below. The air valves are on the left of the fuel valves, being operated from the two small cams on the extreme left of the illustration. In each case, these starting valves do not open directly into the cylinders, but allow compressed air to be admitted to the cylinders through a small non-return valve. This is a system which has lately come into more general operation.

These engines are of the three-cylinder type, each designed to develop about 850 b. h. p., or approximately 1250 i. h. p. at 110 r. p. m. The cylinders have a diameter of 480 m.m. and stroke of 710 m.m., and it is one of the disadvantages of the double-acting engine that its fuel consumption is high, being not less than about .48 pounds per b. h. p. hour, against 0.4 with a four-cycle single-acting engine and 0.42 to 0.43 with a single-acting two-stroke type. Whether this marked difference can be diminished is questionable, but the high fuel consumption certainly discounts some of the advantages of lower cost of construction and this latter is in itself a dubious point.

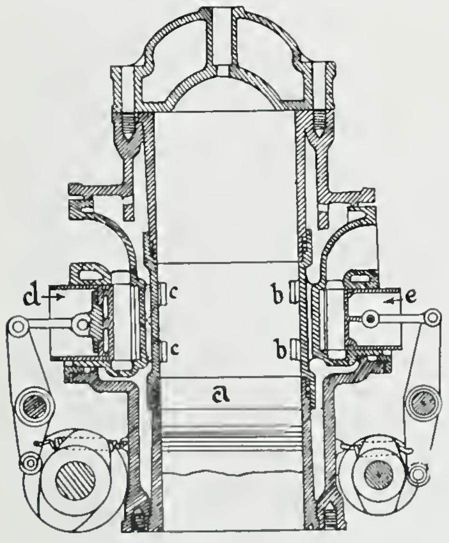


Figure 3. Section through the cylinder of the double-acting Diesel engine now being developed by the North British Diesel Engine Works. This view shows plainly the arrangement of scavenging.

In the double-acting Diesel engine which has been developed by the North British Diesel Engine Works, Glasgow, many novel features are included. In the first place, while the exhaust gases are discharged through ports in the center of the cylinder, exactly similar ports on the opposite side are used for the admission of the scavenging air. These ports have therefore to be controlled by valves and the scavenging air admission ports (b, Figure 3) are only open to the scavenging trunk when the valve (e), actuated by levers and a cam on a camshaft, is lifted. Similar arrangements are adopted in connection with the exhaust valves (c) controlled through the piston valves (d). When the piston (a), therefore, is approaching the bottom of its stroke, first the valve (d) is opened, allowing the exhaust gases to escape after which the valve (e) is moved, permitting scavenging air to enter the ports (b) to scavenge out the remaining exhaust gases and fill the cylinder with pure air for the next compression stroke.

Another patented feature in this engine is the piston which at the bottom is made to the same shape as the bottom cylinder cover. Fuel is admitted through **one** valve into a recess within the bottom half of the piston itself, which is thus actually the combustion chamber. By this means the necessity of providing two fuel valves is avoided, while at the same time allowing the fuel to be injected right into the center of the cylinder and thus avoiding uneven combustion.

A third novelty in the same engine has the object of improving scavenging at the end of the stroke so as to ensure that every particle of exhaust gases is discharged through the exhaust ports and the cylinder left full of pure air. This is of the utmost importance to obtain high efficiency and low fuel consumption and the system is adopted in conjunction with the method of scavenging which has just been referred to. The principle is illustrated in Figure 4. On the piston rod (a) at the bottom is the portion (b), which has a smaller diameter and which is enclosed in a sleeve (c) just above the crosshead (d). There are two series of ports (f) and (g) in this sleeve, the former communicating with the inside of the cylinder. The ports (g) coincide with the ports (q) in a sleeve (p) in the cylinder cover, so that communication is thus established with the annular chamber (l). At the end of the stroke, therefore, the scavenging air in the chamber (l) passes into the cylinder through the ports (g) and (f).

While it is natural that at the present time the chief concern of most engine builders is to construct commercial Diesel motors of known and proved types, nevertheless there is a certain amount of experimental work proceeding in connection with the development of double-acting machinery, and it is possible that further progress in this direction will shortly be made.

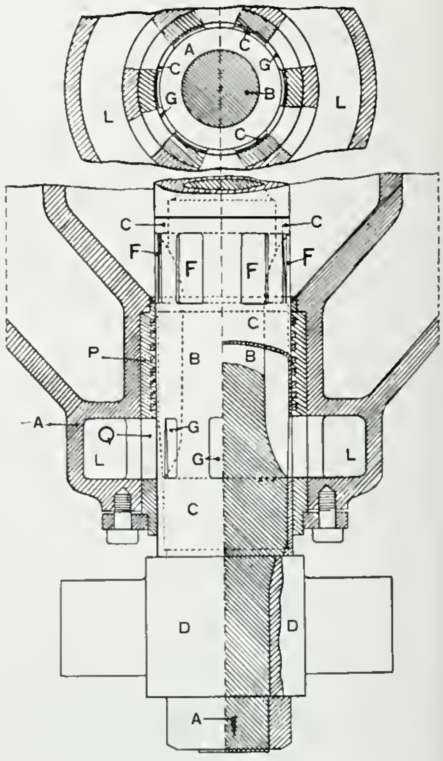


Figure 4. Sections showing the design of piston rod in the double-acting Diesel engine of the North British Diesel Engine Works.

MOTOR SHIPBUILDING IN EUROPE

IT has already been pointed out in these columns how completely some of the largest and oldest established British shipbuilding firms are now turning over from steam building to motorship construction, and instances in which this policy is being carried out in a wholehearted manner are afforded by the well-known Doxford and Harland & Wolff firms. It is interesting to note that Vickers are also tending to become a motorship rather than a steam shipbulding firm and they are spending a great deal of time and money in converting what were previously gunshops into factories for the production of large marine Diesel engines. Moreover, the whole of what was originally the submarine engine building department is now employed upon mercantile oil engine construction and there is not a single motor for installation in a submarine now on order. When it is realized that in the submarine engine shop, motors were turned out in hundreds of thousands of horsepower annually, it will be realized what possibilities of rapid production are opened out. Already there are seven testing beds suitable for testing engines up to 4000 or 5000 horsepower, and with the facilities now afforded Vickers are in a position to turn out at least fifty Diesel engines of 1000 horsepower and upwards every year.

This firm is now concentrating upon the construction of standardized four-cycle solid injection Diesel engines, the standard model being one of about 1600 i. h. p. It is realized, however, that the future demand will be for engines of larger power suitable for installation in single-screw vessels and designs are now being prepared for an engine of similar type with much larger cylinders capable of developing up to about 3000 horsepower. At the same time experiments are being carried out with an opposed piston two-cycle engine and it is not unlikely that the ultimate design upon which manufacture will be based on a large scale will be an opposed piston oil engine. This gives confirmation of the belief which is held in many quarters that, finally, even the manufacturers of four-cycle Diesel engines will have to change to the two-cycle type in view of the advantages which are offered by this latter design.

14,000—12 1-2—18

It is an indication of the progress which has been made in motor shipbuilding that 14,000-ton motor vessels are now being turned out regularly every two or three months without exciting any comment. Already four of these vessels have been launched for the Glen Line, forming part of a program of six craft of a similar size. One, the Glenogle, has just returned from her maiden voyage to China and back with complete success, and it was found that the average fuel consumption of this large vessel carrying 14,000 tons of cargo at 12½ knots was only about 18 tons of oil per day. If this is compared with a steamer it will be found that a coal-fired steamship needs approximately 80 tons for the same work, while an oil-fired steamer will use between 45 and 50 tons of oil fuel. The saving effected is nothing short of enormous, especially when it is remembered that owing to the existing contracts of the Glen Line, fuel oil is obtained at an average price which scarcely exceeds that of coal. At a time when many steamers are being laid up, this economy of the motorship is attracting more attention than was the case a year or two back, when freights were so high that running costs were not of such vital importance.

The First Motor Passenger Liner Launched

The second 14,000-tonner, the Glenapp, has started on her maiden voyage; the third, the Glengarry, was launched about two months ago and will be completed within the course of the next few weeks; while the fourth, the Glenbeg, was launched in January. Another launch of great importance on the Clyde was that of the Magvana, the first motor passenger vessel built for the British India Steam Navigation Company, and is one of four sister ships for the same firm. There is scarcely any doubt that the motor passenger liner is going to be a great success both from the standpoint of the shipowner and the passenger. All those who have traveled on motor cargo boats which are usually fitted with accommodation for a few passengers agree in stating that the comfort is in excess of that which can be expected on any ordinary steamer owing to the absence of smoke, vibration and noise. This question of the utilization of oil engines in large passenger liners is causing a great deal of discussion and by the end of the year there should be at least half a dozen such craft in regular service.

The three which are being built for the Italian Transatlantic Company for service between Genoa and New York are well under way, and although these will not be high-speed vessels they will have accommodation for 350 passengers and may reasonably come in the category of passenger liners. In these vessels two-cycle machinery of 6000 horsepower will be installed, built by the Ansaldo San Giorgio Company, who, in addition, have under construction five cargo motorships to be equipped with the same class of machinery.

182 Motorships Building

Perhaps the best indication of the present state of motorship progress in Europe can be given from the figures recently published concerning the number of vessels actually under construction, excluding those for which orders have been placed but for which the hulls have not been laid down. These are official figures and show that at present in Europe there are 182 motorships being built with a gross tonnage of 429,000. This is equivalent to 700,000 tons deadweight carrying capacity and probably these figures represent not more than two-thirds the total number of vessels that have act-

Swedish motorship Finn, 3000 deadweight tons capacity

ually been contracted for. They will all, or practically all, be completed by the end of the year, so that there will, by that time, be an enormous increase in the world's merchant motorship shipping fleet.

It is extremely interesting to analyze the figures from the standpoint of the countries and district in which they are being constructed. On the Clyde alone there are no fewer than twenty-two motorships in course of completion, totaling about 220,000 tons d. w. c., and this represents a record for any one district. In Italy there are forty-nine motorships being built, but the deadweight carrying capacity is only about 85,000 and the majority of these vessels are wooden craft of 2000 tons and under. In Denmark there are twenty motorships being built of about 80,000 tons and at least another thirty which have not yet been laid down but will be as soon as berths are vacant. The total in Great Britain alone is fifty-seven ships with a deadweight carrying capacity of approximately 350,000 tons.

These figures should be sufficient to convince the most sceptical that the motorship is really making rapid progress and a more significant fact is that many inquiries are now being received by shipbuilders for quotations for the conversion of existing steamers to motor vessels. At present it must be admitted that the quotations are somewhat high and that shipowners are hesitating to carry out such conversions. There is little doubt, however, that within the course of the next year or two the problem will be seriously tackled, and it will not be surprising to find a large proportion of the British mercantile fleet converted to motor vessels, especially during the coming slump period, when many steamers will undoubtedly have to be laid up. It is noteworthy that shipbuilders and engine manufacturers are anticipating this state of affairs arising by standardizing types of motor that shall be eminently adapted for installation in existing steamers without any modifications to the stern gear.

Long Stroke Diesel Engines

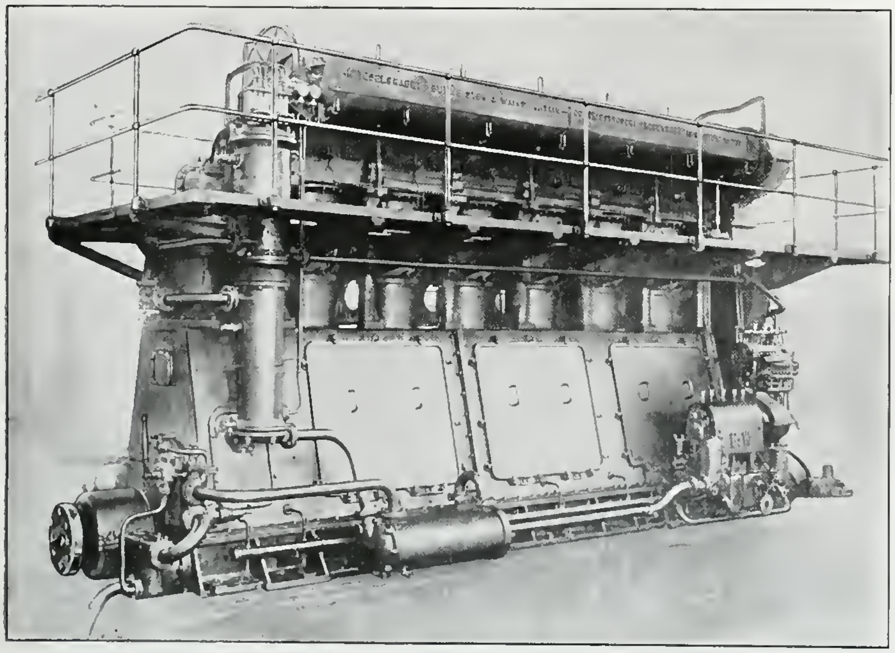
Burmeister & Wain have turned their attention to the problem and have developed a long stroke engine of their well-known design which runs at relatively low speed. They are also making this engine for low powers for installation in vessels of about 1000 to 3000 tons and such an engine was recently installed in a new 1000-ton vessel, the Fritzoe, that has just been put into commission. The engine is interesting as showing the trend of design for Diesel motors intended for use in existing steamships in place of the steam machinery. It is, of course, desirable to make such an engine as self-contained as possible and in this new Burmeister & Wain motor, of which an illustration is given, various pumps are driven directly off the engine, including the daily service pump for the fuel oil, a bilge pump and a circulating water pump.

These relatively small motorships are becoming increasingly popular, especially among Scandinavian owners for coastal trade and also for service between various European ports. Two vessels of 3000 tons d. w. c. have just been built in Sweden and one of these, the Finn, is illustrated. They are found to be a particularly economical class of vessel for such service and the machinery installation has some points of unusual interest. In the Finn and her sister ship, two 500 b. h. p. Diesel sets are installed of the Polar two-cycle type. The design of this engine has recently been modified to incorporate some of the more recent improvements. It is eminently adapted for relatively low powers (not above 750 b. h. p.) and is remarkable for the method employed for starting.

The 500 horsepower engine consists of four working cylinders and two maneuvering cylinders in line with the working cylinders. In the ordinary course of operation one of these maneuvering cylinders serves as a scavenging pump supplying the scavenging air. The other cylinder acts as the low-pressure stage of the injection air compressor, the high and intermediate pressure cylinders being separate and forming a two-stage air compressor driven off the crankshaft. The virtue of the arrangement lies in the fact that for starting purposes both maneuvering cylinders are used and compressed air is supplied to them. This is effected by the employment of a simple change over valve and it is thus unnecessary to admit cold starting air to the top of the working cylinders when maneuvering—a frequent source of trouble. It is perhaps somewhat surprising that this engine has not found wider adoption, for it is one of the simplest to operate, having no valves in the cylinder cover except the fuel valves, and scavenging is effected by means of ports at the bottom of the cylinder.

There still remain a few, but very few, large shipbuilding firms in Great Britain who have not taken up the construction of Diesel engines. Their number is steadily diminishing and the last concern which found it was impossible to keep out of this new movement is the Wallsend Slipway & Engineering Company, the builders of the machinery of the Mauretania and a large number of other Cunard vessels, having an output of steam plant probably as great as any other marine engineering firm. They have decided to adopt the Sulzer engine which is now built under license by no fewer than four British firms—namely, Armstrong, Whitworths, Denny Brothers, and Alexander Stephen & Son—in addition to the Wallsend Slipway & Engineering Company.

There are now altogether twenty builders of marine Diesel machinery in Great Britain and a number of them have taken up the problem in a very active manner and have not merely purchased licenses to meet emergencies. The feeling was never so strong as it is now that the motorship will be the type of vessel most in demand in the future and no shipbuilder is able to neglect its possibilities. The writer was



New Burmeister & Wain type long stroke Diesel engine, especially adapted for conversion of steamers to motorships. This engine has circulating water pump, daily service pump for fuel oil, and bilge pump incorporated in its design told by one of the best known shipbuilding firms in Great Britain a short time ago that they have tendered during the past year for Diesel machinery of no less than 200,000 horsepower and that, although a great many orders were in abeyance for the time being owing to the present difficult circumstances, nevertheless when shipowners start ordering ships again they will undoubtedly demand motor vessels and not steamers.

An Oil Turbine

One of the surprises of the last month has been the construction of an oil turbine in Germany of the Holzwarth type by the well-known Thyssen Works. It was known that a good deal of experimental work was being carried out, but the completion of a finished turbine of a standard type which is now being sold as an ordinary commercial product came somewhat as a surprise. The first set is one of 500 horsepower, but it is stated that other oil turbines of 3000 horsepower are under construction. Holzwarth appears to have been able to raise the compression in this turbine as compared with the first experimental type, but, even so, the compression pressure is low, while the temperature of the cycle is also low. The result is that this machine can hardly claim to have the efficiency of a Diesel engine, but at the same time, when further progress has been made in metallurgical research, and it is possible to manufacture blades which will stand a very high temperature, it is quite likely that the turbine will be capable of operation under much the same conditions as a Diesel engine and give the same low fuel consumption. In the turbine which has just been built, the oil is sprayed in through a series of atomizers arranged circumferentially around the turbine casing, into the compressed air. With the low temperature of compression the heat is not sufficient to ignite the oil spontaneously and electric ignition has to be adopted. The Germans hope for great things from this turbine and a large amount of money is to be expended in its development, especially for marine work. Incidentally it may be added that motorships are now being built in Germany and an 8000-ton vessel, the Vistula, will shortly be completed at Kiel fitted with Sulzer Diesel engines.

MARINE PROPULSION MACHINERY

By W. E. THAU

General Engineer of the Westinghouse Electric and Manufacturing Company

At the joint meeting of the New York Section of the American Institute of Electrical Engineers and the Metropolitan Section of the American Society of Mechanical Engineers held in New York, January 28, 1921, W. E. Thau, general engineer of the Westinghouse Electric and Manufacturing Company, delivered a very interesting address on the electric propulsion of ships, which was largely composed of a description and discussion of the propelling machinery of the U. S. S. Tennessee. In Mr. Thau's introduction to the discussion of electric propulsion of ships he gives a very fine condensed account of the various types and arrangements of propulsion plants, which have so far been applied in the merchant marine. We herewith quote this introduction in full:

It is believed to be generally recognized by those who have made a broad study of the situation that the type of drive best suited to a given ship depends upon the characteristics of the ship, its trade route, and the cargo to be carried. These factors are so diversified that no unqualified preference can be held for any one type of propulsion, or in other words, there is a proper field for all principal types of ship drives.

The following types and arrangement of power drives have been applied with more or less success:

1. Direct connected reciprocating engine.
2. Direct connected turbine.
3. Geared turbine.
4. Turbine electric with direct connected motor.
5. Turbine electric with geared motor.
6. Internal combustion engine, direct connected.
7. Internal combustion engine, geared.
8. Internal combustion engine or Diesel electric using direct connected motors.

The principal objections to the reciprocating engine are those incident to its poor economy, and to some extent its weight and space factors. This type of drive, however, will exist for some time to come, as it has obtained a high state of development, and is at the present time better understood by the operating engineers. It is felt, however, that this condition will be greatly overcome as soon as the engineers now under training have become acquainted with the newer types of drive.

The development of the direct-connected turbine has probably gone as far as can be expected. This type of drive is being discarded because of its poor performance, as both the propeller and the turbine are operated at speeds not adapted to the best operating conditions of either.

There have been numerous applications of the geared turbine drive, and although there have been some disappointmets, the general results indicate that the geared turbine drive has come to stay and enjoy a field of its own.

The turbine electric drive using direct-connected motors is a perfectly logical and applicable type of propulsion. Owing to the economy of high-speed turbines, alternating current is found best suited as a-c. turbo-generators lend themselves very readily to high-speed operation. Two types of motors have been proposed and used, namely the induction type and the synchronous type. The synchronous motor drive has slight weight and cost advantages over the ordinary induction motor drive, for the reason that the unity power factor of the synchronous motor permits a smaller generator, and the synchronous motor is cheaper to build than the induction motor. On the other hand, the induction motor drive has maneuvering advantages as it requires less skill in handling and possesses much better starting torque characteristics. The economy of the two types should be about the same.

Turbine electric drive using geared motors will probably see very little more development as the speed reduction can be accomplished efficiently with direct connected motors without gears.

The internal combustion engine direct connected to the propeller shaft has been applied with considerable success in European countries, and is being given considerable attention at the present time in this country. From an economic standpoint, the direct-connected Diesel drive is far superior to any type of steam drive, and is certain to see an era of prosperity. However, when compared with the Diesel electric drive, the economy advantages of the direct Diesel drive are small and in the case of long runs, the additional weight has a slight disadvantage.

The ordinary internal combustion engine using gears will probably see very little more development under present conditions.

The internal combustion engine or Diesel electric drive using direct-connected motors offers possibilities superior to those of any other type of drive, as will be shown in detail later.

For convenience, ship drives may be classified as follows, according to capacity of the propelling equipment: (1) Ships up to and including 6000 h. p.; and (2) Ships in excess of 6000 h. p.

For drives up to and including 6000 h. p., we might logically have reciprocating engine, geared turbine, turbine electric, direct-connected Diesel, and Diesel electric types of propulsion.

For drives in excess of 6000 h. p. we might have geared turbines and turbine electric. At the present writing, it is believed that the development of the Diesel engine in direct-connected units in excess of 3000 h. p. is not perfected. Neither has the development of the high-speed Diesel units for electric drive been perfected in sizes which will permit a drive in excess of approximately 6000 h. p.

Unquestionably, the prime consideration is reliability, while economy, simplicity, cost weight and space are important but secondary considerations. One must not be unmindful of the fact that when a ship leaves port, it must absolutely rely on its propelling equipment to reach its destination, and therefore, the lives of crew and passengers as well as the safe transport of the ship and its cargo are dependent upon the satisfactory performance of the propelling machinery. For this reason, reliability should not be sacrificed for any other consideration. Reliability necessitates close adherence to rugged and thoroughly proven apparatus which must, of necessity, stand more or less abuse without danger of failure. The machinery must operate continuously for days and possibly for months without shutting down, and must be simple within reason and thoroughly understood by the operators. Economy, cost, weight, space, etc., are important in that they determine the relative earning capacity of the ship.

Merchant Ships

With these general statements in mind, let us consider more closely the merits of electric drive, first for merchant ships, and second for battleships. As stated above, there are two general systems of electric propulsion, namely that in which the prime mover is the steam turbine and that in which the prime mover is the Diesel engine. With the turbine electric drive, the electrical equipment is of the a-c. type for the reason that a-c. turbo-generators are inherently better suited for the high economical speeds of turbines. With the Diesel electric drive, the electrical equipment is of the d-c. type, because of its flexibility, ease of speed control and simple requirements of the engine governors. If alternating current were used with Diesel electric drive, the engine governors would have to be highly refined, as it would be necessary to operate the generators in parallel; whereas with direct current, the generators may be operated in series, thus permitting relatively simple engine governors. Even with parallel operation of the d-c. generators, the governor problem offers no difficulty, however, there are other decided advantages in favor of the series operation which will be discussed later. In the case of the turbine electric drive, the propeller speed is varied by throttling the turbine, and reversal of propellers is effected by reversing the motors connections. In the case of the Diesel electric drives, the propeller speed is varied any amount from zero to a maximum in either direction, without opening a single circuit, by merely adjusting the generator voltage by means of a simple field rheostat, the engines always operating at constant speed.

In the turbine electric drive, the motors are direct connected to the propellers. As most ships up to 6000 h. p. are of the single-screw type, there is usually but one turbo-generator and one motor. The electrical characteristics are usually 50 to 60 cycles, 1100 to 2200 volts, and polyphase. The control of the apparatus is effected from a central control station usually located in the engine room. The switches and turbine control valves are controlled by means of simple levers, symmetrically arranged and suitably interlocked in order to prevent improper operation. All necessary gauges and electrical instruments are mounted upon a panel directly in front of the operator, so that the performance of the machinery is under his observation at all times.

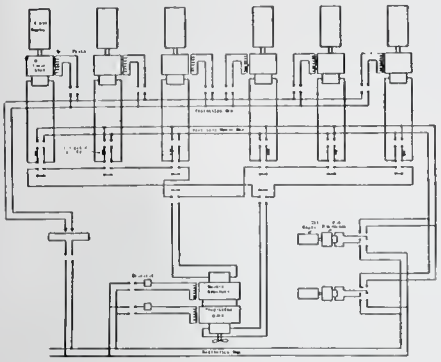
The turbine is equipped with a speed governor, overspeed stop governor and throttle valves. Where the throttle valve is not used to regulate the speed, some form of "power limit stop" is necessary to prevent excessive overloads being imposed on the machinery when maneuvering or in case the propeller comes out of the water.

In the case of twin-screw ships having two generating units, turbine electric drive possesses the advantage over direct connected and geared drives, of flexibility in that the failure of either generating unit will not seriously cripple the propelling equipment. Should one unit fail, the remaining unit would deliver equal power to both propellers to the extent of its full equivalent capacity, thus enabling the ship to make about 70 to 75 per cent of full speed. This is also true to a large extent in the case of the geared turbine drive using cross compound turbines, as the failure of a high or low pressure turbine element would mean the loss of only from 40 to 50 per cent of the power. In the case, however, of a complete expansion turbine, the failure of one unit would necessitate dragging that screw, resulting in a serious retarding effect. Large ships invariably have twin, triple or four screws, and therefore, the flexibility of the electric drive is an important advantage.

For ships up to 6000 h. p. (the larger sizes having twin screws), the Diesel electric type of propulsion possesses marked advantages over all other types. With this type of drive, any reasonable number of generating units may be used, independent of the arrangement of the propellers. It is, therefore, possible to use a number of relatively small reliable, high-speed Diesel engines driving direct-connected d-c. generators. By using a number of the small unit, the disadvantages of large Diesel engines are obviated. Aside from the reliability thus obtained, there is the added important advantage of flexibility with regard to reserve power, and as will be shown later, this advantage is possessed in an extreme degree only by the Diesel electric drive.

The electrical apparatus is well understood, thoroughly tried out, and there is consequently no question as to its reliability. The motors are separately excited at constant potential in one direction while the generators are supplied with excitation through a reversing field rheostat so that any desired voltage may be obtained from zero to the maximum in either direction. With this arrangement, the speed of the motors is directly proportional to the voltage of the generators. Therefore, the control is as simple as could possibly be desired.

Series connection of the generators with the motors interposed to reduce the ground voltage to a minimum has certain advantages over parallel connection of generators. For the purpose of discussion, let us assume a single-screw drive consisting of six generators and a motor consisting of two separate units mounted on the same shaft. Electrically, the machines would be arranged in series as follows: Three generators, one motor unit, three generators, one motor unit. On the basis of 250-volt generators, the maximum ground voltage would be 750 volts, although from the standpoint of current, the system has all the advantages of a 1500-volt circuit. This arrangement of generators and motors is independent of the number of either, and is particularly advantageous in case the number of generators is uneven, such as five generators and two motors. Furthermore, the motor units may be on different screws as in the case of a twin-screw drive. Even in the latter case, independent control of the port and starboard screws can be obtained. However, with the same or opposite rotation of the screws, the amount of speed difference obtainable is somewhat limited, although wholly within requirements. In this case, the speed difference between the propellers is obtained by adjusting the motor fields.



Diagrammatic arrangement of series connected generators and double armature motor for Diesel electric marine drive.

The advantage of the series system over the parallel system from an engine operating standpoint has already been covered.

With the series arrangement, more power can be obtained from remaining generator units in case of failure of one or more generator units, without providing excess capacity in the motors. The reason for this is that each of the remaining generators can be operated at normal voltage and the field of the motors weakened to increase the propeller speed to a value which will load the remaining generator units to their full capacity. With parallel operation, it would be necessary to lower the voltage of each generator a certain amount, thereby operating them at reduced capacity; or else to operate the remaining generators at full voltage and provide additional field capacity in the motors so that the speed could be lowered the required amount by increasing the motor field. Thus, in case of failure of a generator unit, parallel operation would either afford slightly less power than series operation or would necessitate slightly larger and heavier motors.

The Diesel electric system of ship propulsion possesses a flexibility of reserve power in the case of failure of prime movers which far surpasses any other type of drive. For example, assume a case in which there are three generators and one motor. Should one of the engines fail, the remaining two units could be operated at full capacity, giving two-thirds the total voltage and the motor speed increased by weakening its field to a point where the propeller would require two-thirds of full power, with a resulting ship speed of approximately 88 per cent. In the case of two engines failing, the available speed of the ship would be approximately 70 per cent of full speed. And to assume the remote case of all main engines failing, the ship could make steerage way on the auxiliary generating sets.

The multiplicity of units of the Diesel electric system affords another advantage of great importance, namely, that units can be overhauled at sea without entailing any serious loss of speed.

In the way of a summary, the following table of comparison of the various principal drives will be of interest. In arriving at the figures given, all items of machinery and supplies necessary to the main propelling machinery were considered; foundations, water, fuel, etc., were taken into account. However, it was necessary in some cases to make certain assumptions, but an effort was made to place such assumptions on the conservative side, so as not to show an exaggerated comparison. Further, certain major figures are at great variance in practice, and the table is, therefore, given as indicative of the trend of this comparison rather than actual proportions. The figures for turbine electric drive and geared turbine drive are based on the same steam conditions.

The figures are based on a 3000 h. p. ship operating over a 4000-mile course at a speed of 11 knots, and making a total of 14 single trips per year. The geared turbine ship is taken as unity. Owing to the present unsettled conditions, it is hardly possible to make an intelligent cost comparison.

Drive	Fuel Consumption	Machinery Weight
Geared turbine	1	1
Turbine electric	1.06	1.05 to 1.10
Direct connected Diesel	0.49	1.10 to 1.25
Diesel electric	0.57	0.75

A NEW SERVICE CORPORATION

IT should be of interest to our readers to know that an organization of industrial engineers has recently established offices in Philadelphia, Pa., known as the Philadelphia Engineering and Sales Corporation. This concern is offering its service to management in industry for the elimination of waste, greater production, restoration of incentives to labor and a return to better relations between employer and employees. The organization contains many former shipyard executives well known to our readers and they are therefore particularly adapted for the service in this field.

Mr. William B. Ferguson, who was an honor man at the Naval Academy in 1900, is the president of this new organization and has been the author of many interesting papers and articles on production methods in shipbuilding in recent engineering periodicals and a book on "Estimating the Cost of Work", which is the standard volume on this subject. His success as production manager of the Remington Arms Bridgeport plant and later as manager of the department of standards at Hog Island is well known.

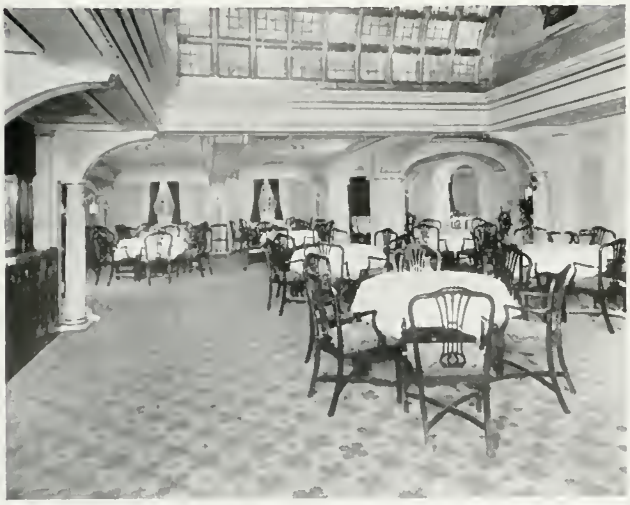
Mr. Ferguson has recently been appointed a member of the Committee on Elimination of Waste in Industry of the Engineering Council of which Mr. Herbert Hoover is chairman and Mr. L. W. Wallace vice-chairman. The investigations which this committee, as authorized by recent act of Congress, will conduct with relation to shipyards will come under Mr. Ferguson's personal direction.

We congratulate him on his appointment and feel that the shipyards are most fortunate that a man of his training and ability will cover this phase of industry in the preparation of the committee's report to Congress.

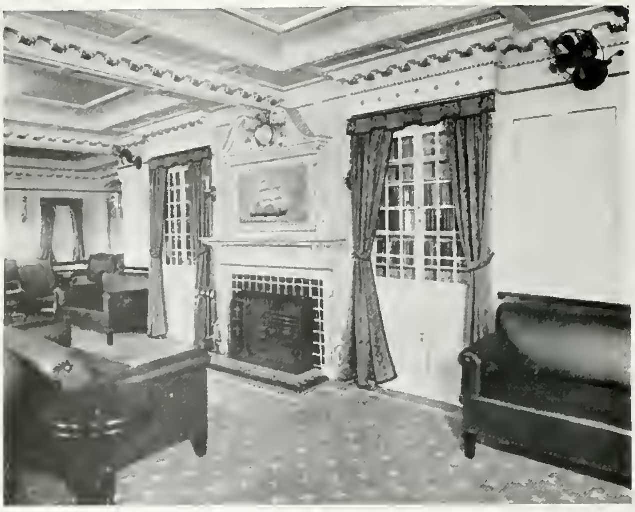
The remainder of this organization has been selected with that keen judgment which is always apparent in successful executives and we believe that the service offered shipyard managements by this new corporation will fill a long felt want.

The Pacific Marine Review wishes them every success in their new enterprise.

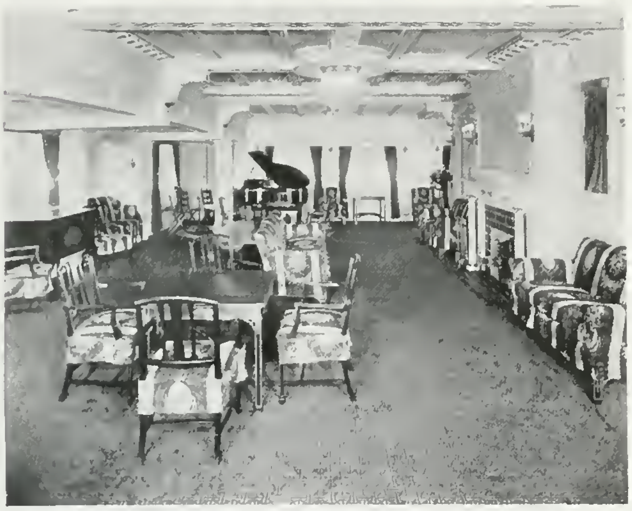
SOME INTERIORS OF THE S.S. HAWKEYE STATE



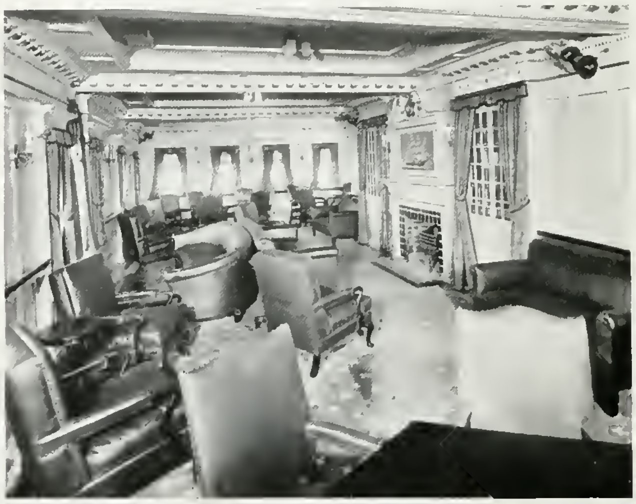
There are seats for 164 persons, four at each table, in the dining-room. The dome above is lighted by electric globes. Two large mural paintings by Carroll Bill, not shown in this photograph, add much to the appearance of the salon.



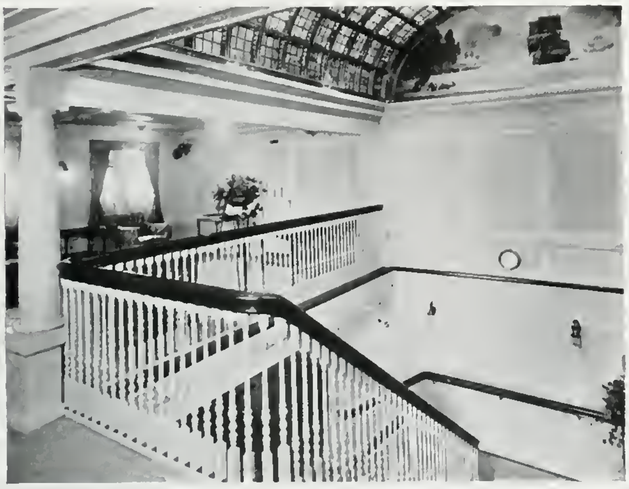
This is another view of the smoking-room, showing the fireplace and a painting of an American clipper ship by Carroll Bill.



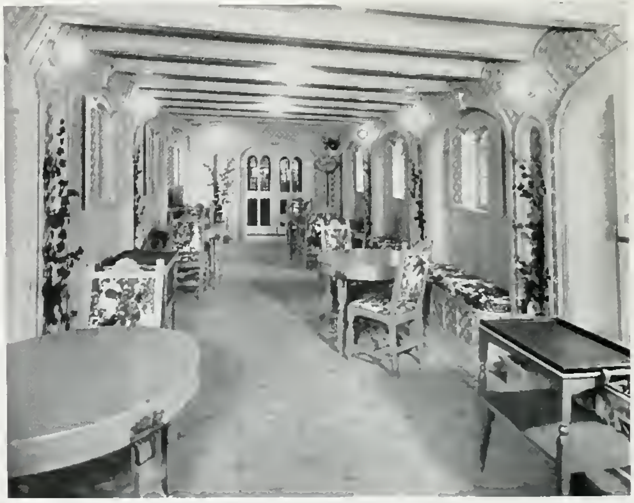
The Colonial atmosphere pervades the music room, in which are a piano and phonograph. The windows are high and have potted flowers.



The mantel of the west parlor, Mt. Vernon, was the inspiration of the mantel of the smoking-room. The after windows were taken from those of the banquet hall, Mt. Vernon. This fireplace is "real" and burns coal.



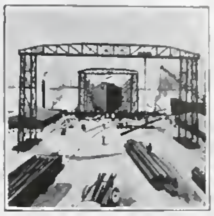
This wide and handsome stairway leads from the upper to the main deck. It is in Colonial style and was built by Frank Knipp & Sons of Baltimore.



This tea-room is off the writing-room and looks upon the after veranda. The furnishings and whole tone of the tea-room are in the "garden" style.

The Hawkeye State, one of the new passenger liners of the Shipping Board 535 type, was allocated to the Matson Navigation Company of San Francisco and started on her maiden voyage from Baltimore to the Pacific Coast February 15. She was built at the Sparrows Point Plant of the Bethlehem Shipbuilding Corporation and on her trials developed 13,000 H. P. and a speed of 18.8 knots.

Material Handling



PORT AND HARBOR DEVELOPMENT

At the present time practically every seaport of any importance in Europe, the two Americas, the Pacific Coast of Asia, Australasia, and even Africa, has under way or projected enlargements, developments or alterations. It will be our purpose in this department of Pacific Marine Review from time to time to cover in a general article the high spots of all of this work and to give detailed descriptions of the larger and more important projects.

Beginning with North America, the projected work recommended by the Port and Harbor Development Commission of the Port of New York is by far the largest and, in some ways, one of the most unique and original port projects yet put forward in the United States. The Port and Harbor Development Commission was formed for the purpose of making a survey of the problems of the harbor of New York in order to arrive at some method of relieving congestion, reducing terminal charges and bringing about a co-ordinated comprehensive control and management of the entire harbor, parts of which lie in different states and under varying and, in some cases, conflicting political and managerial control.

The report of this commission describes a number of engineering projects which had been submitted to it for consideration and in which by various means it was proposed to handle the tremendous traffic coming into New York from the hinterland of Middle Western and Eastern United States, both for local consumption in New York and for trans-shipment in foreign trade. We will concern ourselves here only with that part of the report which describes the system recommended by the commission, and which represents a very radical departure from anything now existing in any port in the world.

The investigations of the commission reveal the fact that approximately 40 per cent (by weight) of the freight coming into New York was bulk and 60 per cent general, either in miscellaneous freight or standard package freight.

The essential elements of the proposed system are a belt line railroad in New Jersey connecting with all of the New Jersey railroads that give pier station service; a joint yard and transfer station on the belt line; two parallel but independent tracks of standard gauge running in a loop, mainly in separate tunnels, from this yard to Manhattan and back to the yard; a series of multiple story terminals over the loop in Manhattan with car elevators from these terminals to underground siding tracks; a separate con-

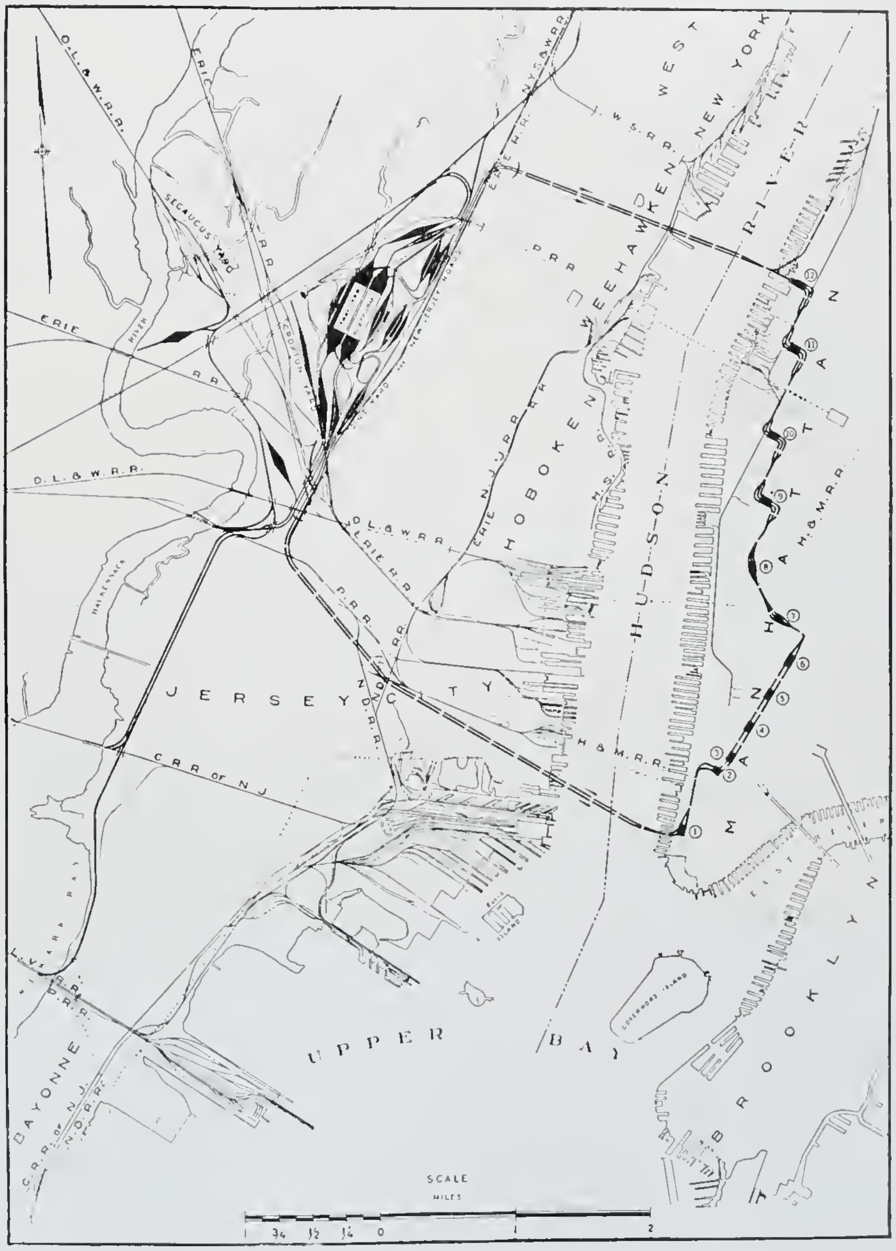
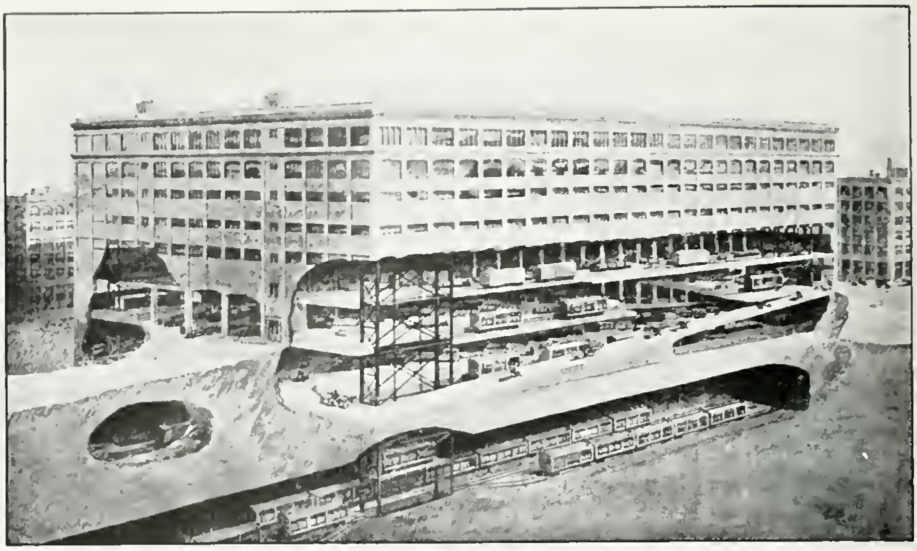


Diagram of the port of New York showing proposed arrangement and location of automatic electric system for handling general freight



Sketch of typical terminal for the automatic electric system proposed for the port of New York

nection and transfer station in Manhattan for the New York Central Railroad; a fleet of special electrically operated, automatically controlled cars for use on this loop, and a fleet of small four-wheel trailer trucks.

It is proposed that inbound freight will be transferred at the joint yard onto trailer truck trains, these trains to be run onto the electrically operated, automatically controlled cars, which cars will be run in eight-car trains at a speed of 1200 feet per minute which will permit under peak-load conditions of a headway between trains of 3.29 minutes. This speed would mean that these trains would reach the various terminals in Manhattan from the Jersey transfer station in from fifteen to thirty minutes. These trains at the transfer station are normally standing on a siding which is used as an electrical connection for supplying energy to the motors of the cars, the track being so connected and of such a length that by the throwing of a switch the train is started and will automatically speed up to 1200 feet per minute at the point of leaving the accelerating track section and entering the main track. When the train arrives at the yard terminal for which it is intended, the throwing of another switch will turn it from the main track and it will be automatically brought to a standstill on the siding, which acts as a "decelerating" section after the train has cleared the main track.

The truck trailer trains mounted on these cars are run off with their own power onto the platform at the siding and another truck trailer train loaded with return freight run onto the automatic electric train car and the train dispatched onto the main track in the same direction in which it was going when it arrived at the terminal, the loops being continuous. The general arrangement of this system is shown in the illustration herewith.

It is obvious that this system is very flexible and that any required number of terminals can be built in connection with it on the Manhattan side. The cars will move around the loop on either track in one direction only so that the two lines will be absolutely independent of each other. There will be no operators on these trains, as they will be controlled by a train dispatcher and his assistants.

The only precedent for the design of this system is an installation on a smaller scale, similarly operated, which is being made for the Postoffice Department of the British Government in London. Before the war interrupted this work six and one-quarter miles of deep tunnel of nine-foot diameter had been completed between outlying railway stations and the general postoffice in the center of London. Experiments had been carried out which showed the entire feasibility of using an ordinary interlocking block signal system and dispatchers with trailing dead sections of track behind each train, which would automatically do away with any possibility of collisions. The experiments carried out in London showed the entire feasibility of operating this system completely automatically with speeds up to 35 miles per hour.

The estimated cost of this automatic electric system with construction and equipment at 1918 prices aggregates $201,190,000, which includes twelve terminals in Manhattan giving an estimated annual capacity of 10,000,000 tons. After a careful consideration of the engineering features and possibilities, the actual cost of operation shows a saving over present methods of about 43 cents per ton, or $4,318,000 annually. It is also estimated that there would be a saving in truck delays of $1,648,000 and a saving in trucking expense on account of shorter distances of $1,154,000, making a total of $7,120,000, or a 3.54 per cent net return after paying 5 per cent interest on the capital invested.

The commission recommends also, at a total expenditure of $218,630,000, the building of two additional loft floors on each terminal warehouse, which would bring in a net rental of $6,416,000 per year and make a total revenue and saving over present methods of $13,536,000 per year, or a net return of 6.22 per cent on the investment after paying 5 per cent interest.

There are, of course, a very great many items of saving upon which it is impossible to figure any particular money value, such as the increased average loading of railroad cars and

View at Seattle showing the former outfitting dock at the Skinner & Eddy Shipyard transformed into a terminal for the Isthmian Steamship Line of trucks, the reduction in trucking expense to tenants of terminal buildings, the better quality through quick delivery and less handling of milk, dairy produce, and live poultry from New Jersey farms, the decreased maintenance in city streets, freedom from interruption by fog and ice, and increased real estate values and commercial capacity for all Manhattan.

In making its report on the facilities at present available in New York harbor the commission under the item of drydocks and marine repair plants gives some figures which are of particular interest to marine operators. The commission reports about twenty companies within the port district which offer drydocks, floating docks, or marine railways, these companies comprising about fifty drydocks and floating docks and a number of patent slipways. About half of the plants are located in Brooklyn. The largest commercial drydock, according to the commission, is the graving dock at the Erie Basin, Brooklyn, which is 620 feet long, 85 feet wide, and 25 feet deep over the keel blocks; and the largest graving dock is at the New York Navy Yard, Brooklyn, and is 694 feet 9 inches long, 112 feet wide, and 32 feet 11 1-2 inches deep over the keel blocks. These figures are particularly interesting for two reason: generally, because the commission seems to have overlooked the large floating drydock at Brooklyn which takes vessels 735 feet long, and locally, to San Franciscans because we apparently are ahead of New York in one respect at least, having the great drydock at Hunter's Point which is apparently about 45 per cent larger than the largest graving dock in the "greatest port in the world."

It is certainly very much to be desired by all good American citizens that the various sections in control of the New York harbor situation should get together and sink their differences and carry out some comprehensive scheme for relieving the congestion at that port and cheapening its terminal costs, because undoubtedly New York leads and its example in this regard would have a very great influence in every port in the United States toward better terminal engineering.

Jumping across the Atlantic, we find some very interesting developments under way at the port of Havre, where a new harbor in the Seine is being projected south of the existing docks, capable of extension in an easterly direction, the ultimate plan being to provide a series of deep water basins extending along the north bank of the Seine to Tancarville, a distance of twelve miles. These basins will be so developed that vessels drawing forty feet can remain afloat at their berths at all stages of the tide.

The first work in this plan is a tidal basin enclosing a total area of 704 acres, part of which will be reclaimed as industrial sites. The enveloping breakwater for this harbor has already been completed, and 1640 lineal feet of new quay wall is completed and available for use on the north side of the new basin. This wall has a depth of water below zero datum alongside of 39.37 feet. It will ultimately be 1000 meters long and is of very massive construction, having a total height from its foundations of over 83 feet. It is constructed of concrete and ruble masonry and lime mortar faced with granite and contains an average of 118 cubic yards of masonry and concrete per foot. The ground between this quay wall and the old river wall is being filled hydraulically with the material dredged from the new harbor basin.

In connection with this harbor there is being built under the same enabling act a large graving dock, which is very interesting from an engineering standpoint, both by reason of its exceptional size and the novel method of constructing the foundation. This dock will have a length on the keel blocks of 1024 feet 4 inches, a width on bottom at entrance of 124 feet 8 inches and a depth on the sill at average high water neap tides of 46 feet 9 inches. It is designed to take ships drawing 44 feet at all stages of high water. Practically all of the soil at this part of the estuary of the Seine is composed of very deep alluvial deposits, and in order to meet the difficulty of establishing a proper foundation upon these strata it was determined to build the dock upon a steel pontoon.

This pontoon is 1132 feet long, 196 feet 10 inches wide and contains about 8000 tons of steel work which was fabricated ashore on shipbuilding ways in the shape of a framework of longitudinal and transverse steel lattice girders covered with three-eighth inch steel plating. The pontoon was then launched and floated over to the permanent bed which had been prepared for it in the alluvial strata of the river bottom. The bed had been dredged to sufficient depth and especially leveled by divers. The pontoon was filled with concrete and sunk into this bed, and the floor and side and wing walls and caisson chamber of the graving dock are being built upon it. This method of drydock construction should be watched very carefully by the harbor engineers of many American harbors where the same difficulty of establishing foundation exists.

Belgium is carrying out improvements in the way of a new barge fishing harbor at Zeebruge, which is part of a project for the establishment of a national fishing industry. The Belgian Government is constructing the harbor and will provide for handling and transportation of cargoes. Private enterprise is establishing cold storage and factories for pickling, drying and canning fish.

Up in the Baltic, Finland has completed four of the warehouses in the free harbor of Hango. One of these warehouses has been fitted with a heating system and made suitable for storing all products requiring dry air. All of these warehouses will enjoy free port privileges.

News comes from the Union of South Africa that plans have been completed for building a complete chain of elevators for the handling of bulk grain. One of these elevators will be at the port of Capetown with 30,000 tons capacity, and one at Durban with 42,000 tons capacity, while in the interior—up country—there will be a chain of seventy-one elevators with an aggregate of 160,000 tons. The plans call for cleaning and drying plants, hopper weighing machines, and hydraulically operated tippers, and it is expected that for the service of these elevators 1000 railway trucks of box type and of 40 tons capacity each will be required for railway service.

Coming back to North America again, we note that the classic town of New Haven has caught the fever and is planning a first unit in the development of a waterfront under the direction of the well known harbor engineer, W. McL. Harding.

All of the larger cities of the Great Lakes, both on the Canadian and American sides, are busy planning new developments. The city of San Francisco is debating the advantage of taking over from the State of California the control of its waterfront, while Los Angeles is debating the advantage of giving back to the state control of its harbor. Seattle is busy putting the finishing touches on its great Smith Cove project. Vancouver has two notable projects under way, Ballantyne pier and the new Canadian Pacific pier. In short, notwithstanding the world-wide depression in shipping, every port on the globe seems to be awake to the idea of developing for the future, so that manufacturers of material handling machinery and port development engineers should certainly have their hands full of profitable work.

ELECTRICAL TERMINAL FACILITIES

By COMMANDER C. S. McDOWELL, U. S. N.[*]

In considering the question of our American Merchant Marine, it appears probable that the subject of suitable terminals has not received the attention which it deserves. Transportation is the necessary means of conveying the products of the factories, mills, mines and farms to the consumer, and as we must look to the markets of the world for the customers of a certain part of our products, both raw and finished, every one who is at all concerned in the production of material in this country is affected by the efficiency of our means of transportation of products to the ultimate consumer, situated as may be at the ends of the earth. Transportation is as much a part of the cost of production as labor or material. Ordinarily, however, in thinking of transportation from our factories, mines, grain elevators, etc., to the foreign purchaser, we consider only the necessity of getting the product to the seaport by rail or boat, and the shipping required to carry it across the sea. The great importance of the connecting link, the terminal facilities, required for the transference of products from the one system of transport to the other, was forcefully brought home to most of us during the war. The amount of material piled up on the Jersey Meadows, for instance, made many a manufacturer wonder at the insistent demand made on him to rush his orders for foreign shipment, and this congestion at our ports was not primarily due to the lack of ships, but to the inability to get the materials to the ships, and quickly loaded on them. Thus, if we assume that under the congested terminal conditions during the war, it took ten weeks for a ship to make a round trip, while with adequate terminal facilities the same ship could make the round trip in five weeks, it is seen that terminals are in reality the neck of the bottle and that the mere building of ships and doubling or quadrupling our merchant fleet does not increase our ability to transport freight in the same ratio.

Quick Turn Around Needed

To operate our merchant marine economically in peace time, and compete with other countries, it is highly important that the "turn around" should be cut down to the minimum. There is no particular purpose in providing economical propelling and auxiliary machinery on shipboard, if all the saving obtained by such improvements is eaten up by unnecessary delays in port, waiting to unload and load cargo.

We need fewer and higher skilled, better paid shipmen and dockmen with the very latest, speediest machines for loading and unloading. Such facilities both ashore and on board ship, combined with the higher skill of America in operating and caring for machinery is our chance to offset the higher wage paid our seamen, and put us on a competitive footing with our friends in the Atlantic or in the Pacific.

The time has now arrived when active steps must be taken toward constructing wharfage and warehouse facilities adequate for the use of our ever increasing merchant marine. Most cities have restricted their activities simply to the construction of piers, with little consideration for the development of adequate storage and freight handling facilities.

No standard layout can be established as applicable to all terminals, as the variables encountered are too numerous. Thus, the kind of cargo to be handled (bulk, as coal, wheat, ore, etc., uniform package as bagged sugar, or general cargo), determines the facilities that are required. In addition, the methods of receipt of cargo for ocean shipment and of distribution of the cargo from ships, whether by rail, by lighter, by truck, or storage in local warehouses, influences the apparatus required. Also, the types of ships docking at a terminal determines somewhat the mechanical facilities required on the pier.

The simplest method and the one allowing the most economical handling of freight is the one where standard ships run between two definite ports, always utilize the same terminals and carry only bulk or standard package freight. Under such conditions the special problem may be solved by installation of permanent electrically operated conveyors of different types, electric cranes, mechanical unloaders, etc., and cargo handled in much the same manner at ocean terminals as ore is handled on the Great Lakes. The above condition also permits the installation of all the cargo handling apparatus on shore and eliminates the present steam winch, which is notoriously inefficient, from the ship; it also, by the same elimination, puts the cargo handling gear where it is used practically continuously and removes this gear from the ship where it has been a large expense to install and keep in order, being used for a short time only at the end of each voyage.

Under such conditions, the ship becomes a freight carrier and is analogous in this respect to a railroad car or barge.

Bulk Cargo

Unfortunately, the conditions as outlined above are seldom or never met with. A near approach to it, though, is the shipment of export coal. Up to twenty years ago the most efficient type of plant consisted of a pier with railroad tracks on two levels, the loaded cars running out on the high level, discharging their load at a height of some 40 feet above the water into the chutes which fed directly in the cargo holds. The cars then proceeded to the end of the pier where they were lowered by a platform elevator or a drop table, returning to the shore over the lower line of track, both lines being so graded that the cars traveled by gravity. The limitation in this system lay in the speed with which cars could be handled, and the capacity did not exceed 300 or 400 tons per hour. An objection to the system was the fact that a very large amount of rolling stock was tied up, it being necessary to have a full ship's cargo waiting on wheels at the pier.

About twenty years ago one of the above type of piers was remodeled in the following manner: At the shore end large hopper bottom bins were built which held an entire ship's cargo of coal. Through a tunnel under these bins, which were provided with gates in the bottom, there was run a 36-inch belt conveyor, which in turn fed a second conveyor, which ran the entire length of the pier. This conveyor discharged the coal at several points simultaneously, and provided a loading capacity of 800 tons per hour. This system also greatly reduced the number of cars operating between the mines and the pier, as each car was immediately released after dumping its coal into the storage bin.

Although other types of piers with gravity feed have been built in the past twenty years, the present trend is apparently toward the belt conveyor system, electrically driven. Thus, one of the latest coal piers built is the loading pier for the Baltimore and Ohio Railroad at Curtis Bay, Baltimore, at which the cars are dumped in the yard on shore on the tail end of the system of four parallel 60-inch belt conveyors, each of which discharges to the vessel by means of a large "tripper" consisting of a movable steel tower, which carries pulleys over which the belt turns back on itself to discharge its load.

The above is given as an example of

---

[*] Address delivered before the joint meeting of the New York Section of the American Institute of Electrical Engineers and the Metropolitan Section of the American Society of Mechanical Engineers held in New York, January 28, 1921.

what may be done in the loading of a uniform bulk cargo, in the case of coal piers; the proposition is simply one of loading; if unloading is to be provided for, an entirely different type of equipment is required, and in such a case for bulk cargoes, separate piers are usually provided. Unloading of bulk cargoes has not been brought to the same degree of efficiency, as a record on the Lakes of two and one-half hours unloading for a 10,000-ton vessel, as compared with 23 minutes for loading it, will show. The Hulett "grasshopper' unloader is now in general use and consists essentially of a massive frame or walking beam, whose front end rests on the face of the dock, and the rear end on a slightly raised concrete wall. On this frame is a carriage moving backwards and forwards over the trough. The outer ends of the walking beam are legs which reach down into the hold; the whole mechanism being operated by one man. When a load of 15 to 20 tons is elevated by the bucket clear of the vessel, the carriage runs back on the main frame until the bucket is over the weighing hopper or trough and there the load is released. The weighing hopper moves only between the main legs of the machine. A cable runs alongside of each track continuously and the movement of cars is taken care of by the cable. An operator pulls a lever on the mechanical clamp which is attached to the train and moves the train a car length for the next load.

The cheapening of the cost of unloading by the successive steps by which the process has been improved since 1880 is shown by the following:

Cost of unloading a ton of coal with wheelbarrows	$.56
With Brown machine and shovelers	.28
With Brown fast plants	.12
With Hulett fast plants	.04

Uniform Package Freight

Another type of cargo where efficient mechanical apparatus for loading and unloading may be employed is in the uniform package freight, which consists of coffee, sugar, seed, rice, paper in rolls, crates of fruit, bananas in bunches, cotton seed cake, and many other commodities of similar character.

At the Port of New Orleans where bananas are unloaded in greater quantities than in any other port in this country, the handling of the unloading by mechanical devices has been developed until practically all of the bananas are now unloaded by machines. The general plan is to employ unloaders of a structural steel framework supported by railway trucks running on standard railway tracks set close to and parallel with the face of the wharf. The framework supports a double boom which can be adjusted into position over the hatchway of the ship. Over the booms constant running chains are installed which are equipped to carry several bunches of bananas in huge slings. The chain is lowered through the hatchway by means of the adjustable booms and after being placed into position the bananas are placed into this sling and removed from the hold to be deposited on a receiving table on the wharf. Trolley conveyors are utilized for distributing the bunches of bananas to refrigerator cars located on railroad sidings, running perpendicular to the face of the wharf, these conveyors having branches to each siding.

Mechanical unloaders of a construction similar to that given above have been designed for handling of miscellaneous cargoes and are installed, or being installed at some army bases. They consist of structural framework with double boom and constant running chain carriers similar to the one mentioned above. The plan in this instance is to carry small trucks loaded with miscellaneous cargoes. These trucks are fitted with small wheels so that when they are deposited on the wharf or in the storage rooms they are automatically released and can be wheeled to any position or location desired. For carrying material within the warehouse, it is planned to carry these same trucks automatically on overhead trackways and have them automatically deposited wherever wanted. This type of apparatus is reversible and can be used for both loading and unloading ships.

In the case of bags and bales, not very much progress has been made in the utilization of continuous movement apparatus, although unloaders of the conveyor or continuous chain type have been developed and installed in some cases. The electric crane has been developed to such efficiency that it is probable that continuous movement unloading machinery would have a hard time competing with it. Bags and crates unloaded through hatches are lifted in the rope sling by boom or crane and deposited on the wharf deck for handling. In some cases, however, conveyors have been built with a movable section, permitting it to be extended to the deck of the ship where bags, barrels, etc., are fed to slings which lower a sling full at a time into the hold. In case of unloading, the slings are used to take the freight from the hold.

Miscellaneous Cargo

Speaking generally, it is easy to provide mechanical handling facilities for bulk cargo, or for package cargo, when the latter is uniform. The difficult proposition is to provide facilities for miscellaneous cargo, and as a rule, the ships leaving our ports carry a mixture of almost everything from kegs of nails and sacks of grain, to steel rails and crated automobiles, and for such a mixture there is no adequate system of mechanical handling.

In this connection it may be noted that the stevedore is required not only to handle the freight from the dock to the vessel, but to so place it and secure it in the vessel, that stability and center of gravity may remain just right, and that the cargo itself may not shift and be injured by the constant movement of a vessel in an ocean voyage.

For the handling of such miscellaneous cargo, an electric crane is most essential and it appears preferable that the cargo be handled directly into the ships' hold with the crane without the use of the ship's booms. The question of the number of cranes to be provided at the pier depends to a great extent upon the character of the pier itself; if room and facilities are available for feeding cargoes to each hatch, then

View of one of the modern quays at the port of Antwerp. Note the lavish provision of electric cranes there should be sufficient cranes to work all hatches. It may be noted that in new basins at Hamburg the cranes are spaced every 100 feet. When the cargo is to be distributed in part or in whole by lighters from a pier, a desirable arrangement is to provide cranes on dolphins on the off-shore side of the ship for loading and unloading to lighters, at the same time the cargo is being handled on the pier. Incidentally, in connection with electric cranes, it should be noted that electric heaters are desirable for the comfort of the operator, in cold weather.

It is not the purpose of this paper to go into the design of the pier itself, but is presumed that a marine pier or terminal will be provided with sufficient space to handle both incoming and outgoing cargo without confusion.

On the wharf, itself, means are required for handling the loads for conveyors or crane hoists to and from the ship, and the old method which is common today on many of our wharves is the use of the hand truck. For short movements the hand truck cannot properly be dispensed with, but for most movements on the wharf, the electric truck or tractor with trailer, or the continuous movement, portable piler with trailer, can and should supersede the hand truck, and eliminate many of the men now required to handle cargo. These trucks, or tractors, are usually of the storage battery type and have demonstrated their thorough usefulness.

For handling cargo on the pier, an overhead trolley hoist, either of the monorail type or of the double track type, commonly used in large factories, has been developed.

For stacking freight at the terminal a tiering machine has been utilized which allows not only much more rapid tiering with the elimination of most of the manual labor, but also allows tiering to much greater heights.

Double Level Piers

In some cases two-decked piers have been built in order to save space, and in order to keep incoming and outgoing freight separated without moving the ship. This form of pier usually requires a connection between the two decks and involves elevating and lowering from one deck to the other. These movements are accomplished by electric freight elevators, by continuous movement parcel elevators, etc.

For moving freight cars at the terminal, electric locomotives, either of the trolley type or storage battery type, may be provided, or electric gypsies installed. For handling ship's lines, and moving ships at the pier, electric winches can be used, and in addition, electric winches of the permanent or portable type can be utilized for whips, either for handling cargo on the ships or for handling on the pier itself.

To sum up, the following are some of the electrical apparatus and devices which are available for use at terminals: Cranes; Conveyors, belt or chain type; Trucks; Tractors with trailers; Tiering machines; Pilers; Mechanical unloaders; Winches, permanent or portable; Freight elevators; Overhead trolley hoists; Locomotives.

Power Supply

The electrical supply at the terminal should be of the same voltage and kind of current (D. C. generally) as that in use on board ships which are to be handled. This will allow the ship to receive electric current from the pier for the ship's purposes, and the ship generators can be shut down while at the dock, so that all overhauling on the ship's steam and electric system can be made at the same time as freight is being discharged and received. This should materially reduce the average "turn around" time and allow the ship's main and auxiliary machinery to be given a thorough examination, and overhauling, while in port.

It is believed that modern port terminals offer a good electric load, which central stations should endeavor to develop in order to increase the efficiency of our terminals, as well as to improve the load factor of central stations.

NEW DRY DOCK AT FORE RIVER

THE new 10,000-ton floating drydock just completed at the Fore River plant of the Bethlehem Shipbuilding Corporation, Ltd., is a welcome addition to the repair and reconditioning facilities of the port of Boston. The new dock accommodates vessels of a maximum length of 479 feet over-all and a maximum draft of 24 feet. It has a rated capacity of 10,000 tons, but will lift somewhat in excess of this figure.

The new dock is of the Donnelly type and represents all the advantages of this general type with such improvements as fit it to handle repair work at this shipyard most efficiently. It consists essentially of ten wooden pontoons held together by rigid steel side wings extending the entire length of the dock.

The pontoons, which were built at Solomon's Island on the Chesapeake, were brought up the coast to Fore River plant by means of tugs. They were towed in twos and threes, with 1000 feet of sea room between them, three of them making a tow of nearly three-quarters of a mile. Each of these pontoons measures 41 feet by 116 feet and is divided into two compartments by a water-tight bulkhead extending through the center.

The wings on each side of the dock are essentially hollow watertight steel girders of approximately the same depth as the ship and, in docking, provide longitudinal rigidity for distributing over all stresses to such an extent that vessels docked in this class of floating drydock are handled with as much certainty as when placed in a basin dry dock, and, in addition, effect a great saving in the time required for docking. The 1700 tons of steel work required in the construction of the side wings was fabricated at the Steelton plant of the Bethlehem Steel Company.

The machinery consists of twenty centrifugal pumps direct connected to electric motors vertically mounted on the decks of the side wings and remotely controlled from the control house on shore. These motors are rated at 50 horsepower and may be operated through a master switch, so as to operate simultaneously, or through individual switches so that the pumps in any pontoon may be operated independently of the others. This feature provides for increased or decreased upward pressure on any one pontoon or set of pontoons, which serves to equalize the stresses in the vessel being docked. Rotating semaphores, mounted on the watertight casings of the motors, serve to show the operator in the control house just which pumps are in operation. The pontoons can be emptied in an hour and a half.

An electric capstan located at the end of the mooring pier serves to tow the vessel through the channel to the dock. Electric capstans located on the deck of the wing walls are used in guiding vessels in and out of the dock. Ample illumination is provided for night work. The dock is completely piped for steam, air and tank water, and plug outlets on each wing wall provide for transmission of power to ships.

In connection with the dock there has been built a concrete mooring pier 50 feet wide by 600 feet long, with a timber extension 200 feet long, and also a marginal wharf 30 feet by 500 feet. A great deal of dredging has been done which has materially improved the ship water facilities opposite the yard, providing a main ship channel that is now 29 feet mean low water.

EUROPEAN MARINE DEVELOPMENTS

Exclusive Correspondence of Pacific Marine Review

JUDGING by the reports which appear in the British newspapers, readers might very well at times wonder whether we are having a shipping and shipbuilding slump, or whether we are not, after all, doing "Quite well, thank you." Things are in a very bad way, but we have incurable optimists, like Sir William H. Raeburn, chairman of the Clyde Navigation Trustees, deprecating the pessimistic view which has been taken of the recent slump in shipping activity on the Clyde and at Glasgow. He suggests that it is a season of fluctuation, which is invariably experienced in greater or less degree at the New Year holiday period. He added that if freights remain as at present there must be further laying up of shipping, but he anticipates a change in the existing conditions which will bring down costs and in that way improve the world trade generally.

Sir William, in the course of his review of the position, said it was gratifying to be able to say that the revenue of the Trust for the last six months had really been very good. Many had thought that the revenue was bound to fall off and that they would have a very bad half year. But that apprehension had not been realized. They had had a very fair six months. What was going to be their experience in the next six months? He had in his hand a rather pessimistic account which appeared in the Glasgow Herald of the state of the harbor at the present time. Everyone of them knew perfecty well that shipowners and shippers all tried to clear out their traffic at the end of the year and they had always been accustomed to pretty slack business at Christmas and the New Year, and for some little time afterwards. One could always find at this season a large number of unoccupied berths, but that was not to say that trade on the Clyde had fallen off. The conditions improved after the holiday period, and he believed that on the present occasion they would find the harbor very busy within the next few days. The Trust had just come through a very busy half year, and for the present there was no need in his opinion to be pessimistic.

There was no gainsaying the fact, he continued, that shipping had fallen upon very bad times. There was a great deal of unemployment, and many works had had to go on short time, and some had even to close down. Our import and export trade was bound to feel the effect of such developments. There would be, he was bound to say, a great deal of laying up of shipping if the freight market remained as it was at present. But we had always had these waves of depression, and this one had come upon us very quickly. His own impression, however, was that the reaction from it would come also perhaps sooner than most expected.

New Cunard Capital

Just lately we have had rather a rush of more hopeful views about shipping and shipbuilding, and curiously enough this happened to precede the new issue of capital by the Cunard Company. This great concern appealed for four million pounds sterling, equal at, say, four dollars to the pound, $16,000,000. The issue was made at a price that practically yields the investor here 7¾ per cent, and was very attractive, so that a good slice was taken before the issue by the underwriters. The public actually subscribed only some million and a half pounds sterling, but that was more than sufficient, with the above arrangements, to make the issue a success.

Promoters of big loan and capital issues are experts in creating an atmosphere favorable to their issues and this may in passing serve to explain some of the more recent optimism about British shipping. It is not long since we heard that the Cunard Company had stopped all work on three new constructions. Now it is going to double its fleet before the end of the current year, and Sir Alfred Booth can hardly see a cloud in the sky. His note is that whatever is bad in the industry is very transient and temporary.

World's New Ships

Shipbuilding returns for the quarter ended December 31, 1920, have now been issued by Lloyd's Register of Shipping, and they enable the approximate number of vessels, and the total tonnage, launched during 1920 to be known. Although the present returns are primarily concerned with the amount of tonnage under construction at the end of the year, they indicate the figures of the numbers of vessels and tonnage launched during the past quarter. These figures for steamships are 153 vessels, with a total gross tonnage of 543,000. By adding these to the figures given in the three previous quarterly returns, a total is arrived at of 574 vessels of 1,991,782 tons for the year. The figures for each quarter are as follows:

Quarter	Vessels Launched	Tonnage
First	123	451,236
Second	154	518,568
Third	144	478,631
Fourth	153	543,347
Total	574	1,991,782

The tonnage building in the United Kingdom at the end of last year was 3,708,916 tons. This amount is less by about 22,000 tons than that building at the end of the September quarter, but it is more by 714,000 tons than that under construction twelve months ago. The figures for the past month include sixty-four steamers and motor vessels of 1000 tons and over, with a total tonnage of 422,553 tons, intended to carry oil in bulk.

First Bad Quarter Since End of War

The Register points out that this is the first time since the end of the war that a decrease is shown as compared with the previous quarter's returns. The tonnage building at the end of December, 1918, was nearly 2,000,000 tons; at the end of December, 1919, the total had increased by more than 1,000,000 tons, and at the end of September, 1920, the figures had reached 3,731,098 tons. The present decrease is a small one—namely, 22,000 tons; but it is thought that the movement may prove to be the beginning of a decline just as rapid as the increase which has taken place since 1918. This probability is further emphasized by the fact that the total tonnage of vessels commenced during the quarter—namely, 506,353 tons—is 139,000 tons below the average of the previous six quarters.

One fact of great importance which a comparison of the returns discloses is that, although the total tonnage under construction has been and still is so large, the amount completed has compared very unfavorably with that of pre-war times. In 1913 the average tonnage completed during each quarter was over 23 per cent of the total work in hand at the beginning of the quarter, whereas in 1920 the corresponding figures do not amount to 13 per cent. In this connection it is interesting to find that the tonnage launched during the last quarter of 1920, amounting to about 580,000 tons, is the highest output for any quarter, being 12,000 tons more than the previous "record" figures for the fourth quarter of 1913. The tonnage building in the Glasgow district—namely, 959,347 tons—is a "record."

Tonnage Building Abroad

The total merchant tonnage building abroad, 3,470,862 tons, is about 363,000 tons lower than the total building at the end of September, the reduction being entirely due to the large decrease in the tonnage building in the United States—462,000 tons less than at the end of September, according to the returns. Apart from the United States, there was an increase of tonnage building abroad during the last three months of nearly 100,000 tons. The leading countries are Holland with 450,964 tons, France with 397,969 tons, and Italy with 363,784 tons under construction. The world's total of 7,179,778 tons is about 385,000 tons lower than the figures for September, and 869,000 tons lower than the "record" figures reached at the end of September, 1919.

Oil Tankers a Boom Spot

A notable feature of the returns is the number of tankers under construction. The retuns show that there are at the present time 169 steamers and motor vessels, each of over 1000 tons, with a total tonnage of 1,169,003 tons building for the carriage of oil in bulk. Of the total, 64 of 422,553 tons are building in the United Kingdom, and 88 of 637,100 tons in the United States. For the first time the returns distinguish between steamers and motor vessels. At the end of December there were under construction in the world 189 vessels of 454,502 tons to be fitted with internal combustion engines.

The tonnage of vessels actually building under the supervision of the Society's surveyors, and intended to be classed with Lloyd's Register, amounts to 4,800,409 tons—namely, 2,920,656 tons in the United Kingdom and 1,879,753 tons abroad. The following figures showing the merchant tonnage building in the world at the end of June, 1914, are of interest for comparison with the present totals.

Building in U. K., tons....	1,722,124
Building abroad, tons......	1,440,766
Total for world, tons....	3,162,890

Figures for Germany are not included since the complete totals are not yet available.

Increased Pilferage Claims

Apart from the work which has been done by the committee of business men appointed under the auspices of the London Chamber of Commerce to discuss robberies of goods in transit before and after the merchandise is in the charge of owners, some of the leading shipping firms are now giving close attention to the best means of preventing pilferage while the goods are in their care. In the letter recently forwarded by the committee to the Home Secretary, it was pointed out that the claims for pilferage on one shipping company had risen from 1.44 pence per ton of cargo in 1913 to 26.91 pence per ton in June last, an increase of nearly 2000 per cent. These figures may now be supplemented by some statistics prepared by a company engaged in the Australasian trade and quoted in the London Times. These show that the average claims for Australasian voyages averaged 60 cents per ton of cargo for the first nine months of last year. An interesting point disclosed in an analysis of the figures was that the losses were much heavier in the case of the final port than in that of the first. As the vessels called at the different ports the losses through pilferage increased, indicating that when the ships were being discharged pilferage went on of cargo destined for later ports. Further analysis of such figures might give useful indications of how the very serious robberies occur.

Oil and the Olympic

It has been decided to increase the oil bunker capacity of the White Star liner Olympic, a job which is to be taken in hand immediately by Harland & Wolff, at Belfast. As an oil burner the great liner has given an excellent account of herself, her speed having been increased by about one knot. On one eastward voyage her average was 22.53 knots. Hitherto her oil bunker capacity has been 5068 tons, and as her consumption is about 3600 tons for a single voyage she has had to bunker both here and in America. It is proposed to give her a capacity up to 7555 tons, or more than sufficient for a round voyage. It is expected that she will be ready to take up her station again in March.

A NEW MARINE ASSOCIATION

ON January 28 representatives of a number of shipbuilders and manufacturers of marine equipment and supplies met at the Biltmore Hotel, New York City, and organized under the tentative name, Marine Equipment Manufacturers' Association. Among those who attended or who signed the call for the meeting were the following:

American Car & Foundry Company, New York.

American Engineering Company, Philadelphia, Pa.

American Steel Foundries, Chicago, Illinois.

Baltimore Dry Docks & Shipbuilding Company, Baltimore, Md.

Bethlehem Shipbuilding Corporation, Bethlehem, Pa.

Brunswick Refrigerating Company, New Brunswick, N. J.

Coen Company, San Francisco, Cal.

Columbian Bronze Corporation, New York.

Columbian Rope Company, Auburn, New York.

Charles Cory & Son, Inc., New York.

Crane Company, Chicago, Ill.

Cutler Hammer Manufacturing Company, Milwaukee, Wis.

Electro Dynamic Company, Bayonne, New Jersey.

Estate of Adolph Starke, Brooklyn, New York.

Fairbanks, Morse & Co., Chicago, Ill.

Federal Bending Machine Company, Bayonne, N. J.

Gold Car Heating & Lighting Company, New York.

Griscom-Russell Company, New York.

Horne Manufacturing Company, Jersey City, N. J.

Hyde Windlass Company, Bath, Me.

International Nickel Company, New York.

Locomotive Superheater Company, New York.

Marine Decking & Supply Company, Philadelphia, Pa.

Marine Engineering, New York.

Marine News, New York.

Naval Company, Philadelphia, Pa.

Niles-Bement-Pond Company, New York.

Page Steel & Wire Company, New York.

Paige & Jones Chemical Company, New York.

Pacific Marine Review, San Francisco, Cal.

Pneumercator Company, New York.

Pyle-National Company, Chicago, Ill.

Shepard Electric Crane & Hoist Company, Montour Falls, N. Y.

Steward Davit Equipment Corporation, New York.

Sperry Gyroscope Company, Brooklyn, N. Y.

The Texas Company, New York.

W. & J. Tiebout, New York.

Todd Shipyards Corporation, New York.

Wailes, Dove, Hermiston Corporation, New York.

Wall Rope Works, New York.

C. H. Wheeler Manufacturing Company, Philadelphia, Pa.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Williams & Wells Company, New York.

William E. Williams Valve Company, Brooklyn, N. Y.

C. A. Woolsey Paint & Color Company, Jersey City, N. J.

The objects of the association are: To advance the interests of its members; to promote good will between those who buy and those who sell marine equipment and supplies; to promote and supervise exhibits; to co-operate with other associations in the marine field to the end that their efforts for the advancement of the designing, building and operation of ships shall be most productive.

FOUR NOTABLE SEA-GOING TUGS

THE four tugs now being built and engined by the Main Iron Works of San Francisco, California, for the Shipowners and Merchants' Tugboat Company of San Francisco present some rather unusual features and are therefore thought well worthy of a full description and illustration for the readers of Pacific Marine Review.

These tugs are among the largest ever built on the Pacific Coast, the principal dimensions being: Length over all, 150 feet; length between perpendiculars, 141 feet; beam molded, 30 feet; depth molded, 17 feet, with a mean designed draft of about 15 feet no inches.

Tug Sea Lion, first of four sisters

Hull

As will be seen from the reproductions of drawings herewith, the hull is of wood, the deckhouse is of steel and the superstructure on top of the deckhouse is of wood construction. Some idea of the ruggedness of construction of this wooden hull can be gained from the dimensions of a few of the important scantlings, which are of clear grained Oregon pine with the exceptions noted: Keel, 14 inches by 14 inches with 4-inch shoe; stem, 14 inches by 14 inches with 5 inches by 2 inches iron band on forward edge; sternpost, 14 inches by 18 inches oak swelled for propeller boss; rudder post, 14 inches by 14 inches oak with steel knees and fastening plates. Frames are all double-sided 9 inches molded, 16 inches at center, 14 inches at bilge and 8 inches at deck and are spaced 28 inches between centers; keelson, 14 inches by 14 inches; sister keelson, 14 inches by 14 inches; rider keelson, 14 inches by 12 inches, and all other timbers of corresponding dimensions.

Machinery

The propelling machinery consists of a triple expansion vertical marine engine 17 inches by 25 inches by 43 inches diameter and 30-inch stroke with piston valves on high and intermediate pressure cylinders and double ported slide valves on the low pressure cylinder. Steam is furnished to these engines by two Scotch marine boilers 11 feet 6 inches diameter by 12 feet long, each fitted with two corrugated furnaces and supplying steam at 180 pounds gauge pressure under natural draft. The engines operating at 120 revolutions per minute at this gauge pressure will develop 1000 horsepower.

Auxiliaries

All of the auxiliary machinery is steam-driven independently of the main engine and consists of one 9-inch centrifugal type circulating pump driven by a 6-inch by 6-inch vertical steam engine; one vertical duplex air pump; two boiler feed pumps; one fire and wrecking pump; one boiler circulating pump; one sanitary pump; one evaporator pump, and one bilge pump; one S. and K. evaporator and one enclosed feed water heater of the Main Iron Works type fitted with bypass; one 7½ kilowatt Engeberg steam-driven electric lighting set with switchboard; one 6-inch by 6-inch American Engineering Company steam steering engine and the condenser, which is of sheet steel cylindrical construction with ¾-inch seamless brass tubing arranged for 1500 square feet of cooling surface. All of the above auxiliaries are located in the main engine room.

In the boiler room are installed the fuel oil-burning arrangements, consisting of two 4½ inches by 2¾ inches by 4 inches horizontal duplex fuel oil pumps and one four-unit oil-heater with the usual strainers, meter, and valves of Main Iron Works manufacture. Coen oil burners and furnace fronts are fitted to the furnaces of the boilers.

Cruising Radius

One very unusual feature of these tugs is the supply of fuel oil carried. As will be noted from the drawings, eight oil tanks are fitted, the main tanks being placed two aft, two amidships and two forward, with two small tanks in the forecastle, the total capacity being about 1925 barrels, which gives a steaming radius to these vessels of about 7000 miles. A large supply of fresh water is also arranged for in two tanks, each of 4700 gallons capacity, and one small galley tank of 1300 gallons capacity, all in the forward hold.

Towing Arrangements

A 14-inch by 14-inch American Engineering Company towing engine is set in the after end of the steel deckhouse, the winding drum having a capacity for 1800 feet of 1¾-inch steel towing hawser. The hawser is led through an opening in the after end of the house, passes between the heads of the massive towing bitt on deck and across a large towing roller and out over the stern. A heavy chafing iron protects the stern rail, the stern of the vessel being cut away so that at all times the hawser rides on the steel roller. At each side of the stern worked into the rail are two side bitts. A niggerhead is fitted on the stern and immediately abaft of the stem a heavy bow bitt. A 6-inch by 6-inch Main Iron Works enclosed deck type steam capstan of special design is fitted on the after deck, and a Main Iron Works 6-inch by 8-inch underdeck type anchor windlass is fitted on the main deck forward. This windlass may be operated by hand as well as steam. An anchor davit is fitted on the forward bitt and stepped on the 'tween decks, being so braced that it is capable of lifting a 5-ton anchor. This heavy anchor davit windlass and capstan are provided with the idea that in the use of the vessel for wrecking and salvaging purposes she may be prepared to lay heavy anchors at sea so as to get a proper purchase in pulling off stranded vessels, and the hull is fitted with two wooden pole masts which are equipped with forestaysail, foresail, mainstaysail and mainsail and with a complete wireless outfit. Two 20-foot lifeboats, each capable of holding 18 persons, and a 10-foot work boat are stowed on the boat deck.

Crew Accommodations

It is in the accommodations for the comfort of the officers and crew that these towboats present very unusual and praiseworthy features. The crew carried will be eighteen in number, one captain, two mates, one wireless operator, three engineers, three oilers, three firemen, three deckhands, the cook and messboy. The steel deckhouse is 89 feet long by 18½ feet wide. This houses the quarters for all of the crew except the deck officers and also contains galley, mess rooms and bathroom. It is provided with an inside passageway so that in stormy weather access can be had from forward aft without going out on the main deck.

The deck officers' quarters are in the wooden structure above the steel deckhouse, which contains also the pilot house and the radio room. All of the staterooms on both decks are fitted with lavatories and running water from a 260-gallon tank placed on the boat deck. The messrooms are immediately forward of the galley, the sailors' mess on the starboard side and the officers' mess on the port side. In addition to the daily icebox in the galley, a large icebox capable of taking one and a half tons of ice is fitted in the forehold and arranged for refrigeration of galley stores.

First Tug Delivered

The Sea Lion, first of these four tugs to be finished, was put through her trials on San Francisco Bay recently and maintained an average speed of 12 knots in several trips over the measured mile with great ease. On this trial trip the vessel was also put through a very gruelling series of maneuvering stunts, and her owners were more than pleased at the facility with which she met every test.

It is a very safe prediction that these tugs with their long cruising radius, comfortable accommodations for crew, and excellent seagoing qualities of hull, will be very much in demand for the long tows which are constantly becoming more frequent on the Pacific Coast.

PACIFIC COAST PORT WORK

Washington

Plans have been drawn by Arthur Shumway, city engineer of Vancouver, Wash., for the municipal dock, for which $130,000 was voted last June. The dock will have two slips and will accommodate five vessels. In the first unit will be one slip, an open dock and a freight shed. Bids will be advertised for as soon as specifications have been completed.

Land holdings of the Great Northern Railway at Anacortes, Wash., have been purchased by the Morrison Mill Company, which intends to build a large dock equipped with loading machinery.

The Grays Harbor port commission has purchased 107 acres of land at Cow Point. This land, added to that which the commission already owned, makes a total of 260 acres, streets and harbor areas included.

A decision of the Supreme Court of the United States upholds an act of the Washington Legislature, passed in 1913, whereby the Seattle Port Commission was granted title to the East and West Waterways' area between the property line of upland owners and the pierhead line. The Oregon-Washington Railroad & Navigation Company had contested the title of the commission.

Oregon

All Portland port bills have been passed by the Senate and House of the Oregon Legislature. These bills were introduced following the defeat of port measures at the November election. The Port of Portland Commission is authorized to acquire Swan Island, but it cannot acquire Mock's Bottom or Guild's Lake without reference to the people. An appropriation of $250,000 was made for the improvement of North Portland harbor. The membership of the commission was increased from seven to nine.

Commodity rates for the four principal goods that will be handled by the bunkers of Pier 5, Municipal Terminal No. 4, Portland, have been fixed by the Commission of Public Docks. They are as follows, bunkerage, loading or unloading and handling being included: Coal, 56¼ cents; copra, 87 cents; phosphate rock, 51¼ cents; sulphur, 76¼ cents. Coal is quoted by the long ton; the others by the short.

The Port of Astoria Commission will spend $319,000 during the next few months on construction, maintenance and dredging. Bonds to the amount of $300,000 will be sold to provide funds.

Practical completion of the latest and largest unit of the Astoria port terminals has been announced. Pier 3, with its largest single stage warehouse in America, now stands finished, save for the pavement that will be laid outside the freight shed. The pier stands today as the second largest in the world.

An effort is to be launched in Astoria for the establishment of an Astoria channel project as differentiated from the Portland project, which calls for a 30-foot channel from that city to the mouth of the Columbia. Although a depth greatly exceeding 30 feet exists at the mouth of the river and in most places as far up stream as the limits of the Port of Astoria, there is a shoal at the mouth of Young's river where but a depth slightly over 30 feet is sounded. This is sufficient for vessels capable of negotiating the up-river channel, but it is none too deep for vessels entering to load at the Astoria terminals. The coming of large vessels that will make Astoria a port of call and the construction of the Tongue Point naval base this spring doubtless will render necessary a greater depth than the 30-foot minimum now established. To secure this is the purpose of the Astoria project.

Five thousand square feet will be added to the Port Orford wharf area to accommodate shipments of lumber passing through the port.

California

The San Francisco Chamber of Commerce is opposing the transfer of harbor control from state to municipal authority at this time, said George C. Boardman, vice-president, in an address to the Warehousemen's Association.

Reviewing briefly the history of harbor control in California, Mr. Boardman said that with the single exception of San Francisco, all harbors in California have been transferred from the State Board of Harbor Commissioners to various municipalities. The San Francisco Chamber of Commerce at the general election in November supported the charter amendment, which really was an enabling act to permit the city to take over control of its harbor facilities when the time to do so is right.

However, the Chamber of Commerce is opposing the transfer of harbor control at this time, Mr. Boardman stated, because the administration of the present commissioners is eminently satisfactory to all shipping interests of San Francisco and they are now unanimously opposed to a change. Such a momentous shift of responsibility should not be made, in the view of the chamber, until a careful study of the legal and financial aspects of the transfer has been made.

This procedure, Mr. Boardman declared, was necessary in order not only to protect the shipping interests, but also to provide against any contingency that might in any way impair the ability of San Francisco to finance harbor improvements that the development of trade in the future may make imperative. The Chamber of Commerce, Mr. Boardman concluded, was opposed therefore to hasty action.

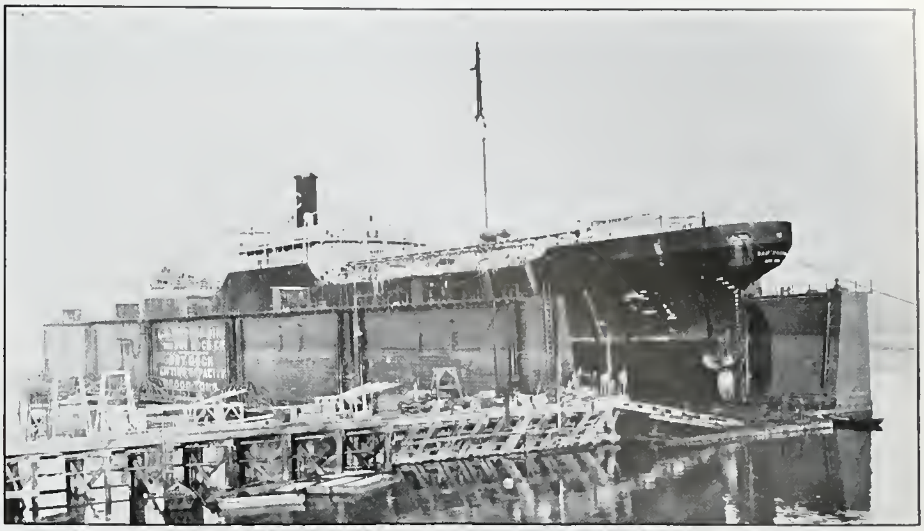
LOS ANGELES' GREAT DRYDOCK

THE two illustrations herewith show to very good advantage the large floating drydock of the Los Angeles Shipbuilding & Dry Dock Company in the inner harbor of Los Angeles. This dock lies just off the outfitting wharves of the Los Angeles Shipbuilding & Dry Dock Company's yard and is approached by a 200-foot channel subject only to a four-foot range of tide and completely protected from all storm conditions and all adverse currents which might cause trouble to ship owners.

The drydock as now operated consists of five pontoons. The sixth pontoon is now being completed and will be added to the dock, giving it a capacity for handling ships measuring up to 560 feet in length. The lifting capacity of the dock will allow it to handle a deadweight of 12,000 tons. The largest ship so far handled by the five sections now in use was the 10,000-ton tanker La Brea, which is 435 feet in length. In the last week of January the La Brea was placed upon the dock for inspection of repairs to the tailshaft, which had been effected at sea by her crew, and for cleaning the hull. Absolutely no difficulty was experienced by the dock in handling this big tanker.

The dock is electrically operated and controlled and is capable of handling, with expedition and dispatch, the largest ships coming into Los Angeles harbor.

The shops of the Los Angeles Shipbuilding and Dry Dock Company are equipped to take care of all of the machining, foundry, forging, plate and angle shop work necessary in hull or engine repairs; in fact, that company is now carrying out extensive alterations and refurnishing work on the passenger ships Yale and Harvard, an account and photographs of which will be published in a forthcoming issue of Pacific Marine Review.



Concrete tanker San Pasqual in the drydock of the Los Angeles Shipbuilding & Drydock Company

A 200-foot channel, with a 4-foot range of tide and without either currents or storms to hinder shipping, leads directly to the wharves and drydock of the Los Angeles Shipbuilding & Drydock Company in Los Angeles Harbor. The photograph shows the Union Oil tanker La Brea approaching the dock.

TRANS-PACIFIC HARBOR DEVELOPMENT

Almost $2,000,000 will be requested of the Hawaii Legislature for harbor work. The Board of Harbor Commissioners has submitted the following recommendations to Governor Charles J. McCarthy:

For Oahu—Completion of sheds on Piers 8, 9 and 10, $800,000; construction of Pier 14 and sheds, $700,000; Pier 15A, $60,000, of which $45,000 is already authorized; wharf and dredging of Kewalo basin, $300,000; oil pipelines, $40,000; approach to Waimanalo wharf, $10,000.

For Hawaii—Dredging in Kuhio bay and addition to wharfshed, $75,000.

For Maui—Track and piershed at Hana, $20,000; Mala piershed, $20,000.

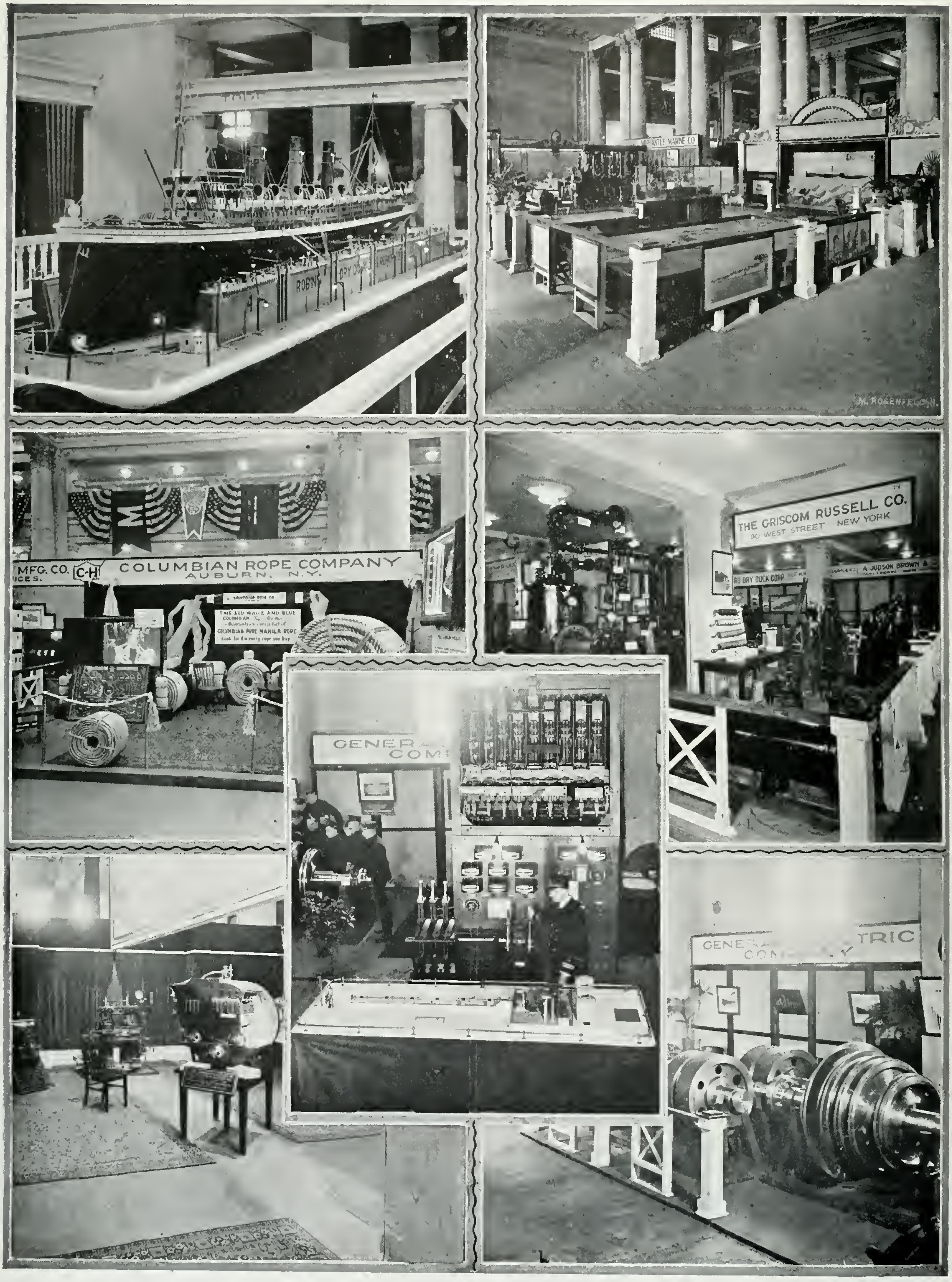
Pending action by the Federal Government on the Nawiliwili breakwater, no recommendation was made for Kauai.

According to the Japanese press of Dairen, plans for the extension of Dairen harbor facilities are rapidly crystallizing and work on the contemplated additions will be commenced in the near future. The improvements under consideration will necessitate notable extension of the present breakwater, a reclamation of marshy and waste land, and the construction of quays and piers. Manufacturers and others interested should address the South Manchuria Railway Company direct.

Plans that are being formulated in Peking for the construction of wharves along the Whangpoo south of the Woosung creek are announced in the Hongkong Weekly Press. This is referred to as a $10,000,000 project, with the ultimate aim of establishing a city for industrial purposes in competition with Shanghai. Most of the land will be reclaimed property belonging to the Ministry of Finance, and the money required for the preliminary improvements will be raised among merchants.

A group of Chinese commercial men is endeavoring to develop a port project at Hulutao, which is in the northwestern corner of the Gulf of Chihli and which would compete with Dairen.

AT THE NATIONAL MARINE EXPOSITION



Upper left, exhibit of Robins Drydock & Repair Company of the Todd Shipyards Corporation. Upper right, International Mercantile Marine & Submarine Boat Corporation. Middle left, Columbian Rope Company. Middle right, Griscom-Russell Company. Center panel, model of propelling machinery of steamship Eclipse, General Electric Company. Lower left, White Fuel Oil Engineering Corporation of the Todd Shipyards Corporation. Lower right, General Electric Company.

NATIONAL MARINE EXPOSITION

By MYRON B. STEWART

OUR congratulations go forward to the National Marine League for the exposition held under their auspices in New York City the week of January 24. While this show was not quite as large as the one held a year ago, the exhibitors were gratified over the number of visitors who displayed a genuine interest. We shall not attempt to describe in detail all the booths, nor can we hope to illustrate all the interesting features of the show, but we have selected some few photographs which reflect the character of the exhibits.

During the week of the exposition there was an informal gathering of exhibitors called for the purpose of forming an association, whose membership would comprise the shipbuilding and allied industries. It was agreed that such an association might prove valuable to safeguard the interests of these men, and accordingly a temporary organization was formed to draw up a constitution, by-laws, etc. It is assumed that in an early issue we shall have a formal and definite announcement to make containing details covering the functions of this association.

In spite of the geographical barrier of mountains, desert and prairies, three Pacific Coast organizations had booths. Allan Cunningham of Seattle had an electric cargo winch to show in conjunction with the McTaggart-Scott hydraulic telemotor he manufactures. The Pacific Mail Steamship Company had a model of the steamship Ecuador and a model of one of the new 535's which will soon be in service in Pacific Coast runs. The Coen Company of San Francisco featured their latest improved air register and showed the arrangement of their complete oil-burning equipment, including pumping unit, heaters, strainers, etc. They also demonstrated their recently patented burner lighting torch which is the only thing of its kind on the market.

The Steward Davit & Equipment Corporation exhibited their complete lifesaving equipment, having all parts installed as though on shipboard and demonstrated the full operation from the removing of the gripes to the releasing of the boat.

The General Electric space was replete with their products made for marine use. The model of the electric ship propulsion machinery of the steamship Eclipse made it clear to the laymen as to how the various units were hooked up to turn the propeller. The set of 2500 horsepower geared turbines in this booth and the sets of turbines shown by De Laval were so beautifully machined they won the admiration of all those who know something about the "mysteries" of the machine shop. Modern methods of handling cargo out of a ship's hold were shown by the operation of new equipment now exploited by the Shepard Electric Crane & Hoist Company.

Those unfortunates who cannot resist seasickness were interested in the Sperry ship stabilizer model. May the day soon come when all large passenger ships will be equipped with something of this sort, for it is a fact not to be denied that many people avoid travel by water simply because they fear and dread a recurrence of seasickness. The Sperry compass was explained in detail to the relays of visitors. Charles Cory & Son featured the Ramsey governor and had such a complete display of communicating systems that it would bewilder the reader to enumerate all of them. A non-condensing turbine, air occluder and a feed-water heater were demonstrated by the Alberger Pump & Condenser Company, whose space adjoined the American Steel Foundry Company, where a Dunn anchor filled the floor.

The corner occupied by the Hyde Windlass Company might have been termed "The Throne Room," owing to the royal purple draperies used to cover the wall and against which the polished brass and the bronze propellers blazed in glory. Since the American Engineering Company was right next to Hyde, it was an easy matter "to steer a straight course" in that portion of the show. Valves and fittings of all sizes and kinds were to be seen in the Crane, Lunkenheimer & Williams' headquarters. Then, if you wanted to get "roped in," it was such a simple matter, for Plymouth, Columbian, American, Wall & Whitlock had ropes varying from small strands to those big brutes used for towing or similar heavy jobs.

We all know that government tests are extremely severe, but these tests are frequently exceeded, and the Scovill Manufacturing Company had ample proof to show the superior quality of their metal tubing. A two-ton refrigerating plant complete with steam driven compressor, condenser, ammonia receiver and oil separator connected to a two-compartment refrigerator equipped with coils, occupied the space of the Brunswick Company. Fairbanks-Morse had a 100-horsepower "C. O." engine. Visitors to the American Balsa Company were amazed to learn how buoyant and light this balsa wood is, and of its many different uses. Another educational exhibit was that of the International Nickel Company, where one could learn of the peculiar properties of monel metal. The Baltimore Drydock booth deserves mention for its graphic method of showing how many details are involved in the hull construction of the ship. The heaters, evaporators, compressors, and other products made by the Griscom-Russell Company are shown in an illustration.

The Bethlehem Shipbuilding Corporation had a model of the Dahl mechanical oil-burning equipment in addition to several other of their marine devices. Oil-burning equipment was also shown in the Todd booth, where a new Todd burner, inclosed in glass, threw a spray to demonstrate how the oil was atomized. Todd's also had the model of the Tacoma plant illustrated in the January Pacific Marine Review. Until you see the Berwick electric rivet heater in action, it is hard to believe the claims of its manufacturer; but "seeing is believing," and visitors to this booth went away convinced.

The Luckenbach Steamship Company had a model of their terminal in Weehawken, New Jersey, and a longitudinal cross section of the steamship Lewis Luckenbach, showing just where and how cargo is stored. This proved to be a most interesting and instructive exhibit for those who were unacquainted with ship operation. Worthington had a model of the original direct-acting steam pump made by Henry Worthington in 1840, and the present type was also shown there in conjunction with nine other Worthington products. The Munson Steamship Company distributed folders featuring their Cuban and South American service. Babcock & Wilcox had a full size sectional model of their marine boiler and also an express type boiler. Both of these were fitted with B. & W. oil-burning apparatus and there was a set of valves with sections removed in order to illustrate their operation. They were featuring a new electrical boiler water testing outfit that has just been developed and which we hope to explain in detail in an early issue of our magazine.

There were many other booths at this show not mentioned in this brief resume, but to repeat our remarks in the beginning of this article, we are not attempting to describe in detail all of the interesting and unique features of this exposition.

FEDERAL SHIPBUILDING COMPANY

THE Federal Shipbuilding Company is the largest self-contained shipyard in the United States which was built during the war. It was incorporated on July 24, 1917, and during the next two and a half years not only was a permanent plant with all steel shops completed, but twenty 9700-ton freighters were delivered to the Emergency Fleet Corporation. Since December 30, 1919, the Federal has been engaged exclusively on work for private account, and has delivered eleven freighters of three types, and one tanker, besides having five 15,000-ton tankers nearing completion for the Standard Oil Company of New Jersey, deliveries starting in February of this year.

Now, at the present critical stage in the shipbuilding industry, the Federal stands equal, at least, with the other great yards of the country in its ability to compete for new contracts, and in addition its repair department has the unique advantage of being situated in the great seaport of New York. Conversely, the Port of New York gains by having a great shipyard with all its stock of ship materials and special equipment that cannot be maintained by the exclusively repair yards. General reconditionings, replacements of machinery and such major repairs as can best be performed by a big shipbuilding plant will have less occasion than formerly to leave the port.

The construction of a shipyard had been considered for some years by the United States Steel Corporation, which owns the Federal, as a logical part of its organization. The project was brought to a head by the military requirements of the nation for more ships. At the time the Federal was incorporated, the Emergency Fleet Corporation was not yet able to give financial assistance in shipyard construction, and the immediate decision to construct the yard was welcomed by Government officials. As it turned out, the Federal was one of the few shipyards building ships for the Emergency Fleet Corporation whose plant construction was financed without Government assistance of any kind. In addition to going ahead with plant construction, the Steel Corporation decided on a building program of ten ships, on which work was well under way by October 15, 1917, when the Emergency Fleet Corporation contracted for them.

Although the plant was built during the war, it was felt that economy would in the long run demand construction of a permanent character, and accordingly steel shops on concrete piles, were designed to serve the requirements of ten shipways.

The site chosen was on the Hackensack River, at the head of Newark Bay, easily accessible to Manhattan, Brooklyn, Jersey City and Newark and thus having practically the whole metropolitan area from which to draw its mechanics. The fact that it is within half hour's journey of lower Broadway now makes it unusually accessible for all ship owners, marine superintendents, underwriters and consulting engineers—a very important fact in connection with the development of a dry dock and repair business.

The first big problem met in building the yard was raising the general level of the site, which was marshy. The difficulty was met by pumping 780,000 cubic yards of wet fill from the channel in front of the shipways, and from the site of the outfitting dock. In addition, over 500,000 cubic yards of dry fill have been used.

Five shipways were completed and keels laid on them before the end of 1917. All the original ten ways, and two others built later at the request of the Emergency Fleet Corporation, were built to take 425-foot ships, while five are now lengthened to take ships up to 500 feet with a further extension possible. All the ways are decked the whole length with wood or concrete.

The buildings were designed by the American Bridge Company and were

General view of the Federal Shipbuilding plant, October 3, 1918

Outfitting basin, Federal Shipbuilding Company, Kearny, New Jersey. The new 10,000-ton drydock is being built opposite the 100-ton derrick in the basin shown here

Steamship Craster Hall receiving boilers at the Federal yard

fabricated in its shops, the field erection being performed by Post & McCord, of New York. All of them are of steel framework, on concrete piles, with an unusual amount of window sash. Some idea of the size of the plant may be gained from the fact that over 14,000 tons of structural steel was used in the buildings, with 350,000 square feet of steel sash, 125,000 square feet of terra cotta blocks and over 500,000 square feet of roofing.

From the handling of raw materials as they enter the plant to the tug boats which escort ships from the yard on their trial trips, the Federal's equipment is thoroughly efficient. Plain rolled steel is stored under overhead cranes, with sufficient area under them to permit storing the plates, angles, channels, tees and so on so that each shop can have a separate pile and is always accessible. Plates are stored mainly in vertical racks.

Mold loft, Federal Shipbuilding Company. The floor, as will be noted, is free from columns and other obstructions

Shipway crane, Federal yard

The plate and angle shop is 920 feet long by 175 feet wide. It has the usual plate and angle furnaces, shears, counter sinks, scarphing machines, punches and presses. The plate bending rolls are 37 feet long and there is a 700-ton hydraulic press for use in connection with the plate furnace. All except furnaced plates are punched on Lysholm tables. There is an outside overhead crane running the length of the shop on one side, under which most of the assembly work for floors, side frames, hatch girders and so on is carried out.

At the head of the ways, larger sections of the ship, such as bulkheads, deck houses, fan tails, forecastle heads, etc., are assembled. By using two of the moving shipway cranes at once single lifts up to forty tons have been made. As a result it is possible to drive over a third of the total rivets in a ship in the shops and on the ground.

Over the plate shop is the mold loft which has a floor 120 feet wide without a single column or obstruction. At present only 500 feet of the available length of 800 feet has been utilized, although the loftsmen have worked on as many as four types of steel ships at once.

The shipways themselves are equipped with twelve cranes, like the one shown in the illustration. Two can be used at once for making lifts of large assembled units up to forty tons. The ways are all supplied with compressed air at 100 pounds pressure and in addition most of them are piped for oxygen and acetylene for burning and welding. Electric welding circuits are also provided for each way and pumping apparatus to furnish river water for tank testing.

The equipment of the machinery division is similarly complete. Foundry materials are stored under a trestle, and the foundry itself, with two cupolas, and complete sand blast system, core ovens, etc., has been successful in turning out all types of iron castings required in building reciprocating engines, turbines, condensers and other ship machinery and fittings. With the ships which have already been built by the Federal, the foundry has on hand an accumulation of standard patterns for marine use.

The forge shop—151 feet by 300 feet—turns out practically all the forgings used by the yard. Most of the small tools used in the plant are made by Federal blacksmiths, while forged fittings and flanges are used wherever possible on the ships in place of the cast steel used by so many of the newer yards. Although young for a shipyard, the Federal has developed a spirit of workmanship excelled nowhere—a good example is the three-ball stanchion which is rolled during the forging, instead of having to be trimmed. This involves some very nice practical technique.

The boiler shop has turned out seventy-three Scotch boilers, with a minimum diameter of fifteen feet, three inches, in six consecutive months, working 44 hours per week—in addition to condenser shells, uptakes, stacks, and so on. Little more need be said of a shop with such a performance—to use a hackneyed phrase, it is the "last word" in boiler shops.

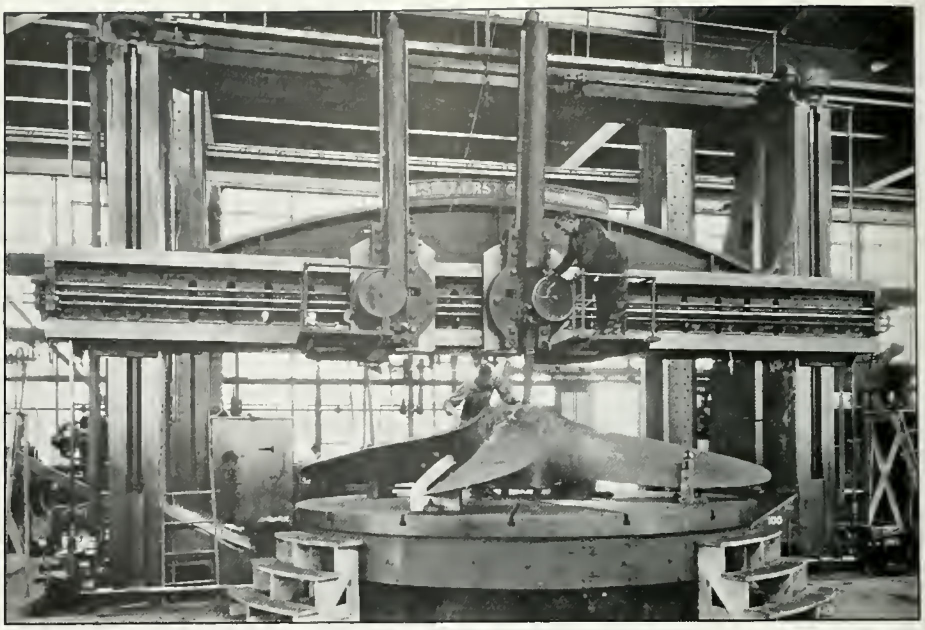
The machine shop—124 by 500 feet—is adequately equipped for marine work of all types. It is successfully building turbines and reciprocating engines, and has done some classes of work for other yards. Its equipment includes a 16 by 40 foot planer, which is shown in the illustration machining bedplates for two complete 1700 h. p.

engines at one time. Among the other larger pieces of machinery in the shop are a 25-foot boring mill (the table is 17 feet in diameter), a 12-foot planer and a 72-inch lathe.

The coppersmiths, pipefitters and sheet metal workers share a large two-story shop, while the shipwrights, outside machinists and riggers all have buildings of their own. The joiners and pattern-workers are housed over the plate shop, at the other end from the mold loft.

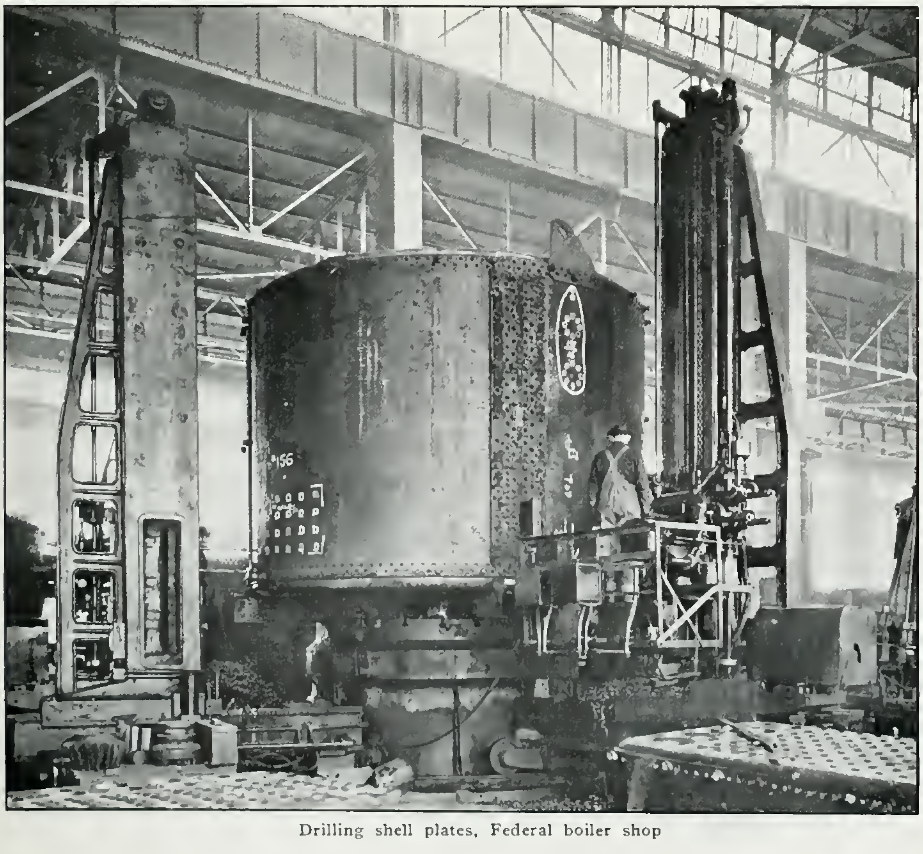
The fitting out basin, which is 250x1025 feet, is equipped with a 100-ton swinging arm derrick, which possesses unique advantages over other types of large cranes. With it, three boilers have been placed aboard new ships in less than five hours from launching. It has put over 200 boilers aboard vessels without a single accident or slip of any kind. The basin is equipped with electric capstans for warping ships without the aid of tugs.

The floating dry dock is being built in one corner of the basin. It is designed by William T. Donnelly, and will take vessels up to 450 feet in length. The pontoons are of wood while the wing walls are steel. Construction is sufficiently advanced as to make it practically certain that the dock will be in operation by July of this year.



Sellers boring mill, Federal Shipbuilding Company. On the 17-foot table an object of 25-foot diameter may be machined

The repair department of the Federal, however, is already active, having had a number of sizable jobs on ships at berths in different parts of the Port of New York. A repair barge, with unusually complete apparatus for compressing air, electric welding equipment, tool room and so on is being built and will be in operation early in the spring for ship-side repairs. A gasoline motor launch, specially built, is also provided for this work. Two large tugs escort all ships to and from the yard. With the unexcelled facilities and personnel of the entire yard at its disposal, the Federal is "making good" in repair work.



Drilling shell plates, Federal boiler shop

The performance of any plant furnishes a very fair standard of judgment for its equipment, organization and personnel. The war record of the Federal, mentioned above, gives some indication of the yard's capacity. During the year 1920, work has been entirely on ships for private account. Ten, of two types, were for the Isthmian Steamship Lines of the United States Steel Products Company and these ships have already made successful voyages to ports in the five continents. The records of the last three, the Steel Exporter, Steel Ranger and Steel Inventor are especially good, all three of them having made perfect performances in their maiden runs through the Panama Canal to the Pacific Coast. The Steel Exporter averaged 12.5 knots, fully loaded, from New York to the coast and back to Great Britain, although designed for 12 knots trial and 11.5 sea speed. The Steel Ranger made the run to San Pedro from New York in seventeen and a half calendar days. These ships are equipped with Parsons geared turbines designed by the Federal engineering department and built in Federal shops.

Seven of these "steel" ships were of this 9400-ton type and three of the 9700-ton type, modified from the similar ships designed for the Emergency Fleet Corporation. The Emergency Fleet, by the way, adopted the Federal's designs for use in several other shipyards. A 6300-ton tanker and a 6700-ton bulk freighter were also delivered during 1920, in addition to the major part of the work on the five 15,000-ton tankers mentioned above.

Marine Insurance

DEVELOPMENTS IN MARINE INSURANCE

By C. F. HOWELL

IT is always a gratifying circumstance to a marine underwriter to observe his clients taking exemplary precautions against the occurrence of those reverses that so frequently occasion him loss. Nothing, therefore, has given him more satisfaction of late than the circulating by the Merchants' Association of New York of the following observations and suggestions designed to reduce losses by better packing. They originated with a member of that body, and the ideas advanced were so excellent as to lead the Association to scatter them broadcast:

Packing for Export

During the past twelve months we have received more insurance claims than at any previous time that we have been doing export business, and the majority of these claims are for loss of several pieces of goods stolen from bales or cases while in transit, most of the losses being from cases. We believe that all finishers of textiles are interested in co-operating with the exporter with a view to eliminating as much as possible any possible losses, and from our experience we have found that one fault with much of the packing turned out by the average finisher is that the nails used in fastening the boards in the panel ends of the cases are not long enough, as, if these nails were sufficiently long, they could be turned in inside of the case and would prevent in many cases the boards from being staved in, as very often it takes very little pressure to push a board out of place, and so facilitate the pilfering of one or more pieces of goods. Furthermore, cases should be packed as tight as possible, as any surplus space does not permit the case to be rigid enough and very often a board is broken because the goods do not back up against the sides or ends in order to strengthen them.

Wood used should be as free from knots as possible, and should never be less than three-quarter or one inch lumber.

Export cases must always be strapped with extra strong strapping. "Tin" strapping is absolutely of no use whatsoever beyond "ornamenting" the case. Even if there is an additional charge to cover longer nails and heavier strapping, we believe, in the end it is most economical, and we urge all finishers where possible in so far as we are concerned to use an extra strap around the centre of the case, preferably sealed, using, if possible, one of the standard sealing straps which can be purchased in the market.

Everything which tends to prevent loss by theft and pilferage means a reduction in insurance premiums. Furthermore, goods packed strongly will always be received in better condition by the ultimate foreign consumer.

Bales should be exceedingly well pressed, so that when taken out of the press the straps are exceptionally tight and boards or "slats" should be used to prevent the strap getting on goods of a fine texture. Care should be taken when putting on the strap, as thousands of bales are received in New York every week with one or more straps missing.

A suitable form of "link" should be found to be used with straps which will not slip out, as, if care is exercised to get the strap taut, there is very little chance for even a single piece being abstracted.

We are writing this letter to the various finishers who pack goods for us in the hope that they will submit this letter to the party in charge of their packing department in order that any improvements possible will be made to insure careful packing for export.

Export goods have to travel so many miles and receive so much more extra handling than domestic packages that more care must be exercised.

The Question of Valuations

Perhaps the most serious problem of the hour to marine insurance men is the awkward combination of low valuations and high repair costs. In spite of the steady retirement of merchant vessels from the carrying trade on the plea of little business, the materials and labor involved in effecting ship repairs remain on war levels; nor is there a prospect of any immediate improvement along these lines, either here or abroad. Low hull valuations persist at the same time, and this complicates the situation greatly for the underwriter. It is a double-dilemma. All marine insurance policies are valued; the consequence is that hull valuations have to be fixed with the nicest care or else a moral hazard will immediately result. On the other hand, if valuations should be allowed to decline materially, and vessels continue to be put out of commission because they can not be employed profitably, then repair yards would have to face the problem of less work, and down would come wages and charges generally. Underwriters have, from time to time, resorted to one or another makeshift with the hope of relieving the situation, but nothing seems to have filled the bill. The one thing most needed is a substantial cut in repair costs.

Co-operation Urged

M. B. Trezevant, manager of the Insurance Department of the United States Chamber of Commerce, makes the following interesting observations with respect to marine insurance conditions:

"It is stated that the organization of the American Marine Insurance Syndicates has overcome half of the disadvantages experienced by American companies in competing with foreign non-admitted companies. The other half lies largely in the laws of the various States which do not differentiate as to taxation and legal permissions between marine underwriting, an international business, and other insurance of a strictly local or domestic character. In order to put American companies on a competitive basis, certain of these laws must be amended, and the United States Shipping Board and House Committee on

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME
JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON
E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.
FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Merchant Marine and Fisheries have made remarkable headway in creating a more favorable situation for the reception of the other proposals. The United States Chamber of Commerce is a federation of local chambers of commerce throughout the country, and of State and national business organizations, and it is by laying the facts before these constituent members that the National Chamber can be helpful in assisting them to arrive at an intelligent understanding of the situation and the important influence marine insurance has, not only upon the development of American foreign commerce, but, through such development, upon the prosperity of the country as a whole, including the local community."

This is an impressive appeal, and a very necessary one. Oddly enough, the most difficult handicap that promoters of American interests have to overcome is the indifference of Americans themselves. The solidarity of England is an example we might emulate to our great advantage. Englishmen insist upon patronizing their fellow-countrymen; and in nothing more impressively than in marine insurance. Americans, on the contrary, will run to any nationality where a trifling fraction of a rate is undercut, and the fact that they might do business with other Americans appears to mean next to nothing to them. This callous indifference has got to be overcome if there is to be an American merchant marine or any American marine insurance worth the name. Happily, there are indications that such a change is making headway. A number of national commercial organizations have recently pledged themselves to throw in their influence and business for the strengthening of national prestige and a real American merchant marine.

Motor Truck Merchandise Floaters

There is a growing demand for adequate insurance protection for merchandise shipped by motor trucks in long as well as short hauls. The increasing popularity of this method of transportation is based upon its splendid organization, its well-defined routing and its definite schedules; comparison, in many cases, being favorable as contrasted with rail or water carriage, both as to cost and time. Three types of policies are in general use:

1. That covering merchandise, the property of the assured on his own trucks.
2. Truckmen's form—Blanket.
3. Truckmen's form—Open or reporting.

The first form covers merchandise, being the property of the assured in course of delivery within the limits of the United States while on motor trucks of the assured against loss or damage caused by fire, including self-ignition and internal explosion of the conveyance, lighting, flood (meaning rising navigable waters), cyclones, tornadoes, marine perils while on ferries only, accidental collision of the truck with any other automobile, vehicle or object, overturning of the truck, or collapse of bridges. This cover also applies in temporary or emergency garages or other buildings over night where the assured cannot reasonably be expected to carry specific insurance, provided the goods are loaded on the specified trucks. If it is so desired this policy can be made to cover against the risk of fire only. Rates are, in all cases, based on the policy, being subject to the 100 percent co-insurance clause, though policies may be issued at an increased rate, subject to 90, 80, 70, 60 or 50 percent co-insurance clause. Each truck on which insurance is to attach must be specified in the policy and be completely described, i.e., year model, tonnage, make, motor and identification numbers and amount of insurance attaching, the aggregate amount of insurance on all trucks being used as the amount of the policy. Fleets of five or more trucks are subject to special rating.

In the Truckmen's Form the cover is similar to the foregoing (which is known as the Owner's Form), both in blanket and open policies, though with differing exclusions. Additional information has to be supplied; as to the number of operators employed, number of men on each truck, whether bonded or not, and details as to the character of the goods principally hauled. In the third form—the open or reporting contract—opportunity is presented for the truckman to ascertain the valuation of goods to be carried and to solicit each shipper for insurance. Thus truckmen are enabled to arrange with shippers to pay the premium or to include it in their hauling charges in each case, and thereby eliminate the necessity of carrying annual insurance to cover legal liability, the cost of which they would have to pay in advance. All risks on which insurance is desired by truckmen must be reported to the company within six hours after they become known to the assured, on blanks furnished by the company for this purpose. Policies are issued without any advance premium as the earned premiums applying to each reported risk are payable on the tenth day of each month following the date of shipment.

Interest in Proposed Waterways

Insurance, particularly marine insurance, is felt to be directly and intimately interested in the success of the proposed St. Lawrence-Great Lakes waterway; though Eastern underwriters are suspected of having large reservations because of the apprehension that the interests of New York harbor may suffer in consequence. Western insurance men argue that the opening up of the interior would be a great thing for the entire country and not for Western cities alone. They are claiming that this new water-avenue would, backed up by the new American merchant marine, solve for all time the problem of building and maintaining adequate American marine insurance facilities. No set of Western men are keener for the new route than those

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING

F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

who live in Milwaukee; for in this development scheme they believe they see their city as a great port of the future.

American Bureau Developments

A conspicuous milestone in the forward progress of the American Bureau of Shipping was set up a few days ago when that enterprising organization brought out No. 1, Vol. 1, of its new bi-monthly publication which it calls The Bulletin. It is a fine-appearing magazine of twenty-four pages, two columns to the page, and is filled with informing and interesting material. It will be sent free to anyone who will but take the trouble to send in his or her name to the Bureau, 66 Beaver Street, New York. It is devoted to the upbuilding of the American merchant marine, with particular attention to the needs of American shipowners and American marine underwriters. Captain Felix Riesenberg resigned the editorship of the National Marine to take the helm of the new journalistic vessel. It was interesting to note, in the initial number, that the Bureau has had under advisement for some time past a proposal to extend its classification facilities to the vast fleet of American craft engaged exclusively in commerce on navigable rivers and in harbors. This traffic is carried on by steamboats, towboats, barges of various descriptions, car floats and canal boats. The idea that a new set of rules for vessels of this character would be a good thing has been strengthened by the opinion of a number of leading marine underwriters, who anticipate that the elimination of certain preventable marine casualties would be reflected in the consequent lowering of insurance rates on craft of this description. Prominent boat builders on the Mississippi and Ohio have been interrogated as to their views on the subject, and highly encouraging replies have been received from them. The Bureau is arranging for the appointment of a special committee to consider and recommend a special code of rules for the construction and equipment of river and harbor vessels.

INTERNATIONAL PARCEL POST

THE Advisory Committee on International Parcel Post has been functioning very quietly and effectively in many ways. This committee, according to a recent statement by its chairman, Henry H. Morse, of the Regal Shoe Company, is composed of only 178 members and hitherto no especial effort has been made to increase its membership. As its work has "already saved millions of dollars for our foreign traders and has opened up many new fields for American enterprise," the committee now feels that it should have larger support from American exporters and importers.

The statement of Chairman Morse summarizes the committee's work as follows:

It is largely due to the activities of this committee that our parcel post service has been extended to include nearly every country in the world instead of the mere handful included less than two years ago.

It is due to this committee that the combination package which permits the sample and the sales letter to travel together at different rates of postage was introduced.

It is due to the activities of this committee that C. O. D. service with the Philippines was established.

It was largely due to this committee that the limit on weight with some foreign countries was increased from eleven pounds to twenty-two.

It was due to the advice and suggestion of the Advisory Committee that the United States delegates to the Universal Postal Union Congress at Madrid in October, 1920, successfully fought down the proposal to increase international postal rates, and, in doing so, brought about with great skill the creation of a new Pan-American-Spain Postal Convention. When this new Convention becomes effective within the next few months:

1. Domestic rates of postage will be permissible on letters addressed to Spain, and all the countries of Central and South America, including Mexico, Cuba, the Dominican Republic and Haiti;
2. Domestic rates will also apply to postal cards; and to
3. Printed matter.
4. The weight limit of newspapers, printed matter and commercial papers will be increased when sent as above from two to four kilograms, and from two to five kilograms in the maximum weight limit for single volumes of printed books. The dimensions for these articles in the form of a roll are increased to a maximum of one meter in length and fifteen centimeters in diameter.

It is our intention to continue our efforts to secure the extension of the parcel post to all territories not yet reached, to obtain the greatest increase in the weight of packages that is feasible, and to develop our foreign mails so as to render the greatest possible service to American foreign traders.

One matter of great importance to foreign traders is about to be attempted: the establishment of parcel post service with Cuba. This is not easy to accomplish, and we shall require an increased measure of support from those of our business men who use our foreign mails.

Additional information may be obtained from the executive secretary, D. W. Thayer, Winter Building, Washington, D. C.

FULL SPEED AHEAD

Pacific Shipbuilding

On February 1 shipyards of the Pacific Coast of the United States had under construction 49 steel merchant vessels of an aggregate deadweight tonnage of 516,160 and the yards of Canada had 7 vessels of 50,870. American yards declined 8 vessels of 82,340 tons from January 1; the status of Canadian yards is unchanged. The following shows the number of vessels and tonnage under construction in Pacific Coast yards of the United States on the first day of recent months: January, 57 vessels of 598,500 tons; December, 66 of 683,040; November, 73 of 746,040. The average number of deliveries a month is between 7 and 8. February will maintain that rate, but deliveries, especially of Shipping Board tonnage, will fall off for two months or so following February.

Although there are many reports of new contracts being let, some of which have little foundation, some of which have the best foundation, the yards concerned have not authorized any announcements, so that no new tonnage is to be added. Definite statements may be expected at any time, however.

A tabulated statement of Pacific Coast building as of February 1 follows:

	No. Ves'ls	Agg'te D.W.
American Yards—		
Freighters U. S. S. B.	9	87,950
Tankers U. S. S. B.	7	67,800
Tankers private	21	243,630
Freighters private	3	34,500
Tankers foreign	9	82,280
Totals	49	516,160
Canadian Yards—		
Freighters gov't	6	50,270
Freighters private	1	600
Totals	7	50,870

January deliveries: Freighters for U. S. S. B., 2 of 18,200 tons; tankers for private account, 6 of 64,140 tons; no change in tankers for U. S. S. B., freighters private and tankers foreign; total January deliveries, 8 vessels of 82,340 tons.

No Canadian deliveries in January.

United States Building

At the first of the year, reports the Bulletin of the American Bureau of Shipping, the following steel tonnage was under construction in the United States: Atlantic, 225 vessels of 1,091,909 gross tons; Pacific, 62 vessels of 429,651 tons; Gulf, 40 vessels of 136,071 tons; Lakes, 7 vessels of 14,593 tons; and interior, 111 vessels of 70,375 tons; the grand total was 445 vessels of 1,742,599 tons. Of these vessels, however, 94 were less than 500 tons in size and 116 were between 501 and 1000. Of the aggregate, 380 vessels of 1,235,184 tons were under construction for private owners, and 65 of 507,415 tons for the Shipping Board. The larger average size of vessels building for the Shipping Board, as compared with those for private owners, and the larger average of the Pacific ships, as compared with the Atlantic and Gulf, are noteworthy.

A digest of the report of Lloyd's Register for the year ending December 31, 1920, will be found in European Marine Developments, page 163.

Canadian yards in 1920 produced about 200,000 deadweight tons, of which about one-third was built on the Pacific Coast. Most of the construction was for the Canadian government.

The annual report of J. W. Isherwood shows that by the end of 1920 the number of vessels built according to his system was 1395 and the aggregate deadweight tonnage was 11,962,400. These figures are cumulative and cover all construction from September, 1907. The work of the year 1920 was 135 vessels, 1,367,700 tons. During the period September, 1907, to December, 1908, only six vessels of 31,608 deadweight tons were constructed; the 100th vessel was built in 1911, and the 1000th in 1918. The report continues:

"The figures for 1920 include oiltankers aggregating more than 1,000,000 tons deadweight carrying capacity, which is an interesting commentary on the prophecy made by our shipbuilding authorities and experts that, during 1920, there would be a world's deficit of about a million tons of oil-carrying tonnage as against the demands for oil fuel supplies. Most of the tankers included in the 1920 figures range from 8000 tons to 20,000 tons deadweight and two vessels are of 20,000 tons deadweight designed for the carrying of ore and oil.

Suitable for Other Types

"Although the general demand and the most insistent is still for oil tankers, for which type of vessel the Isherwood system is now practically universally adopted, the Isherwood system's suitability and advantages for other types of ships is evidenced by the following: a total deadweight capacity of 5,731,070 tons, representing 635 vessels, built during 1920, is divided between general cargo ships, colliers, ore steamers, passenger vessels and Great Lake freighters. This total of 5,731,070 tons is only slightly under the total of oil-tank steamers built during last year, which totaled 6,172,180 tons deadweight and represented 464 oil tankers. Of barges, dredgers and trawlers built during 1920 there were 114, of a total deadweight carrying capacity of 59,150 tons."

Oil Tanker Tonnage

The largest share of the world's tanker fleet is now owned by the United States. At the beginning of the year the number of tankers totaled 709 power-driven ships, with 124 under sail, and the gross tonnage amounted to 3,500,000, says the Bulletin of the Atlantic Coast Shipbuilders' Association. Of this aggregate tonnage the United States and Great Britain own between them 89 per cent. The Netherlands have 34 power vessels, Norway 21, France 7, Belgium 7, Italy 6 and Mexico 4. New tankers under construction number approximately 250 and it is expected that by July next the world's fleet of tankships will be increased by 121, which will bring the tonnage up to 6,500,000. In construction America ranks first with 1,700,000 tons. Tankers building in England number only 60 with a tonnage of 400,000. When tankers now under construction are completed, Great Britain will possess 315 ships, or 35 per cent of the world's tonnage, and the American oil fleet will total 390 vessels.

U. S. S. B. Work

Shipping Board vessels under construction in Pacific Coast yards February 1 totaled 16 of 155,750 deadweight tons, as compared with 18 of 173,950 tons January 1 and 23 of 218,100 December 1. Two freighters of 18,200 tons were delivered during January. Deliveries have dropped off sharply from December and November and will remain low for a few months after February, during which estimated deliveries were three. The following shows deliveries as estimated by months: March, 1; April, none; May, 3; June, 2; July, 2; August, 2; September, 2; October, none; November, 1. The estimated deliveries of February were: 5350-ton freighter Memnon by Hanlon; 8800-ton freighter West O'Rowa by Los Angeles; 7500-ton concrete tanker Peralta by San Francisco. The first of the new steel tankers of the board will be delivered by Bethlehem in May. Only one keel now remains to lay, that of the 11,000-ton freighter West Chopaka by Los Angeles, which now is estimated for March 16.

In the following table T indicates tanker and C cargo; the figures are of deadweight tonnages and the dates those of estimated delivery:

Bethlehem Shipbuilding Corporation, San Francisco: Hambro, T, 10,100, May 15; Hamer, T, 10,100, July 31; Hammac, T, 10,100, May 31.

Moore Shipbuilding Company, Oakland: West Bohemian, T, 10,000, July 14; West Tustem, T, 10,000, August 25; West Lubrico, T, 10,000, September 30.

Hanlon Drydock & Shipbuilding Company, Oakland: Memnon, C, 5350, February 5.

Pacific Coast Shipbuilding Company, Bay Point: Meanticut, C, 9400, March 15; Nashaba, C, 9400, June 30.

Los Angeles Shipbuilding & Drydock Company, San Pedro: West O'Rowa, C, 8800, February 26; West Lewark, C, 11,000, May 26; West Faralon, C, 11,000, June 21; West Greylock, C, 11,000, August 9; West Prospect, C, 11,000, September 14; West Chopaka, C, 11,000, November 20.

San Francisco Shipbuilding Company, Oakland: Peralta, T, 7500, February 21.

Returns of Pacific Yards

hipbuilding

. C. MARINE ENGINEERS & SHIPBUILDERS, LTD., VANCOUVER, B. C.

Auxiliary power schooner for Hudson Bay Com- any; 3-masted, 200 LOA; 36 beam; 15 deep; 12 oaded draft; 700 DWT; oil engines, 360 BHP, built y William Beardmore & Co.; speed 7½ knots; de- very in spring, date uncertain; vessel delayed by on-arrival of engines, ordered in England.

ETHLEHEM SHIPBUILDING CORP'N, LTD.
Potrero Works

Purchasing Agent: O. W. Street

Hammac, hull 5274, tanker for USSB; keel Nov. 0/20; launching Mar. 30/21, est; delivery May/21, st.; 435 LBP; 56 beam; 26 loaded draft; 11 loaded peed; 10,100 DWT; rec. engines, 2600 IHP; three cotch marine boilers, 15x11-9.

Alameda Works

Hambro, hull 5272, tanker for USSB; keel laying ept. 8/20; launching Mar. 10/21, estimated; deliv- ry May 15/21, estimated; 435 LBP; 56 beam; 26 oaded draft; 11 loaded speed; 10,100 DWT; rec. en- ines, 2700 IHP; three Scotch boilers, 15 x 11-9.

Hamer, hull 5273, tanker for USSB; keel laying Jov. 1/20; launch Apr. 30/21, est.; del. June 30/21, st.; sister to Hambro.

K. R. Kingsbury, hull 5306, tanker for Standard Dil Co. of California; keel laid July 2/20; launching 'eb. 7/21; delivery March 20/21, estimated; 440 .BP; 58 beam; 28 loaded draft; 11 loaded speed; 1,600 DWT; rec. engines, 3200 IHP; three Scotch oilers, 15-6 x 12-1.

Frank G. Drum, hull 5308, tanker for Ass'd Oil 'o.; keel laid Nov. 5/20; launching Feb. 18/21; de- very Apr. 1/21, estimated; 435 LBP; 56 beam; 26 oaded draft; 11 loaded speed; 10,100 DWT; rec. ng., 2700 IHP; three Scotch boilers, 15x11-9.

No name, hull 5311, tanker for Standard Oil of 'alif.; keel laid January 11/21; launching May /21, estimated; delivery Aug. 15/21, estimated; 500 .BP; 68 beam; 25-11 loaded draft; 11 loaded speed; 5,000 DWT; rec. engines, 4000 IHP; three Scotch arine boilers, 16-4 x 12-9.

No name, hull 5312, tanker for Standard Oil of 'alifornia; keel laid January 19/21; launching June /21, estimated; delivery Sept. 1/21, estimated; sis- er to hull 5311.

No name, hull 5313, tanker for Standard Oil of 'alifornia; keel laid Feb. 21/21; launching June 15/ 1, estimated; delivery Sept. 15/21, estimated; sis- er to hull 5311.

ETHLEHEM SHIPBUILDING CORPORATION
Potrero Works
Naval Work

Destroyers for U. S. Navy; 310 LBP; 30-11½ eam; 9-4 loaded draft; 35 loaded speed; 1308 tons; rbine engines, 27,000 IHP; four Yarrows boilers, as ollows: Kidder, hull 319, keel laying May 15/19 unch July 15/19; Sloat, hull 316, keel laying Jan. 8/19, launch May 14/19; Wood, hull 317, keel lay- ng Jan. 23/19; launch May 28/19; Shirk, hull 318, eel laying Feb. 13/19, launching June 20/19; Kid- er, hull 319, keel laying May 15/19, launching July 0/19; Selfridge, hull 320, keel laying Apr. 28/19, unching July 25/19; Marcus, hull 321, keel laying lay 20/19, launching Aug. 22/19; Mervine, hull 22, keel laying Apr. 28/19, launching Aug. 11/19; 'hase, hull 323, keel laying May 5/19, launching ept. 2/19; Robert Smith, hull 324, keel laying May 3/19, launching Sept. 19/19; Mullany, hull 325, keel ying June 3/19, launching July 9/20; Coghlan, hull 26, keel laying June 25/19 launching June 16/20; 'reston, hull 327, keel laying July 18/19, launching ug. 7/20; Lamson, hull 328, keel laying Aug. 13/ 9, launching Sept. 1/20; Hull, hull 330, keel lay- ng Sept. 13/20; MacDonough, hull 331, keel laying lay 24/20, launch Dec. 15/20; Farenholt, hull 332, eel laying Sept. 13/20; Sumner, hull 333, keel lay- ng Aug. 27/19, launch Nov. 24/20; no name, hull 34, keel laying Sept. 15/20; no name, hull 335, keel aying Sept. 15/20.

Submarines for U. S. Navy: S-31, hull 136; S-32, ull 137; S-33, hull 138; S-34, hull 139; S-35, hull 40; S-36, hull 141; S-37, hull 142; S-38, hull 143; -39, hull 144; S-40, hull 145, launch Jan. 5/21; -41, hull 146.

RALPH J. CHANDLER COMPANY, WILMINGTON

Purchasing Agent: G. R. Crofut.

Building sixth and last section floating drydock for Los Angeles Shipbuilding & Drydock Company; launched Feb. 5/21.

CHOLBERG SHIPYARD, VANCOUVER, B. C.

Purchasing Agent: W. Meed.

S. F. Tolmie, hull 4, four-masted barkentine for Victoria (B. C.) Shipowners, Ltd.; keel laying May 1/20; launching Dec. 28/20; delivery Feb./21; 250 OA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel, shaft logs fitted for auxiliary but no machinery installed.

Sir Henry Drayton, hull 5, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying May 15/20; launching April 1/21, est.; sister to S. F. Tolmie.

No name, hull 6, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying June 4/20; launching May 1/21, est.; sister to S. F. Tolmie.

No name, hull 7, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying Feb./21; launching Apr. 30/21, estimated; delivery May 30/21, est.; sister to S. F. Tolmie.

J. COUGHLAN & SONS, LTD., VANCOUVER, BRITISH COLUMBIA

Purchasing Agent: J. Joseph.

Canadian Transporter, hull 20, steel freighter for Canadian government; keel laying January 6/21; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; triple expansion engine, 3000 IHP; three Scotch boilers, 15-6 x 11-6.

Canadian Freighter, hull 21, steel freighter for Canadian government; keel laying January 6/21; dim., etc., same as Canadian Transporter.

CROWLEY LAUNCH & TUGBOAT COMPANY, SAN FRANCISCO
EAST OAKLAND

Purchasing Agent: John L. Crowley.

Four launches, 36 LBP; one equipped with 30 HP Frisco Standard engine; one, 25 HP Acme; one, 20 HP Acme; one, 25 HP Frisco Standard.

HANLON DRYDOCK & SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: C. H. Brown.

Memnon, hull 88, freighter for USSB; launching Sept. 28/20; delivery February/21; 305 LBP; 46 beam; 23-5 loaded draft; 10½ loaded speed; 5350 DWT; 1800 IHP engines.

HARBOR MARINE COMPANY, VICTORIA

Purchasing Agent: B. L. Robertson

Canadian Traveller, steel freighter for Canadian government merchant marine; keel Aug. 9/19; launch Sept. 29/20; 400 LBP; 52 beam; 25-2 loaded draft; 11½ loaded speed; 8390 DWT; TE eng.; three Scotch boilers, 15-6x11-6; 2 deck.

Car ferry for Canadian Pacific.

LONG BEACH SHIPBUILDING COMPANY, LONG BEACH

LOS ANGELES SHIPBUILDING & DRYDOCK COMPANY, SAN PEDRO

West O'Rowa, hull 30, steel cargo for USSB; keel laid June 14/20; launch Dec. 30/20; delivery Feb. 26/21, est.; 410 LBP; 54 beam; 24-2 loaded draft; 10½ loaded speed; 8800 DWT; TE eng., 3500 IHP; three WT boilers.

West Lewark, hull 31, steel cargo for USSB; keel laid July 30/20; 430 LBP; 54 beam; 2802 loaded draft; 10½ loaded speed; 11,000 DWT; TE engines, 3500 IHP; three Scotch single end, 15-9; launch Mar. 15/21, est.; delivery May 26/21, est.

West Faralon, hull 32, steel cargo for USSB; keel laying Sept. 27/20; dim., etc., same as West Lewark; launch Apr. 10/21, est.; delivery June 21/21, est

West Greylock, hull 33, steel cargo for USSB; keel laying Nov. 10/20; dim., etc., same as West Lewark; launch May 24/21, est.; delivery August 9/21, estimated.

West Prospect, hull 34, steel cargo for USSB; keel laying Dec. 31/20; launch July 2/21, est.; delivery Sept. 14/21, est.; sister to West Lewark.

West Chopaka, hull 35, steel cargo for USSB; keel laying Mar. 16/21, est.; launch Sept. 6/21, est.; delivery Nov. 20/21, est.; sister to West Lewark

G. F. MATTHEWS, PORTLAND

Undaunted, hull 2, 5-mast schr. for Hart-Wood Lumber Co.; launch Jan. 15/21, est.; delivery Feb. 15/21 est.; 264 LBP; 46 beam; 24 loaded draft; 3800 DWT.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: W. E. Hostetter.

West Bohemian, hull 2862, tanker for USSB; 425 LBP; 57 beam; 26 loaded draft; 10,000 DWT; rec. eng.; three Scotch boilers, 15-2x11; keel Oct. 23/20, launch May 28/21, est.; delivery July 14/21, est.

West Tustem, hull 2863, tanker for USSB; sister to West Bohemian; keel Nov. 24/20; launch June 30/21, est.; delivery Aug. 25/21, est.

West Lubrico, hull 2864, tanker for USSB; sister to West Bohemian; keel Jan./21; launch July 30/21, est.; delivery Sept. 29/21, est.

Manulani, hull 158, freighter for Matson Nav. Co.; keel laid Aug. 5/20; 480 LBP; 62 beam; 30 loaded draft; 14,000 DWT; Parson engines; five Scotch marine boilers, 15-6x12-3½; launch Feb. 20/21.

Manukai, hull 159, freighter for Matson Nav. Co.; keel laid Aug. 17/20; dim., etc., same as hull 158; launch Feb. 20/21.

Tho. H. Wheeler, hull 162, tanker for Stand. Oil Co. of N. J.; keel laid July 28/20; 10,100 DWT; launch Dec. 5/20; delivery Jan. 31/21.

H. T. Harper, hull 163, tanker for Stand. Oil Co. of Calif.; keel laying Oct./20; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engines.

Gargoyle, hull 164, tanker for Vacuum Oil Co.; keel laid Sept. 13/20; 425 LBP; 57 beam; 2603 loaded draft; 10,100 DWT; rec. engines; three Scotch marine boilers, 15-2x12; launch Jan. 9/20.

Tamihua, hull 165, tanker for S. P.-Atlantic S. S. Co.; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; rec. engines; three Scotch boilers, 15-9 x 12.

No name, hull 166, tanker for Vacuum Oil Co.; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec. engines; three Scotch marine boilers, 15-2x12; keel Dec. 9/20.

NAVY YARD, PUGET SOUND

Nitro, ammunition carrier for government; keel laying Mar. 19/19; launching Dec. 16/19; 460 LBP; 61 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp.; turbine engines, 5300 IHP; four Babcock & Wilcox WT boilers; del. Mar. 15/21, est.

Medusa, repair ship for government; keel laying Jan. 2/20; 460 LBP; 70 beam; about 19 loaded draft; 17-5 loaded speed; turbine engine, 7000 IHP; two watertube express type boilers; 10,000 tons disp.; date of launching not set.

Holland, submarine tender for government; date for keel laying and estimated date of launching not set; 460 LBP; 61 beam; about 20 loaded draft; 16 K. loaded speed; turbine engine, 7000 IHP; two watertube express type boilers; 10,000 tons disp.

NAVY YARD, MARE ISLAND

California, battleship for U. S. Navy; keel laying Oct. 25/16; launching Nov. 20/19; 600 LBP; 97-3½ beam; 30-3 loaded draft; 21 loaded speed; 32,300 displacement; turbo-electric engines, 26,800 SHP; eight Bu's express boilers, 50,984 sq. ft.

Montana, battleship for U. S. Navy; keel laying Sept. 1/20; 660 LBP; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 displacement; turbo-electric engines, 60,000 SHP; twelve Bu's express boilers, 74,040 sq. ft.

Zane, destroyer for U. S. Navy; keel laying Jan. 15/19; launching Aug. 12/19; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 displacement; geared turbine engine; 26,000 SHP; four Normand boilers, 27,000 sq. ft.

Wasmuth, destroyer for U. S. Navy; keel laying Aug. 12/19; launching Sept. 15/20; dim., etc., same as Zane.

Trever, destroyer for U. S. Navy; keel laying Aug. 12/19; launching Sept. 15/20; dim., etc., same as Zane.

Perry, destroyer for U. S. Navy; keel laying Sept. 15/20; dim., etc., same as Zane.

Decatur, destroyer for U. S. Navy; keel laying Sept. 15/20; dim., etc., same as Zane.

NORTHWEST BRIDGE & IRON COMPANY, PORTLAND

Purchasing Agent: W. C. Smith

Swiftarrow, tanker for Swiftsure Oil Trans. Co. (France & Canada S. S. Co.); 12,000 DWT; shelter-deck; Isherwood system; 465-7 LBP; 60 beam; 26-3 loaded draft; 10½ loaded speed; TE eng., 3150 IHP; three Scotch boilers, 15-5½x11-9; launch Jan. 18/21; delivery Feb./21.

Swifteagle, tanker for Swiftsure Oil Trans. Co.; sister to Swiftarrow.

Swiftking, tanker for Swiftsure Oil Trans. Co.; sister to Swiftarrow.

Swiftlight, tanker for Swiftsure Oil Trans. Co.; sister to Swiftarrow.

Swiftstar, tanker for Swiftsure Oil Trans. Co.; sister to Swiftarrow; launch Feb. 5/21.

Swiftwind, tanker for Swiftsure Oil Trans. Co.; sister to Swiftarrow.

PACIFIC COAST SHIPBUILDING COMPANY, BAY POINT

Purchasing Agent: J. A. Smiley

Meanticut, hull 949, steel cargo for USSB; keel laying July 18/19; launch Dec. 22/20; delivery Mar. 15/21, est.; 402-6 LBP; 53 beam; 26-6 loaded draft; 9400 DWT; rec. eng., 2800 IHP; three Scotch boilers, 11x15-6.

Nashaba, hull 950, steel cargo for USSB; keel laying Aug. 25/19; dim., etc., same asMeanticut; del. June 21, est.; launch Mar. 25/21, est.

PACIFIC MARINE IRON WORKS, PORTLAND

Steel hull for Port of Portland dredge Columbia; launch Feb. 21, est.; delivery April 1/21, est.

J. H. PRICE CONSTRUCTION COMPANY, ANDERSON SHIPBUILDING PLANT, SEATTLE

Wood M S Donna Lane, launch Nov. 15/20.

Wood M S Muriel, launch June 26/20.

PRINCE RUPERT DRYDOCK & ENGINEERING COMPANY, PRINCE RUPERT

Canadian Reaper, steel cargo for Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Sept. 27/19.

Canadian Thrasher, steel cargo for Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Oct. 20/19.

These vessels will be completed by the Wallace Shipbuilding & Drydock Company, North Vancouver. The terms are time and material plus 8 per cent.

JAMES ROBERTSON SHIPYARD, ALAMEDA

Purchasing Agent: James Robertson

No name, hull 102, side-wheel ferryboat for Richmond-San Rafael Ferry Co.; keel Nov. 15/20; 190 LBP; 34 beam; 17 loaded draft; 10 loaded speed; digaonal cross comp. eng., 500 IHP; two marine dry back boilers, 9 x 17.

ST. HELENS SHIPBUILDING COMPANY ST. HELENS

Purchasing Agent: A. F. Barnett

Yard closed and sold to McCormick & Christiansen.

SAN FRANCISCO SHIPBUILDING COMPANY, OAKLAND

Peralta, hull 1662, tanker for USSB; keel laid Oct. 10/18; launching Oct. 26/20; delivery Feb. 21/21, est.; 420 LBP; 56 beam; 26 loaded draft; 10½ loaded speed; 7500 DWT; rec. engines, 2800 IHP; three watertube boilers, 21,000 sq. ft.

SEACRAFT CORPORATION OF CALIFORNIA WILMINGTON

Purchasing Agent: C. D. Callahan.

Recently took over yard of Marine Equipment Co.; overhauling equipment preparatory to construction of pleasure craft.

SOUTHWESTERN SHIPBUILDING COMPANY, EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

Montebello, hull 21, Isherwood tanker for Union Oil Co.; keel laid Apr. 20/20; launching Jan. 24/21; delivery February/21, estimated; 440 LBP; 58 beam; 29-2 loaded draft; 11 loaded speed; 12,000 DWT; QE engines, 3300 IHP; three Scotch boilers, 15-6 x 12-1.

La Placentia, hull 22, Isherwood tanker for Union Oil Co.; keel laid May 20/20; launching Mar./21, estimated; delivery April 21, estimated; dim., etc., same as Montebello.

No name, hull 23, Isherwood tanker for Union Oil Co.; keel laying Dec. 22/20; delivery July/21, estimated; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engines, 2800 IHP; three Scotch boilers, 14x12.

Scopas, hull 24, Isherwood tanker for Anglo-Saxon Pet. Co.; keel laying Oct. 20/20; launch Mar./21, est.; delivery Apr., 21, est.; 412 LBP; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engines, 2800 IHP; three Scotch boilers, 15-6 x 11-7.

Silvanus, hull 25, Isherwood tanker for Anglo-Saxon Pet. Co.; keel laying Oct. 20/20; launch Apr./21, est.; delivery May/21, est.; dim., etc., same as hull 24.

Semiramis, hull 26, Isherwood tanker for Anglo-Saxon Pet. Co.; keel laying Nov. 5/20; launch May/21, est.; delivery June 21, est.; sister to above.

G. M. STANDIFER CONSTRUCTION CORPORATION, VANCOUVER, WASH.

Livingston Roe, hull 18, shelterdeck oil-tanker for Standard Oil Co. of N. J.; 11,740 DWT; QM eng.; 2800 IHP; three Scotch boilers, 14-4; Isherwood.

Calgarolite, hull 19, shelterdeck oil-tanker for Imperial Oil, Ltd.; dim., etc., same as Livingston Roe, except boilers, which are 14-9 diam.

Albertolite, hull 20, shelterdeck oil-tanker for Imperial Oil, Ltd.; dim., etc., same as Calgarolite.

W. F. STONE & SON, OAKLAND

Purchasing Officer: Lester F. Stone.

Sea Monarch, tug for Main Iron Works; delivery Feb. 21, estimated; 150 LBP; 30 beam; 16 loaded draft; 12 loaded speed.

Sea Ranger, tug for Main Iron Works; delivery Mar./21, estimated; sister to above.

Sea Scout, tug for Main Iron Works; delivery April 21, estimated; sister to above.

TODD DRYDOCK & CONSTRUCTION CORPORATION, TACOMA

Kennecott, Isherwood steel motorship for Alaska S. S. Co.; 360 OA; 49-6 beam; 22 loaded draft; 6500 DWT; McIntosh & Seymour four-cycle Diesel engines, 1200 IHP; 140 RPM; launch Jan. 6/21; delivery Feb./21, est.

Three scout cruisers for United States Navy, 555-6 LOA; 550 LBP; extreme beam 55-4; molded beam 54-9; depth molded 26; mean loaded draft 13-6; displacement 7100 tons; Westinghouse Parsons turbines and reduction gear, developing 105,000 IHP, driving four propellers; designed speed 34 knots; RPM each propeller 375 to 389; shaft HP to each propeller 24,500 max. at 389 RPM, 22,500 max. at 375 RPM; twelve Yarrow WT boilers, working pressure 265 pounds; oil-burning; twelve 6-inch rapid-fire guns, two 3-pounders, two machine guns, two twin torpedo tubes.

First of these vessels launched Dec. 14/20 and christened Omaha; keel laid by Seattle Construction & Drydock Co. July/17 but removed for merchant work; relaid by Todd Dec./18.

UNION CONSTRUCTION COMPANY, OAKLAND

Liebre, hull 12, oil-tanker for General Pet. Co.; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engines, 3000 IHP; three Scotch marine boilers, 15-4x11-8; keel June 9/20; launch Dec. 15/20; delivery Feb./21.

R. J. Hanna, hull 14, oil-tanker for Standard Oil Co. of Calif.; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engines, 3000 IHP; three Scotch marine boilers, 15-2x11-6; keel July 12/20; launch February 5/21; delivery March 15/21, est.

Acardo, hull 15, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; 412 LBP; 53-5 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec. engines, 2600 IHP; three Scotch marine boilers, 15-6x11-7; keel Aug. 7/20; launch Feb. 15/21, est.; delivery Apr. 1/21, est.

Tampa, hull 16, cutter for USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engines, 2600 IHP; two watertube boilers; keel Sept. 27/20; launch Feb. 18/21, est.; delivery April 7/21, est.

Haida, hull 17, cutter for USCG; dim., etc., same as hull 16; keel Sept. 27/20; launch Feb. 18/21, est.; delivery Apr. 7/21, est.

Mojave, hull 18, cutter for USCG; dim., etc., same as hull 16; launch June 1/21, est.; delivery July 15/21, est.

Modoc, hull 19, cutter for USCG; dim., etc., same as hull 16; launch June 1/21, est.; delivery July 15/21, est.

Shawnee, hull 20, cutter for USCG; 150 LOA; 30 beam; 13-6 loaded draft; 12½ loaded speed; 1000 DWT; rec. engines, 1000 IHP; two watertube boilers.

Achatina, hull 21, oil-tanker for Anglo Saxon Pet. Corp., Ltd.; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec. engines, 2600 IHP; three Scotch marine boilers, 15-6x11-7; keel Dec. 15/20.

Ampullaria, hull 22, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; same dim., etc., as hull 21.

Amalthus, hull 23, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; same dim., etc., as hull 21.

All cutters on transverse system; others on Isherwood system.

WALLACE SHIPBUILDING & DRYDOCK CO., VANCOUVER, B. C.

Canadian Skirmisher, cargo for Canadian government; 8400 DWT; 413 long; 52 beam; 31 deep; 11½ loaded speed; keel Oct./20; launch Feb. 28/21, est.; delivery Apr./21, est.

Coastwise steamship for Canadian Pacific; 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel Oct./20; launch May/21, est.; delivery Aug. or Sept./21, est.

This company also will complete the Canadian government steamships Canadian Reaper and Canadian Thrasher, each of about 8400 tons deadweight, work on which was suspended when the Prince Rupert Drydock & Engineering Company went into the hands of a receiver.

Miscellaneous Construction

ALBINA ENGINE & MACHINE WORKS, PORTLAND

Building pontoon for Portland Dock Commission; four sections delivered, last to be completed about Feb. 15/21.

BABCOCK & WILCOX COMPANY, CHARLES C. MOORE, SAN FRANCISCO, PACIFIC COAST MANAGER

Steamer Pacific, Pacific Marine Iron Works, installation of two Babcock & Wilcox marine boilers.

COLUMBIA STEEL COMPANY, PITTSBURG, CALIFORNIA

Steel castings for many steel vessels now under construction in the Pacific Coast yards, including dreadnought Montana and sister ships 49, 50, 52; also for Coast Guard cutters under construction in the Union Const. Co. yard.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING COMPANY, PHILADELPHIA

Twelve Parsons manganese bronze propellers for scout cruisers 4, 5 and 6 building by Todd Drydock & Construction Corporation, Tacoma. Two right-hand and two left-hand propellers for each vessel. Weight of propellers 13,200 pounds each; diameter 11-3; pitch 11-10.

ALLAN CUNNINGHAM COMPANY, SEATTLE

On order and under construction: 6 steam and electric steering gears; 13 steam and electric anchor windlasses; 18 steam and electric and hydro-electric and hand capstans; 37 steam and electric winches.

DOW PUMP AND DIESEL ENGINE COMPANY, ALAMEDA

H. T. Harper, motorship for Standard Oil Company; one 200 IHP, two 267 IHP Diesel auxiliary electric drive engines.

FORD & GEIRRINE, AGENTS, SAN FRANCISCO

McNab direction indicator, mfd. by the McNab Company, for hulls 12, 14 at Union Const. Co., hull 163 at Moore's; Willett-Bruce whistle control, mfd. by the McNab Co., for hull 14 at Union Const. Co., Brown steam tiller, Hyde Windlass Co., for hull 5308 at Bethlehem; National stockless anchors, Upson Walton Co., for hull 165 at Moore's; Dean feed pumps, Dean Bros. Steam Pump Works, for 166 at Moore's; Reliance forced draft equipment, John Reid & Co., for hulls 165, 166, at Moore's; National stockless anchors, Upson Walton Co, hull 166, Moore; Dean feed pumps, Dean Bros. Steam Pump Works, hull 23, Southwestern; Balsa wood for cold storage spaces, hulls 158, 159, Moore, hull 14, Union Construction, hull 5306, Bethlehem; Willett Bruce whistle control, McNab Co., hulls 16, 17, 18, 19, Union Construction, hulls 19, 20, Standifer, and Yale and Harvard; Tracy steam purifiers, Tracy Engineering Company, Yale and Harvard; ten sets Welin davits, American Balsa Company, hulls 158, 159, Moore; McNab direction indicators, McNab Co., hulls 16, 17, 18, 19, Union Construction, hulls 21, 22, Southwestern; Reliance forced draft equipment, John Reid & Co., hull 23, Southwestern; Anchor chain, Lebanon Chain Co., hull 23, Southwestern; windlass, gypsy and steering gear, Hyde Windlass Co., hull 20, Union Construct'n.

LIDGERWOOD MANUFACTURING COMPANY, NEW YORK, SAN FRANCISCO, LOS ANGELES

One 10x10 inch screw gear steering engine for U. S. S. Holland building at Puget Sound Navy Yard.

One 13x13 inch automatic tension towing engine for Merrill-Ring Lumber Co.'s tug Wanderer.

LLEWELLYN IRON WORKS, LOS ANGELES

Five marine engines for G. M. Standifer Construction Corporation, 24½ x 41½ x 72, 48 stroke, TE, 2800 IHP.

One for steamship Montebello, Southwestern Shipbuilding Company, 24 x 34 x 51 x 74, 54 stroke, QE, 3300 IHP.

One for tanker Liebre, Union Construction Co., 27 x 47 x 78, 48 stroke, TE, 3200 IHP.

One for tanker Hanna, Union Construction Co., same dimensions as above.

MAIN IRON WORKS, SAN FRANCISCO

Purchasing Officer: B. W. Bengston.

Three tugs for Shipowners' & Merchants' Tug Boat Co.; 150 over-all; 30 beam; 16 loaded draft; TE engines, 1000 IHP; two Scotch marine boilers, 11-6.

MARINE IRON WORKS, CHICAGO

Five hundred special ice machines.

SKANDIA PACIFIC OIL ENGINE COMPANY, OAKLAND

Purchasing Agent: A. Bolander.

Ten 850 BHP Werkspoor Diesel engines building for USSB; 6 cyl., 135 RPM; three delivered.

Ten 140 BHP 4-cylinder Skandia engines for self-propelled barges on Erie Canal.

Fifteen 16 BHP 1-cylinder Skandia engines, auxiliaries for above; deliveries of Erie Canal engines to be made by Apr. 15/21.

One 180 BHP Skandia 2-cyl. stationary engine for driving generator, Benguit Consolidated Mining Co., delivery in April.

STEWARD DAVIT & EQUIPMENT CORPORATION, NEW YORK, SAN FRANCISCO, SEATTLE

Steward davits are being installed in the following: At Alameda works, Bethlehem S. B. Corp.; Yerba Linda, hull 5307, for Gen. Pet. Co. At Union Linda, hull 5307, for Gen. Pet. Co. At Union Const. Co.: Coast Guard cutters, hulls 16, 17, 18, 19, for U.S.; Liebre, hull 12, for Gen. Pet. Co..

At Todd's: SS. Edmore.

At Long Beach: SS. Mazatlan.

At Moore's: hull 164, for Vacuum Oil Co.; M. F. Elliott, hull 161, for Standard Oil Co. of N. J.; Thos. H. Wheeler, hull 162, for Standard Oil Co. of N. J..

For Pacific SS. Co.: Admiral Schley.

For Swiftsure Oil tankers building at Northwest Bridge & Iron Company as follows: Swiftsure, Swiftarrow, Swiftwind, Swiftstar, Swifteagle, Swiftlight, Swiftking.

For Canadian Pacific steamer building at Wallace yard, Vancouver, B. C.

UNION GAS ENGINE COMPANY, OAKLAND

Purchasing Agent: E. H. Cole

rydocking and Repairs

BETHLEHEM SHIPBUILDING CORP., LTD.

Potrero Works

New tailshaft: SS. Lansing. New propeller: M.S. ronite. Engine and hull repairs, drydocking and inting; M.S. Borgland, SS. Lurline; Palo Alto; an Jose; Wilhelmina. Miscellaneous repairs: SS. ichmond; U. O. Co. Barge No. 3; SS. Montrolite; . S. A. T. Thomas; SS. Rose City; SS. Edw. uckenbach, Point Adams, Creole State, Lyman tewart, Texan, Liberator, Arizona; Barge Olinda, anta Paula, Simla. Engine, boiler, hull repairs: S. Mexican, Maui, West Nilus; Tug Wyaddo. Mis- llaneous repairs, drydocking and painting: SS. road Arrow, Klamath, Shabonee, Gorontale, Tah- ee. Install new blades: SS. West Cusseta. Re- irs to oil lines: Barge Fullerton. Make and in- all propeller blade: SS. Lurline. Install sea suc- on for fire pump, drydocking and painting: SS. est Nilus. Miscellaneous repairs, work in connec- on with survey: SS. Bradford. Labor and material ordered: SS. War Ghurka. New gypsy for wind- ss: SS. West Carmona.

Alameda Works

Miscellaneous repairs, drydocking and painting: Pilot boat Adventuress; Tug Sea Eagle (also new stem and stem shoe); SS. Griffco, Arctic, Humboldt; Barge Benicia. Miscellaneous repairs: SS. Algonquin, Tiverton; Barge Sampson. Alterations to deck fitting: SS. West Isleta. Install electrical telemotor: SS. Palo Alto. New propeller: SS. Halco, Daisy. Engine, boiler, hull repairs, drydocking and painting: SS. Carmel. Miscellaneous repairs: retubing condenser, drydocking, painting: SS. Idaho.

RALPH J. CHANDLER COMPANY, WILMINGTON

Reconditioning SS. Harvard to be completed in approximately sixty days.

MAIN IRON WORKS, SAN FRANCISCO

Repairs to SS. Multnomah, Centralia, Sierra, Anne Hanify.

MOORE SHIPBUILDING CO., OAKLAND

Drydocking, cleaning, painting and miscellaneous repairs: SS. Eastern Exporter, Coalinga, Marin, Yerba Buena, Krakatau, Rainier, Memnon; Stm. Schr. Northland; Tug Fearless; SS. Ventura (also extensive engine repairs). Drydocking and miscellaneous repairs: SS. Dilworth. Extensive engine repairs: SS. Pomona, West Kebar, M. F. Elliott, Thomas H. Wheeler; Ferry Str. Ed. T. Jeffery.

NAVY YARD PUGET SOUND

Drydocking, cleaning, painting bottom, miscellaneous alterations and repairs: Houston, Pawtucket, Charlotte, Swallow. Placing out of commission: Armored cruisers Seattle, Missoula. Miscellaneous repairs: Destroyers Rathburne, Talbot, Roper, Mackenzie, Renshaw, O'Bannon, Hogan, Howard, Stansbury, Welles, Aulick Turner, Gillis, Delphy, McDermut, Edwards; Minesweeper Ortolan; Patrol Eagle No. 57; Light vessel No. 92; Subchasers 295, 301; Tugs Pawtucket, Sotoyomo, Tatnuck, Iroquois.

SOUTHWESTERN SHIPBUILDING COMPANY, EAST SAN PEDRO

Repairs to windlass: SS. Eastern Sword. H. P. Valve: SS. Creole State. Piping: Edward Luckenbach, Union Oil vessel. General repairs: SS. West Holbrook.

W. F. STONE & SON, OAKLAND

General overhauling, recaulking, etc.: Schr. Melrose; Subchaser No. 289. Recaulking and repairs to stem: Tug Arabs. Miscellaneous repairs: Schr. Fiorgyn. Decks recaulked: SS. Stanley Dollar.

West Coast Yard News

Bethlehem

Fifteen destroyers were under construction at the Potrero works of the Bethlehem Shipbuilding Corporation on February 1. The yard estimated that three would be delivered during February, and five, the record number, in March. All told, the Potrero works held contracts for the construction of 66 of these vessels. There were 11 submarines building February 1, none of which will be delivered during the next few months.

Bethlehem has laid the keels of two 15,000 deadweight ton tankers for the Standard Oil of California, the keel of hull 5312 having been laid January 19 and that of hull 5313 February 21. The keel of the first 15,000-tonner for the Standard Oil, hull 5311, was laid January 11. The 10,100-ton tanker Frank G. Drum, being built for the Associated Oil Company, was launched February 18 and will be delivered about April 1. The tanker K. R. Kingsbury, an 11,600-tonner for the Standard Oil of California, was launched February 7 and will be delivered in late March. Two deliveries were made during January, the 10,100-ton tanker Crampton Anderson to Pan-American Petroleum and the 10,100-ton tanker Yorba Linda to General Petroleum.

Chandler

The Ralph J. Chandler Company, Wilmington, launched the sixth and last section of a 12,000-ton floating drydock for the Los Angeles Shipbuilding & Drydock Company February 5. This drydock is the first on Los Angeles Harbor.

Cholberg

The first of four barkentines building for the Victoria (B. C.) Shipowners, Ltd., by the Cholberg Shipyard, Vancouver, B. C., was scheduled for delivery in February. She is named S. F. Tolmie. The revised schedule of the yard provides for launching the second, the Sir Henry Drayton, April 1 instead of January 15; of a sister, unnamed, May 1 instead of February 25; and for laying the keel of a fourth sister in February instead of December, 1920.

Coos Bay

The Coos Bay Shipbuilding Company's yard, which constructed ten wooden vessels for the Shipping Board during the war, has been dismantled and all equipment has been removed.

Hanlon

Work of the Hanlon Drydock & Shipbuilding Company, Oakland, for the Shipping Board was completed with the delivery of the 5350-ton freighter Memnon in February.

Los Angeles

The launching of the 12,000 deadweight ton freighter West Lewark, under construction by the Los Angeles Shipbuilding & Drydock Company for the Shipping Board, scheduled for February 25, has been postponed to the middle of March, and delivery now is estimated for late May. Immediately after the launching the keel of the sister ship, West Chopaka, will be laid. This will be the last keel for the Shipping Board on the Pacific Coast.

Moore

Moore Shipbuilding Company, Oakland, launched the two 14,000 deadweight ton freighters Manulani and Manukai, under construction for the Matson Navigation Company's Hawaiian trade, February 20. These vessels are the largest freighters (or tankers, for that matter) built on the Pacific Coast up to this time, but their record will not last long, inasmuch as the Moore yard has a contract for a 16,340-ton tanker, Tamihua, for the Atlantic Steamship Lines of the Southern Pacific. Moore laid the keel of the tanker West Lubrico, the third of three sisters building for the Shipping Board, on January 26, and now has all board work on the ways. The name H. T. Harper will be given to the 4750-ton tanker under construction for the Standard Oil of California. This vessel was to be named F. H. Hillman. The 10,100-ton tanker Thomas H. Wheeler was delivered to the Standard Oil of New Jersey January 31.

Northwest Bridge

Northwest Bridge & Iron Company, Portland, launched the 12,000 deadweight ton tanker Swiftstar for Swiftsure Oil February 5, and delivered the sister Swiftarrow the same month. The first vessel of seven, the Swiftsure, was delivered in January.

Pacific Coast

Of two 9400-ton freighters for the Shipping Board, Meanticut and Nashaba, being built by the Pacific Coast Shipbuilding Company, Bay Point, one is scheduled for delivery March 15 and the other in June.

Pacific Marine & Construction

The Navy has taken the plant of the Pacific Marine & Construction Company, San Diego, at which two concrete tankers were built, and will convert it into a repair base, the 75-acre site and equipment having been turned over by the Shipping Board to the Navy. A marine railway, machine and woodworking shops and concrete piers will be maintained for the repair of destroyers, minesweepers and other craft stationed at San Diego.

Pacific Marine Iron Works

A new steel hull for the port of Portland's dredge Columbia was scheduled to be launched in February and delivered in April, with the machinery of the old Columbia installed.

Prince Rupert

Advices from Prince Rupert confirm the report that the Wallace Shipbuilding & Drydock Company, North Vancouver, B. C., would complete the steamships Canadian Reaper and Canadian Thasher, each of 8390 tons deadweight, which were building at the yard of the Prince Rupert Drydock & Engineering Company. This company recently failed, liabilities approximating $800,000. The Wallace yard will complete the two vessels for material and labor plus 8 per cent.

St. Helens

The wooden yard of the St. Helens Shipbuilding Company, St. Helens, has been closed and sold to McCormick & Christiansen. No statement has been made as to the disposition of the yard.

San Francisco

Delivery of the last concrete vessel for the Shipping Board, the tanker Peralta, formerly scheduled for January, is estimated for late February. She was built by the San Francisco Shipbuilding Company, Oakland.

Seaborn

The Seaborn Shipyards Company's plant, Tacoma, which built wooden vessels during the war, has been completely dismantled, buildings, machinery and piling, etc., having been removed.

Southwestern

Names have been given to three 8400 deadweight ton tankers under construction by the Southwestern Shipbuilding Company, Los Angeles, for the Anglo-Saxon Petroleum, as follows: hull 24, Scopas; hull 25, Silvanus; hull 26, Semiramis. The revised schedule of the yard calls for: Scopas, launching March, delivery April; Silvanus, launching April, delivery May; Semiramis, launching May, delivery June. The yard expected to deliver the 12,000-ton tanker Montebello to Union Oil in February and to launch her sister La Placentia in March, with delivery in April.

Standifer

Work on the 11,740-ton tanker Livingston Roe, built by the G. M. Standifer Construction Corporation, Vancouver, Washington, for the Standard Oil of New Jersey, is nearing completion. This vessel is the last of three sisters for the Standard of New Jersey, but two more, Albertolite and Calgarolite, are building for Imperial Oil.

Union Construction

Union Construction Company, Oakland, delivered the 10,200 deadweight ton tanker Liebre to the General Petroleum Company in February. This is the second vessel delivered to General Petroleum recently, the other, and the first of the company's fleet, having been the Yorba Linda, built by Bethlehem. Union Construction launched the 10,200 ton tanker R. J. Hanna for the Standard Oil of California February 5. Names have been assigned to the four Anglo-Saxon Petroleum tankers as follows: hull 15, Acardo; hull 21, Achatina; hull 22, Ampullaria; hull 23, Amalthus.

Yard Notes

A suit has been brought by the Pacific Marine Iron Works, Portland, against the Emergency Fleet Corporation for $590,000. The company asserts that the corporation failed to provide hulls for outfitting as contracted for; that profit payments and direct labor charges were not paid; that $100,000 was uselessly expended in plant extensions by oder of the corporation and that the company was compelled to keep its plant open for a year after the cancellation of the contract.

Captain James Fowler, arbitrator of one of the claims of the Patterson-McDonald Shipbuilding Company against the Commonwealth of Australia, has awarded the company $74,079. The award concerns equipment. Captain Fowler is Lloyd's surveyor at Portland.

The Six-Minute Ferry Company, Vallejo, California, is preparing plans for the first of three ferries that will be placed in operation between Oakland and San Francisco.

With Atlantic Builders

Association Moves

The Atlantic Coast Shipbuilders' Association has announced the removal of its general offices from 30 Church Street, New York City, to 1701 Walnut Street, Philadelphia. All future activities will be conducted from Philadelphia.

Cramp

The 12,500-ton cargo motorship William Penn, the last ship built at the Gloucester yard of the Pusey & Jones Company and which was towed to the Cramps' shipyard to be completed when the Gloucester yard ceased operations, has been completed and delivered to the United American Lines.

Federal

The Federal Shipbuilding Company, New York, launched the twin-screw tanker Walter Jennings, 15,000 tons deadweight, for the Standard Oil Company of New Jersey, February 9. She was the first of five sisters for the Standard Oil and the largest vessel built in the port of New York. She entered the water with the engines and boilers aboard, steam up, and whistles blowing.

The Walter Jennings is the most complex, and one of the largest, single objects produced by the United States Steel Corporation. Except for the nonferrous metals, wood, some of the minor machinery and mechanical devices, and a few steel castings, she is the product of corporation subsidiaries. Steel made in Pittsburgh, from ore mined and transported by constituent companies, is used to make and rivet the hull. Boiler plates come from the Gary mills. The pipe is all made by a subsidiary, and most of the sheet metal, and wire and cables, as well as many of the bolts, large forgings, and billets and pig iron used as raw material in the Federal blacksmith shop and foundry. When it is realized that the Steel Corporation mines its own coal and limestone, it is safe to say that no other single organization in the world comes so near being self-sufficient in building ships.

Favorable progress is reported in the construction of an 8000-ton floating dry dock for the Federal Shipbuilding Company, Kearny, New Jersey.

Fore River

Fore River plant, Bethlehem Shipbuilding Corporation, launched the tanker India Arrow, a sister to the Japan Arrow and China Arrow, for the Standard Transportation Company, New York, on January 29.

Fuller

The George A. Fuller Company, Carolina Shipyard, Wilmington, North Carolina, on January 29 launched the San Lamberto, the first of the steel tankers building for the Eagle Oil Transport Company, London. These tankers are 9200 tons deadweight, with reciprocating engines and Scotch boilers, and built for 10½ knots speed.

Harriman

The Harriman yard, Merchant Shipbuilding Corporation, agent for the Shipping Board, has completed its fortieth and last 8800-ton freighter for the government. The yard will be turned back to the Shipping Board. The Chester yard of the Merchant corporation launched the combination vessel Mount Clinton for the Shawmut Steamship Company February 7.

Hog Island

Hog Island was turned back to the Shipping Board by the American International Shipbuilding Corporation February 4, having built and delivered 122 vessels. The contract for the construction of the yard was signed September 13, 1917; ground was broken September 15; the first keel was laid February 12, 1918; the first vessel, Quistconck, was launched August 5, and the last, Manatawny, July 21, 1920. During 1920 the yard led America with 46 vessels of 399,950 gross tons. In the year April 18, 1919, to April 17, 1920, the yard launched seventy-nine vessels and delivered seventy-four.

Secretary of War Baker summed up Hog Island's work well in a statement issued in Washington on January 22: "Hog Island is one of the great monuments of the war. Perhaps no achievement of the war was so remarkable as this shipbuilding yard. The trial trip today of the last ship built there, the Aisne, closes with a picturesque sight a very great undertaking."

League Island

Captain Louis McCoy Milton, commandant, is quoted as saying that the cut in the appropriation for the League Island Navy Yard, Philadelphia, from $1,200,000 to $200,000 will not make any material difference in the conduct of the yard; for some time to come at least, as work will be provided for in the appropriations under another heading. Work on battle-cruisers will be continued.

New York

New York Shipbuilding Corporation's 1920 production is summarized in Yorkship News as follows:

	1919	1920
Number of ships	20	23
Tonnage, gross	88,977	161,118
Tonnage, deadweight	85,608	161,233
Indicated horsepower	430,450	406,950

"The prospects for 1921 are that we will easily be the banner yard in delivering passenger ships, no less than twelve such being probable deliveries; a list of which even Harland & Wolff could be proud. We will also turn over quite a fleet of oil tankers, if all goes well. The new year will probably see two battleships launched and the balance of the destroyers delivered."

Perth Amboy

It is reported that the Perth Amboy Dry Dock Company will soon install a new 10,000-ton electrically operated dry dock at its plant at the foot of Broad Street, Perth Amboy, New Jersey.

Standard

The 8400-ton tanker San Teodoro, of the Gold Shell type, built by the Standard Shipbuilding Corporation, New York, for the Eagle Oil Transport Company, had her sea trial February 4, attaining an average of 11.22 knots. She is the first oil-tanker built by an American yard for British account. The Standard yard has launched the sister ship, San Tiburcio. Both are Isherwood-framed.

Submarine Boat

The Submarine Boat Corporation on January 27 launched the Susparco, the 148th fabricated vessel built at the Newark Bay yard. She is of 5075 deadweight tons and will have a speed of 10½ knots. The 150th and last vessel was scheduled to be launched in late February. Of the complete program of the yard, 118 vessels were delivered to the Shipping Board and the remaining thirty-two were taken over by the builders. No definite announcement has been made of the future of the yard.

In Oriental Plants

Japanese Building

During 1920 Japanese shipyards constructed 460,000 gross tons of vessels, according to returns of the Department of Communications. Ninety-four vessels of 424,815 tons exceeded 1000 tons gross. The output of vessels exceeding 1000 tons in 1919 was about 600,000, so that the 1920 production declined sharply. The peak of production was attained in March, during which 13 vessels of 58,330 tons were built; and thereafter the output steadily declined, due principally to the completion of numerous steamers for the United States Shipping Board, until the December production (estimated) was 22,000 tons.

Yards Closing

Japanese authorities state that wages remain high and that steel costs yen 220 and yen 230 a ton, but that, despite increased costs of construction, shipping companies demand such low bids that work cannot be undertaken. Consequently, yards are closing. The Harada Dockyard Company's plant, established in 1903 at Osaka, has been taken over by the Osaka Iron Works; the Nitta yard is offered for lease; the Osaka shipyard, after undertaking the construction of trawlers, has suspended operations, and the contracts held have been taken over; the Aizawa yard has suspended work; the Namura plant has begun the construction of boilers and pipe; and the Osaka Ceramic Company, the shipbuilding plant of which was a spectacular "war baby," has been leased to Fujinagata.

Would Abolish Duties

Government aid for shipbuilding is being discussed in Japan. Prior to July 24, 1916, shipbuilding subsidies were granted to vessels built in Japan, the amounts a gross ton ranging from yen 11 to yen 22, in addition to yen 5 for each indicated horsepower, but vessels of less than 1000 gross tons were excluded from the grants. Since July, 1916, however, no subsidy certificates have been granted, although payments under old certificates continued to be made. The largest amount paid in any year was for the twelve months, April 1, 1916, to March 31, 1917, during which yen 5,210,913 was granted.

Now the proposal has been made that the Government abolish duties on steel and timber used in shipbuilding and on machinery that cannot be produced cheaply in Japan and on patented devices. As is well known, Japan is dependent upon other countries for steel, despite some strenuous efforts to develop supplies at home, such as the large plants of Mitsubishi in Korea and, more recently, the reduction of volcanic oxides. This latter could have little significance except in the event of war, when price would be secondary. Quite a flurry was caused recently in the United States by the publication of reports that the Government's Yawata steel plant would have an output of 100,000 tons a month. Well informed Americans detected something wrong with the figure, and their conclusion is borne out by a report from Commercial Attache Abbott, who says that the production will be 300,000 tons of iron and steel a year. Though the production for 1920 was estimated at 400,000 tons, it has been learned from the chief of the foundry that the general business inactivity and the dull situation of the iron industry during the year caused a decrease in output. About October 1, 1920, the foundry held unsold about 70,000 tons of goods in addition to 330,000 tons of stock held in warehouses and by private concerns. Two open-hearth furnaces have recently been purchased by the foundry at approximately $300,000, and it is expected that additional equipment will shortly be acquired.

Four in China

In China the principal interest of Americans centers upon the four large freighters being built by the Kiangnan Dock and Engineering Works, Shanghai, for the United States Shipping Board. These are the last vessels under construction in foreign yards for the United States Government. Each is of 10,000 tons deadweight, oil-burning, with a large, deep tank built into the structure of the vessel aft of the engine room, and equipped with Shipping Board Scotch boilers and reciprocating engines. At the middle of January the status of the four was: Mandarin's trial trip expected to be held before the end of the month, delivery in the United States to be made about April 1; Celestial in the water; Oriental to be launched probably in February; Cathay delayed, awaiting shell plating on order in the United States. Deliveries of all the vessels probably will not be made until the autumn. Messrs. Perry, Ware and Merriman, formerly of the Yokohama office of the Shipping Board, are at Shanghai supervising construction at the Kiangnan yard.

Port Contract Signed

According to reports received by Consul March, the Secretario de Comunicaciones y Obras Publicas, Mexico, D. F., has signed a contract granting a concession for the construction of port works consisting of an aerial tramway and docking island in the harbor of Progreso. It is estimated that it will cost about $1,000,000 to complete the work, which is to be privately financed and operated on a toll basis.

WITH THE EXPORTERS AND IMPORTERS

Conference Breaks

Shippers who delight in falling tariffs and rate wars, actual or potential (those who did not would be slightly more than human), will find the present situation man), will find the present situation quite to their liking. No indiscriminate warfare has developed at the time of this writing, but the forces are being marshalled. The Pacific Westbound Conference has lost a powerful member, the Java-Pacific Line, and efforts to restore harmony have failed signally. Nor is this all. The defection of one member will result in the withdrawal of others, or, what amounts to the same thing, in the breaking away of outside lines that have maintained informal agreements with the conference.

Rumblings are to be heard in trade routes other than the trans-Pacific, notably in the intercoastal, which for several months has been the one remunerative route for American operators. Eleven lines in all are engaged in this business. Consequent upon the increased tonnage, but more upon the employment of Shipping Board vessels by some companies, powerful private parties have become restive, as is evidenced by the statement of W. A. Harriman of the United American Lines before the Shipping Board.

Railroad Increases to Blame

Early in February the Java-Pacific Line announced its withdrawal from the Pacific Westbound Conference. Prior to this action, however, the company had sought a reduced rate on steel manufactured on the Pacific Coast and shipped to the Orient. This new rate would have been $6.50, as against the conference rate of $11.25. At a meeting of the San Francisco committee of the conference the reduction was approved, only to be defeated by the Seattle committee; thereupon the Java-Pacific withdrew.

Since the railroad rate increases of August 26, the trans-Pacific lines have had grave difficulty in competing with the New York-Orient steamships. This has been true especially of steel. With New York quoting a rate of $20 a long ton, equivalent to $17.85 a short ton, plus $7.60 for rail haul from Pittsburgh to tidewater, a total of $25.45, the Pacific Coast could not command business at $11.25 transoceanic in the face of a $16 rate overland. A reduction to $9.45 would be necessary in order that the trans-Pacific steamships could compete with the direct services. This reduction apparently has been made, shipping men having heard that the non-conference rate was $9, or $2.25 less than that established by the Pacific Westbound tariffs.

Other Rate-cutting Suspected

Nor is steel the only commodity as to which the Pacific is at a disadvantage; the list is long, embracing practically everything moving from the Atlantic seaboard and interior to the Far East. Nevertheless, a readjustment might have been made, and the Java-Pacific won back to the conference, if assurances could have been given that all conference members would uphold the schedules, for at various times the suspicion has arisen that rate-cutting was in progress.

A logical sequence to the withdrawal of the Java-Pacific was the decision of the Blue Funnel to meet any competition that might arise. This company, although not a member of the Pacific Westbound Conference, was abiding by conference rates so long as the organization could maintain its front. The Blue Funnel was willing to uphold rates pending a discussion; the Java-Pacific was not, and besides, as was stated above, possible secret rate-cutting by conference members was a deterrent to any agreement.

Canadian Robert Dollar announced independent action about the middle of February, and other companies were almost certain to follow suit from time to time.

Lumber Hits Bottom

Almost coincident with the break in steel and other commodities in the South, the lumber rate was broken in the North, the conference reducing it from $12.50 to $10 February 14. In this reduction the exchange situation figures. Permission was granted by the Shipping Board to one of its operating companies to book lumber at Vancouver at $12.50, presumably American gold; but in fact the rate was $12.50, Canadian. Regardless of the cause of the misunderstanding, the Shipping Board operators, or anyone else, for that matter, could not go to Vancouver and command cargo while demanding the same number of American dollars as the Canadian lines were asking of their own currency. The latent possibilities of trouble arising from the exchange situation were dealt with in these pages last month. In brief, therefore, the Shipping Board company made a reduction to $10, the lowest rate since 1913, which was approved by the Seattle committee, and that rate became general; but the depreciation of the Canadian dollar has not been overcome, as it might be were all rates quoted in the one currency or the other. At the same time, the Seattle committee cut cement to $7 and made other changes.

This break in the ranks of the Pacific Westbound Conference is deplored, especially because shipping men believe that a change for the better is imminent, in the event of which cargoes would be more plentiful, earnings larger and rates consequently easier to maintain. The conference had encountered some threatening squalls recently but had weathered all of them.

Atlantic Competition Felt

Section 28 of the Merchant Marine Act has had much to do with the restiveness of foreign lines. Because of it the Blue Funnel has steadfastly refused to become a member of the Pacific Westbound Conference. But of more immediate weight are the rail rate differentials favoring the Atlantic. From these handicaps no relief is in sight. The lines east of Chicago have refused to acquiesce in the reductions of the Western carriers, whereby the old equality of the two seaboards would have been restored. In this attitude the Eastern carriers were buttressed by vigorous pressure of the Atlantic, especially of New York merchants, who naturally desired that Pittsburgh's steel and Detroit's automobiles should move through their port. A little hope still remains that the Eastern lines may restore the parity, for the Shipping Board, once of the opinion that the Pacific Coast should not ask for freight originating east of Chicago, since that city was the logical point of division between East and West, has been discussing the situation with the railroads and the Interstate Commerce Commission. The struggle not only is between the Atlantic and Pacific ports, but also aligns the Eastern and Western railroads against each other, and to some degree, American roads against Canadian, inasmuch as the latter have made rates to cities east of Chicago that, added to local charges, are less than the American rates.

Cargo Goes Via Panama

Great masses of freight are moving from Atlantic ports to the Orient and Australasia via the Panama Canal, to the detriment of Pacific Coast ports. In the Panama Canal Record are such figures as these for November: East Coast of the United States to Australasia, 101,424 tons; to the Far East, 51,810 tons; to the West Coast of South America, 101,479 tons; as compared with 51,454 tons westbound intercoastal business. It is quite true that neither Australasia nor the Orient is returning a volume of cargo at all comparable to exports from America, for during November the tonnage of freight destined from the Orient to the Atlantic Coast was 37,864 tons and from Australasia only 10,473 tons, so that we have in Australia the spectacle of a country whose currency is seriously depreciated buying far more than it sells.

Board Has Hearing

In view of these different factors tending to unsettle the Pacific, it is a timely announcement made by the Shipping Board of a hearing to be held February 21, at which representatives of the Pacific Coast ports were to "appear to discuss the establishment of trade routes and allocations of vessels therefor from Pacific Coast ports to ports in the Orient." Little information was to be obtained as to the reasons for or the probable outcome of the meeting, but it took on a new and more significant appearance after the troubles of the Pacific Westbound Conference arose.

San Francisco Alarmed

Some alarm does exist, however, as to the intentions of the Shipping Board. The San Francisco Chamber of Commerce stated that "the whole issue of whether or not San Francisco is to have adequate tonnage to care for its huge cargo and passenger needs in the Orient, needs that have been increasing by leaps and bounds, is again thrown into the balance." Fear was expressed that some of the allotted 535's and other vessels might be withdrawn. In a letter to Admiral Benson, Atholl McBean, president of the Chamber, said that the organization deemed it essential that the Shipping Board proceed with a definite policy along these lines:

The assignment of regular express passenger steamers and freighters to trade routes from San Francisco to the Orient under the following classifications:

1. Large, fast passenger vessels, preferably of the 535 type, to be operated on a minimum sailing schedule of one vessel every fourteen days between San Francisco and Oriental common points in Japan, China and the Philippines.

2. Express passenger vessels, preferably of the 502 type, to be operated over the Manila-East Indian route on a minimum schedule of sailings every thirty days.

3. Cargo vessels, comparable to those operated by foreign competitors on a minimum schedule of sailings once a month between San Francisco and Japanese, North China, Manchurian and eventually Siberian ports.

4. Cargo vessels of adequate qualifications, to operate on a minimum schedule of monthly sailings between San Francisco, Guam, the Philippine Archipelago, the East Indies and Malaysian ports.

Attention of the Shipping Board was called to the practices of foreign competitors and the solidity of their position won through established service consistently maintained. San Francisco firms, it was asserted, through long years of service, have built up organizations comparable with the best, comprising entirely American units, with which to administer the service, essential to the preservation of American shipping on the Pacific, and in justice to these firms and to national merchant marine interests, the chamber requested that serious consideration be given requirements of San Francisco.

Lines Need Vessels

Dwight K. Grady, secretary of the foreign trade department, San Francisco Chamber of Commerce, said that recent statistics showed that "during the fiscal year of 1920, 24,453 passengers left and arrived in San Francisco over trans-Pacific routes on American ships, while foreign lines carried 33,743. To meet this competition and to get the fair pro rata of American business moving through an American port, it is essential that the requirements of the companies operating American vessels shall be met.

"There is little doubt but that San Francisco will shortly be made a free port in which event the commerce of the port will be largely increased both for domestic cargo and trans-shipment cargo. Manila expects to be made a free port during the present session of the Legislature. This would have the effect of diverting a large proportion of the commerce now centering in Singapore and Hongkong. The ships of any nation will be able to take advantage of these facilities offered by two such splendid free ports, and unless the various American lines on the Pacific are in a position to handle this commerce, they would be at a disadvantage."

Agreement of Operators

An explanation was made last month of the new plan of trans-Pacific and intercoastal operators to meet direct New York-Oriental competition by the quotation of the through all-water rate and the division of the receipts equally. An informal agreement was entered into at San Francisco January 27 between the intercoastal operators (United American, Luckenbach, Pacific Mail, Swayne & Hoyt, Matson, Atlantic, Gulf & Pacific, North Atlantic & Western and Williams) and the trans-Pacific (Pacific Mail, Struthers & Dixon, China Mail and Los Angeles Pacific) providing as follows:

"That the Oriental agents of the trans-Pacific lines be authorized to issue through bills of lading for cargo destined to Portland, Maine; Boston, New York, Philadelphia, Baltimore, Norfolk, Charleston, Savannah, New Orleans and Jacksonville, for transshipment via intercoastal vessels at Pacific Coast ports. Oriental agents of the trans-Pacific lines to collect for this service current direct service rate from Oriental to North Atlantic ports.

"Exceptions: (1) It is agreed that until further notice a through rate of gold $16 weight of 2240 pounds, or gold $16 measurement 50 cubic feet, ship's option, is to apply as a minimum; (2) on shipments destined to the ports of Portland, Maine; Boston, Philadelphia, Baltimore, Charleston and Savannah and Jacksonville an arbitrary of 15 per cent of the through rate to be added, same to accrue to the intercoastal carrier; (3) if competitive direct service tonnage is advertised for any port named in Exception 2 this arbitrary may be waived.

"Divisions on cargo moving from Oriental ports to New York, Norfolk, New Orleans: Divisions of revenue accruing to each line will be determined by:

"1. Deducting from the through rate all incidental expenses (including state tolls) for trans-shipment at Pacific Coast ports, and subdividing the remainder upon the basis of 50 per cent accruing to the trans-Pacific lines and 50 per cent to the intercoastal lines.

"2. On shipments originating in the Orient (destined to Portland, Maine; Boston, Philadelphia, Baltimore, Charleston, Savannah and Jacksonville) divisions accruing to each line will be determined by first deducting 15 per cent (if it has been collected under Section 2 of Exceptions) of the through rate to be paid to the intercoastal line, then proceed as outlined in Section 1.

"3. In case of shipments moving through British Columbia ports, all freight charges are to be collected and pro rated in United States gold dollars.

"It is further agreed that (1) on shipments of less than 500 tons notice of space required should be forwarded the trans-Pacific lines from Honolulu for immediate transmittal to the interested intercoastal carrier; (2) if over 500 tons of space required advice should be cabled from the last Oriental loading port; (3) on shipments destined to New Orleans, advice should be forwarded from the Orient, regardless of size of shipment, owing to the limited tonnage on this berth;

(4) bill of lading in duplicate to be furnished intercoastal lines.

"The Toyo Kisen Kaisha, Java-Pacific Line and Los Angeles-Pacific Navigation Company representatives stated that they would recommend to their principals the adoption of this arrangement for their lines and report to the intercoastal lines their final conclusions."

Fair-sized Cargoes Booked

Some fair-sized lots of cargo have been booked as a consequence of this arrangement. At first glance one would conclude that a shipper in the Orient would prefer to dispatch his freight by a direct steamship and thus avoid handling at a Pacific Coast port, but steamship operators are sanguine of results because the plan offers the Oriental exporter the choice of two markets, the Pacific and the Atlantic, inasmuch as a shipment could be stopped and sold at the Pacific port if desired.

This plan of co-operation between the intercoastal and trans-Pacific lines, although having good prospects of success in attracting eastbound business, has not been adopted for westbound cargoes. The initiative must come from the Eastern headquarters of the intercoastal lines, which control rates on westbound traffic, and they have had sufficient domestic business to engross them, so that the demand for freight to fill their vessels has not been so pressing as it became on the Pacific. But with the number of vessels in the intercoastal trade increasing the potentialities of the joint arrangement may commend themselves to the Eastern offices.

The various import and class and commodity tariffs issued by the Pacific Coast North Atlantic Eastbound Conference have been combined into one and the "free" period during which goods may lie at the Pacific Coast port has been extended from 20 days to 18 months. The ranges also have been extended, that of the Pacific from San Pedro-Puget Sound to San Diego-Vancouver and that of the Atlantic from Savannah-Boston to Jacksonville-Portland, Maine.

Freight Report

San Francisco, Feb. 19, 1921.

Our last circular was dated January 13, and business has continued inactive, though the small business done has been on a basis of lower freights than before.

The Northwestern Grain & Warehouse Company chartered steamer Pengreep at 80 shillings for early February loading to U. K., Continent, Bordeaux-Hamburg, followed by the charter of the United States steamer Nile from Portland to the same destination at $15 to Balfour, Guthrie & Co. The Northwestern Grain & Warehouse Company also chartered space for about 3000 tons wheat from Portland to Hamburg at $14.

Kerr-Gifford & Co. chartered steamer City of Vancouver for early February loading at 75/- U. K., Continent. This same firm had chartered steamer Hermion in November last, with February 10 cancelling, at 120/- per ton. We understand that the steamer was delayed at Balboa on account of prompt non-payment of canal dues, and this delay caused her to arrive too late to save her cancelling date, and after trying the market in different directions, the owners accepted an offer of 70/- from Kerr-Gifford & Co., making a loss to the owners of 50/-.

No steamer has been chartered from San Francisco for a whole cargo of barley to United Kingdom-Continent, but several thousand tons have been arranged for different barley ports United Kingdom on regular liners, on a basis of 75/- for some outside ports and 70/- for regular ports of delivery. Shippers, on account of the low markets in Europe, are now talking 60/- for barley, and possibly 65/- might be done for March loading. The Royal Commission stopped buying grain about the 25th January, but should they begin to buy in March, there may be a better demand for vessels than at present.

J. J. Moore & Co. chartered schooner Henry K. Hall at $20 per thousand, cargo of redwood from Eureka to Sydney, and they have since chartered the Danish steamer Arabien to carry general cargo and lumber from this port and possibly the North, to Sydney and/or Melbourne. The rates are private.

Grace & Co. chartered schooner Alert at $25 lumber from the North to Callao, and they are reported to have chartered George E. Billings on a basis of $22.50 to Callao.

Renton-Holmes & Co. chartered schooners Salvatore and Camano at $25, also to Callao.

In outside charters we have to report motorboat Benowa chartered at $6.40 per ton with coal from Norfolk to Puget Sound, and steamer Valdez at $8.60 for coal from Norfolk to San Diego. Several United States Shipping Board steamers have been chartered also for coal at $10 per ton, to discharge either at San Diego or here, or Puget Sound or Hawaiian Islands.

The Robert Dollar Company have put their sailers Dunsyre and John Ena on the berth, the Dunsyre from Philadelphia, and the John Ena from Mobile, for their own account.

The demand for tankers has also fallen off, and the best shippers indicate on time charters for tankers, for one to three years, is now about $4.

In all our experience, we have never had such a bad condition of affairs in the way of transacting business in ships and shipping as exists today.

PAGE BROTHERS,
Brokers.

Leixoes Work Planned

The Bureau of Foreign and Domestic Commerce has received through American Consul Wiley, of Oporto, plans for the improvement of the port of Leixoes, in Portugal. This improvement, for which the Portuguese Congress has authorized an appropriation of 30,000,000 escudos, is located about 10 miles to the north of Oporto. Photostat copies of these plans are on file in the district and co-operative offices of the bureau.

An old Pacific liner: The Manchuria in the harbor of Vigo, Spain. Photo copyright 1920 by New York Shipbuilding Corporation

Steamship Operation

Matson Report

While the shipping world is discussing the bearing of capital charges on operation, and especially at this time citing the low book values of foreign fleets, such as that of the Nippon Yusen Kaisha, which is carried at about $41.50 a gross ton, the situations of some American companies are found to compare favorably with those of foreign corporations. A case in point is the Matson Navigation Company, the annual report of which was made public at the meeting of stockholders in February.

$82.38 A Gross Ton

The seven going steamships of the Matson Line, aggregating 46,126 gross tons, are carried at an average valuation of $82.38 a gross ton. Two of the vessels are old, the Enterprise havin 1900; the others, however, were ing been built in 1882 and the Hyades in 1900; the others, however, were built in the last thirteen years, the Lurline in 1908, the Wilhelmina in 1909, the Manoa and Matsonia in 1913 and the flagship Maui in 1917. All these vessels, and the Enterprise as well, are passenger-carriers, and the two large vessels, Maui and Matsonia, rank with any combination liners of the Pacific. These two vessels probably would cost not less than $375 a gross ton, or perhaps more, if built today.

The following table shows the fleet of the Matson Line, the year in which each vessel was built, the gross tonnages and the book valuation, cents excluded:

Vessel	Year Built	Gross Tonnage	Valuation
Enterprise	1882	2675	$127,418
Hyades	1900	3753	133,792
Lurline	1908	5928	255,700
Wilhelmina	1909	6975	402,345
Manoa	1913	6806	533,575
Matsonia	1913	9728	918,534
Maui	1917	10,261	1,428,504
Totals		46,126	$3,799,870

Average valuation a gross ton, $82.38

In addition to these vessels the company has a motor schooner, a barge, two launches and, under construction, two 14,000 deadweight ton freighters, Manulani and Manukai. The Enterprise is undergoing extensive alterations and overhauling.

No War Freights

This showing is the more remarkable because the Matson Line was benefitted in small degree by large freight rates of the war, the vessels beink kept rigorously in the Hawaiian service until commandeered by the Government. The company was built up solely on the Hawaiian trade and remained steadfast during the years of soaring rates, but has its reward today in the enjoyment of what probably is the best and steadiest freight business in the world. Nothing conceivably could interrupt the flow of Hawaiian sugar and canned pineapple to the United States and the return of all sorts of goods for island consumption.

The net profit from all sources during 1920 was $1,245,284, of which $936,739 was from the operation of vessels. Dividends paid during the year totaled $658,296, or 18 per cent of the capitalization of $3,657,200, and balance of the surplus account December 31 was $6,580,058, as compared with $5,993,069 January 1, 1920. Of the assets of $13,005,681 vessels are valued at $5,181,935 and miscellaneous assets, such as real estate, stocks and bonds, at $7,823,745.

Officers Re-elected

The directors and officers of the company were re-elected as follows: E. D. Tenney, president; W. P. Roth, vice-president and general manager; J. A. Buck, vice-president; W. M. Alexander, vice-president; A. C. Dierícx, assistant general manager; A. M. McCarty, treasurer; F. A. Bailey, secretary. The directors are: Messrs. Tenney, Roth, Buck, Alexander, Diericx and C. E. Green, W. Gregg, Jr., A. F. Morrison and A. P. Welch.

The "Ferry Service"

A typical voyage of a Matson steamship to Hawaii and return to San Francisco will serve to make clear why it prides itself on operating a "ferry service":

Steamship Maui, departed from San Francisco at 1 P. M. Wednesday with 6098 tons of miscellaneous cargo for Honolulu and 1399 tons for Hilo; 256 passengers, 26,632 pounds of mail, 10,000 barrels of fuel oil as cargo.

Arrived Honolulu 5:10 A. M. Tuesday, 2100 miles; discharged passengers and cargo.

Sailed for Hilo 5:31 P. M. Thursday with 154 passengers; arrived Hilo, 192 miles from Honolulu, at 5:44 A. M. Friday; discharged passengers and 1399 tons of cargo; loaded 2140 tons of cargo and took 167 passengers for Honolulu.

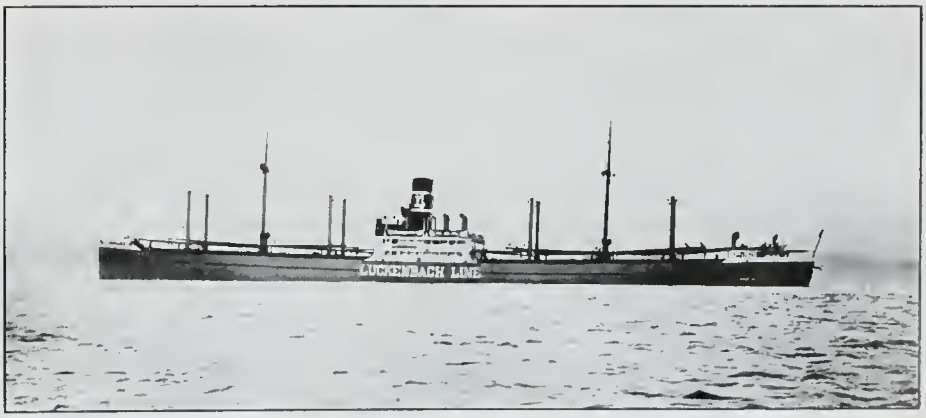
Sailed for Honolulu at 5:54 P. M. Saturday; arrived Honolulu 5:37 A. M. Sunday; loaded 6473 tons of cargo, 1000 tons of molasses in double-bottom tanks, 253 passengers and 6539 pounds of mail.

Sailed for San Francisco at 10:53 A. M. Wednesday, having passengers and mail and 8613 tons of cargo and 1000 tons of molasses; arrived at San Francisco 6:28 A. M. Tuesday. Twenty days out, the next sailing to be eight days later.

Another Luckenbach Record

Another record has been made by the Luckenbach Line. The large freighter Walter A. Luckenbach, a photograph of which formed the cover of Pacific Marine Review for February, arrived at Los Angeles at 4 p. m. February 3, having made the passage from New York in the remarkable time of 15 days, 11 hours elapsed time, delay in the Panama Canal included, and in 14 days 23 hours ocean steaming time. Her average speed over the entire route from New York to Panama and thence to Los Angeles was approximately 15 knots. A digest of the log follows: Departed from New York at 8 a. m. January 19; arrived at Panama January 25, and sailed the same day; arrived at Los Angeles February 3. On this voyage the Walter A. Luckenbach had a cargo of 14,000 measurement tons. She also set another record, in that she was the first Luckenbach vessel to carry United States mail from New York to Panama for delivery to the West Coast of South America, but the other vessels of the fast intercoastal service will do likewise hereafter.

The former intercoastal record was that of the Julia Luckenbach, which arrived at Los Angeles from Philadelphia January 1, having made the voyage in



Steamship Julia Luckenbach of the Luckenbach Intercoastal Line, loaded with a heavy cargo for the Atlantic

15 days 1 hour steaming time, or 15 days 10 hours elapsed time. The Luckenbach Line is advertising a sixteen-day service between the Atlantic and Pacific, and the promise has been more than fulfilled.

Chinese Coal Suggested

If American dealers on the Pacific Coast can use Chinese coal, Commercial Attache Arnold believes that arrangements could be made whereby ships could carry it as ballast in place of sand. The rate would be about $4 a ton. Chinese anthracite coal can be purchased at the port of Chin Wang Tao for $8 Mexican a ton. This coal is considered high-ash coal and retails locally in Shanghai at $17 Mexican a ton. Chinese bituminous coal can be secured at lower prices in larger quantities; probably on a contract basis it could be secured for $4 or $5 Mexican a ton, loaded at Chin Wang Tao. If a trade of this character were to be developed it would likely increase to considerable proportions, to the advantage of the industries on the Pacific Coast.

One Coal Burner

Whether coal could be successfully imported from China is doubtful. Oil has very largely supplanted coal as a fuel for steamships during the last few years. At the present time the Shipping Board has only one coal-burning vessel on the Pacific Coast, the West Harts, now tied up; and privately owned steamships are largely oil-burners. Of the entire fleet of the Shipping Board, according to testimony of Captain Paul Foley, director of operations, before the Walsh Committee, about 80 per cent of the tonnage is oil-burning; in numbers, 980 steel ships are oil-burners and 411 coal-burners. The oil-burners, therefore, are on the average larger than the coal-burners.

More detailed data are obtained from the bulletin of the American Bureau of Shipping. Of 65 vessels building for the Shipping Board January 1, 39 were listed as oil-burners and 26 as oil and coal burners.

Surplus at Honolulu

Nevertheless, temporary shortages of coal are occurring. The Panama Canal continues to grant bunkers sufficient to take a vessel to the nearest port only. In the case of coal-burning steamships bound to the Far East, this policy forces vessels to San Francisco, which is nearer than Honolulu; and as a result there are thousands of tons of coal piled up in Honolulu. Naturally, there is no demand there for Australian coal, which otherwise might give return cargoes to the American-Australasian freighters.

New Services

Norton, Lilly & Company, Isthmian Line agents, who announced the opening of an Atlantic-Pacific-Hawaiian monthly service with the sailing of the steamship Montgomery City from New York in February, have appointed agents in the Hawaiian Islands as follows: Honolulu, Castle & Cooke; Kahului, Alexander & Baldwin; Hilo, C. Brewer & Company. Calls will be made at these ports. Vessels of the Isthmian Line will call at San Diego at least once every sixty days, both eastbound and westbound, and perhaps every thirty days. The intercoastal service now has ten-day sailings.

Feeder Vessels Remodeled

Authority has been granted by the Shipping Board to the Pacific Mail Steamship Company to have four feeder vessels, Lake Fielding, Lake Gilpen, Jacox and Doylestown, now engaged in the Shanghai-Calcutta service, remodeled at Hongkong. Side ports will be installed and shelters built to shelter coolie deck passengers.

Four feeder vessels—Cadaretta, Glymont, Lake Farrar and Lake Onawa—operated in the Orient by the Robert Dollar Company have been turned back to the Shipping Board and reassigned to the Pacific Steamship Company, which will operate them only to the East Indies, leaving the trade of India proper to the Pacific Mail.

The United States Transport Company has announced an intercoastal service, which will be maintained with ten 9400-ton vessels. The new line will be the eleventh in the intercoastal trade, the other being American-Hawaiian, Luckenbach, Robert Dollar, Swayne & Hoyt, Isthmian, Williams, Atlantic-Gulf & Pacific, North Atlantic & Western, Matson, Pacific Mail. The first sailing was that of the C. H. Livingstone from the Atlantic in February.

Mount Carroll Schedule

The first passenger steamship to be built in this country exclusively for third-class passenger and cargo traffic will sail from New York on April 5. The vessel is the Mount Carroll, now being built by the Merchant Shipbuilding Corporation, Chester, Pa, for the United American Lines, which inaugurated its third-class passenger service between New York and Hamburg with the sailing of the Mount Clay, formerly the DeKalb, from New York December 25.

The Mount Carroll will be added to the New York-Hamburg service, which by the early summer will have six vessels specially adapted to carrying third-class passengers. Three of the vessels will fly the flag of the United American Lines, the Mount Clay, the Mount Carroll and the Mount Clinton, a sister ship to the Mount Carroll, and now nearing completion at the Merchant yard at Chester. The three other ships of the service will be operated by the Hamburg-American Line. They are the Hansa, formerly the Deutschland, now being reconditioned, and two new steamships in course of construction.

The Mount Carroll, the latest addition to this fleet, was launched at the Merchant yard at Chester January 10. She has a length over all of 457 feet; length between perpendiculars, 440 feet; beam, 57 feet; displacement, 15,200 tons; speed, 13 knots. She is fitted with Westinghouse reduction-gear turbines, two cylinder cross-compound type, 4200 b. h. p., 90 r. p. m.; four single end Scotch boilers, oil-fired.

The Mount Carroll accommodates 1350 passengers. She has two dining saloons and cabins with two, four, six and eight berths.

German Lines Re-established

Says the Guaranty Trust Company: "With the exception of East Africa, East Asia and Australia, all important parts of the world are again being served by German steamship lines, with chartered ships, ships of their own, or in collaboration with foreign shipping companies. All German shipbuilding yards are turning out freight carriers of all kinds, coal and oil burners, and sailing ships with auxiliary engines and motors."

That summary appears to be in error as regards the Pacific Coast of the United States, unless the operating agreement of the Hamburg-American and Harriman group is considered as embracing the Pacific Coast through the American-Hawaiian Line. No German steamship has appeared on the North Pacific. The Kosmos Line, however, is reported to be about to establish, in conjunction with the Roland Line, a monthly service between Germany and Chile and Peru, via the Panama Canal, and another service to the River Plate.

Calls at Northern Ports

With the sailing of the steamship Liberator from San Francisco for Portland and Seattle in February, the Atlantic-Gulf & Pacific extended its intercoastal service to the Columbia River and Puget Sound.

The Williams Line announced that its first eastbound steamship of the intercoastal service, the Willfaro, would call at Charleston and Savannah in addition to the usual ports of call of the Atlantic.

W. Elwell & Co., New York, have opened a Shipping Board cargo service between Rotterdam, Hamburg, Antwerp and Italy, and between the same northern ports and the Eastern Mediterranean.

New Cunarder Sails

The oil-burning turbine Cunard liner Albania, the first of post-war fleet of thirteen new steamers, made her first trans-Atlantic voyages in the England-Canada-New York service in January and February. She is a vessel of 12,000 tons; length, 540 feet; breadth, 64 feet; depth, 46 feet 9 inches; and has accommodations for 480 passengers. She is of shelter deck type, having forecastle boat decks, two complete 'tween decks and orlop 'tween deck and, being a one-class steamer, all passengers may enjoy the best accommodations the ship has to offer. Her propelling machinery consists of two sets of Brown-Curtis high-speed turbines.

Fiume Opened to Shipping

The steamship Calabria, sailing from New York in February, was the first passenger vessel to sail from New York for Fiume since the first months of the war in 1914. Announcement of this sailing by Cunard and Anchor Lines marks return of Fiume to list of calling ports for ocean liners. The Calabria will carry passengers to Vigo, Patras, Dubrovnic, Trieste, as well as Fiume.

The first of the 535s of the Shipping Board to be dispatched to the Pacific, the Hawkeye State of the Matson Line and the Golden State of the Pacific Mail, sailed from Baltimore together at 1 o'clock February 15, bound for San Francisco via Havana and Panama.

The steamship King Alexander, formerly the Cleveland of the Hamburg-American Line, left Piraeus, Greece, December 18 for its initial voyage in the service of the National Steam Navigation Company of Greece. The King Alexander belongs to the Byron Steamship Company, Ltd., and still flies the British flag, but will be transferred to the National Steam Navigation Company of Greece as soon as present negotiations are completed. On her first trip the ship carried 37 first-class, 344 second-class and 1846 third-class passengers.

A new Canadian steamship line to Java, to be known as the Ellerman and Bucknall Canadian, Indian and Java Service, is announced. Starting at Montreal, a regular monthly service is to be inaugurated to Port Said, Port Sudan, Aden, Bombay, Colombo, Singapore and Java. The first steamer to load in the new run will leave Montreal the latter part of August, 1921.

Consul Latham reports that the British steamship La Belle Sauvage, of 530 gross tons, has recently entered the Cuban-Jamaica passenger service and plies between the ports of Kingston and Santiago.

Shipping Briefs

Swayne & Hoyt, San Francisco, have been appointed California agents of J. H. W. Steele Company and of the Ward Line.

The new passenger office of the Pacific Mail Steamship Company at 621 Market street, San Francisco, has been opened.

There was published in the Brazilian Official Gazette on January 1, 1921, an executive decree reorganizing the Lloyd Brazileiro Steamship Company, the property of the Brazilian government. A new corporation is being formed with a capital of 30,000 contos ($7,500,000). The government of Brazil, according to this decree, contributes property belonging to the present line totaling a value of 25,000 contos ($6,250,000), or five-sixths of the stock, and presumably will be responsible for all that corporation's financial obligations. In order to obtain the remaining 5000 contos a public subscription will be opened. If this is not covered by the public subscription, the government will take it for its own account. The administration of the new corporation will be exclusively in the hands of Brazilian citizens.

The New York Journal of Commerce reports that 24 companies with an aggregate authorized capital of $12,650,000 were organized in January to engage in some branch of shipping. The number of companies increased 50 per cent over December, but the indicated investment fell off $19,375,000. Only companies having a capital of $50,000 or more are included.

Captain Robert Dollar has purchased the former German freighter Kurland, 16,500 deadweight tons, in the United Kingdom and will dispatch her to the Pacific, where she will be placed in the Dollar around-the-world service. Ports of call of the line are: New York, Panama, San Francisco, Vancouver, Shanghai, Hongkong, Manila, Singapore, Calcutta, Colombo and Suez. The Kurland will be renamed Robert Dollar. Captain Dollar also has purchased six ex-German sailing vessels, which were refugees at Santa Rosalia, Mexico, during the war.

At Washington

Secretary of War Baker has stated that the War Department will not sell the docks and terminals built for the army during the war. The department's policy is to retain title and to lease the properties. Arrangements are being made to turn over some docks, notably those at Hoboken, to the Shipping Board.

The Shipping Board is now operating 1156 ships, of which 1133 of approximately 8,200,000 deadweight tons are steel. Virtually its entire wooden ship fleet and 239 of its steel vessels were tied up the first of February. At the middle of the month 31 vessels were tied up in the San Francisco district.

Acting Attorney General Nebeker has issued an opinion that the National Prohibition Act prohibits the transshipment of intoxicating liquors for beverage purposes from one foreign country to another through the United States.

Burean Contract Terminated

The Shipping Board has adopted a resolution terminating in ninety days its contract with the Bureau of Survey for supervision of certain repair work. Admiral Benson has stated that for the present these duties will be handled by the director of the division of construction and repair and that eventually they will be taken over by Syndicate A, organized by the board and insurance underwriters last summer.

In a third supplemental order in regard to Section 28 of the Merchant Marine Act, the Interstate Commerce Commission has ordered that if and when that section is made operative, rates in effect when the goods were started toward the port will apply. This order supplements the prior order providing that the rates in effect on the inland carrier on the date foreign goods arrive at port will apply to inland destinations. These two orders apply the principle that rates cannot be changed while a shipment is in transit.

At least $25,000,000 will be lost in the operation of the government merchant fleet in the first six months of 1921, according to the estimate of Alonzo Tweedale, general comptroller of the Shipping Board.

In the first deficiency appropriation bill reported to the House February 1 the appropriation committee refused the Shipping Board $95,000,000 requested for completing the construction in the vicinity of Philadelphia. The action of the committee does not necessarily mean that the construction must be abandoned, as it contemplates that funds will be obtained from other sources.

Restoration to overseas' commercial trade of the 54,000-ton passenger liner Leviathan, the largest ship afloat, will be soon considered by the Shipping Board. The ship has been lying idle at her Hoboken pier. Bids for her reconditioning, offered about a year ago, called for a $9,000,000 to $10,000,000 expenditure. The board believes this work now could be done for several millions less. The craft is costing $65,000 a month for upkeep and care.

Trans-Pacific Operations

Baron Kondo Dead

The outstanding occurrence of February in Japanese shipping was the death of Baron R. Kondo, president of the Nippon Yusen Kaisha, who succumbed to pneumonia February 9 in Tokyo. As president of the N. Y. K. Baron Kondo occupied a commanding position in the shipping of Japan and of the world, for his company on September 30, 1920, possessed 103 vessels of 494,028 gross tons in service and 12 of 84,420 under construction. Not only was Baron Kondo the most prominent shipping man of the empire, but he also was active in other fields, especially as one of the Japanese delegation to the peace conference in Paris.

During the baron's absence and the illness of Dr. Suda, former vice-president, the active managemnt of the company was in charge of Yonejiroh Ito, at that time managing director, who was made vice-president in November. Although no advices have been received from Japan as to Baron Kondo's successor, the natural assumption is that Mr. Ito will be elevated to the presidency.

Baron Kondo was born in 1850. For many years he had been connected with shipping, having served under the late Iwasaki, who is known both for his connection with the N. Y. K. and the Mitsubishi group. Baron Kondo became a relative of Iwasaki through marriage. Upon the organization of the present company of the N. Y. K. Baron Kondo was appointed a director and was elected vice-president at the time of the Sino-Japanese war. In recognition of his services in transportation during the Russo-Japanese war he was granted the Second Order of the Rising Sun. He was a member of the first Diet, but of late years had had little to do with politics, although he accompanied the Japanese mission to the Peace Conference as an unofficial member. The title of baron was bestowed upon him in 1911.

Baron R. Kondo, deceased president of the N. Y. K.

Japanese Trade Routes

At the end of December there were under the Japanese flag 776 merchantmen of 2,612,625 gross tons (ships of less than 1000 gross tons excluded), an increase of 10 vessels of 23,104 tons having been made during the month. The following changes in the status of vessels at the close of November are to be noted: Increase of four vessels, 22,223 gross tons, in the service between the Orient and the Atlantic Coast of North America; decrease of three vessels of 15,594 tons in the service to the East Coast of South America; increase of three of 14,949 tons in the service to the West Coast of South America. No changes were made in the Pacific Coast of North America and the European services. The increase in the number of vessels plying to the Atlantic Coast of the United States is sufficient to give the Atlantic a lead over the Pacific, the totals being: Atlantic Coast, 37 vessels of 223,204 tons; Pacific Coast, 25 vessels of 212,341 tons. More Japanese tonnage was engaged in these two services than in any other except the coasting trade, which had 193 vessels of 332,074 tons, and the European, which had 111 of 611,240 tons. The Indian service was fifth with 40 vessels of 164,298 tons.

According to the returns of the Department of Communications, at the end of December 16 vessels of 42,878 tons (ships of less than 1000 tons excluded) were tied up, an increase of three of 3666 tons over the number as of November 30; and 18 of 36,933 tons were under repairs, an increase of eight of 11,675 tons. Other figures show the idle vessels December 31 as 101 of 103,485 gross tons, all vessels exceeding 100 tons being included; and the number exceeding 500 tons was 71 of 92,960 tons. The increase in idle tonnage December 31 over October 31 was 14 vessels of 21,000 gross tons.

Subsidy Appropriations

Reports to the United States Department of Commerce give the following condensed statement of the appropriations for Japanese shipping subsidies in 1920, 1921 and 1922, the estimates being in yen:

Routes	1920 Yen	1921 Yen	1922 Yen
South American.......	639,815	1,613,021	......
South Sea.............	75,000	370,000	370,000
South China coast.....	75,000	150,000	150,000
Chosen west coast.....	50,000	100,000	100,000
Dairen	......	100,000	100,000
Shanghai	......	215,000	350,000
North China coast....	......	117,000	117,000
Hokkaido	......	50,000	50,000
Japan Sea	......	251,000	251,000
Kagoshima-Naha	......	60,000	60,000
China	......	437,000	437,000
Hokkaido	......	207,134	207,134
Japan-Vladivostok	20,000	40,000	40,000
Coastwise and inland..	......	224,356	224,356

The North American services, although subsidized, do not appear in the above table.

Deferred Rebates

Newspapers of Japan "understand" that vessels of the Shipping Board have been admitted to the Orient-Europe deferred rebate conferences and that they will maintain a monthly service from Japan, Shanghai and Java to Europe. No verification of these reports is obtainable in the United States.

In connection with the proposal that Shipping Board vessels join deferred rebate conferences, the statement has been made that the Sherman Act might operate to prevent such action. A quotation from a brief of J. Parker Kirlin, general counsel of the American Steamship Owners' Association, filed with the commissioner of internal revenue at the hearing on prohibition on American passenger vessels, is of interest as bearing on the applicability of anti-trust laws to acts done on the high seas and in foreign waters. Said Mr. Kirlin:

"In American Banana Company vs. United Fruit Company, 213 U. S. 347, the Supreme Court had under consideration the applicability of the anti-trust laws of the United States to actions in restraint of trade charged against the United Fruit Company, an American corporation, in Costa Rica. After discussing the territorial application of laws, especially their application to acts outside the territorial limits of the United States, the court said, at page 357: 'The foregoing considerations would lead, in case of doubt, to construction of any statute as intended to be confined in its operation and effect to the territorial limits over which the lawmaker has general and legitimate power. All legislation is prima facie territorial.' "

This would indicate that the Sherman Act does not bar Americans from membership in deferred rebate conferences so long as they do not violate the Merchant Marine Act by granting rebates on freight moving to and from American ports.

Hope of Improvement

In the superseding of short trade routes by long, such as the transportation of American coal instead of British to Europe, the dispatch of cereals to Europe from South America, Australia and the Orient instead of from Russia and Poland, Managing Director Ishii of the Nippon Yusen Kaisha sees hope of improvement in shipping. Mr. Ishii admits, however, that the tonnage of the world has increased 8,000,000 gross tons since 1914 and that about 7,000,000 tons is under construction; and he continues thus in discussing volumes of cargo:

"Before the war the world's movements of cargo amounted to about 980,000,000 tons a year, but at the end of 1919 the amount was 530,000,000 tons, and the cargo has since fallen off stil further. Before the war Japanese cargo amounted to about 11,000,000 tons, and it has increased to about 13,000,000 tons, but there has been an incomparably greater increase in the amount of freight space. The country's ships amounted to only 1,700,000 tons before the war, but the latest figure is over 3,000,000 tons. Besides, about 350,000 tons of ships are under construction. Foreign countries have increased their shipping activities, especially in the Orient and in the Pacific. Before the war about 1,400,000 tons of foreign ships came to this part of the world, but the present tonnage is about 2,400,000 tons. The increase in foreign ships is particularly marked in regard to American vessels."

U. S. in the Orient

C. S. Holmes, assistant general manager of Struthers & Dixon, with headquarters at Shanghai, returned to San Francisco in February. Mr. Holmes was general chairman of the United States Shipping Board Trans-Pacific Homeward Conference while he was stationed in the Orient, and in this capacity was instrumental in bringing together American and foreign operators into the Trans-Pacific Freight Tariff Bureau of Japan, which was reorganized last fall. Consequently, Mr. Holmes has an intimate and first-hand knowledge of the Oriental situation as it affects American shipping.

Sections 28 and 34

For the time being, rates are steady and give promise of remaining so, said Mr. Holmes, despite sporadic cutting by Japanese tramps. Trans-Pacific rates have not fallen in response to the 20 per cent break in the Orient-New York tariffs, but any further reductions in the New York rate probably will force a cut by the trans-Pacific lines.

After attempts had been made by other American steamship men in the Orient to bring about the formation of a general conference, without success, Mr. Holmes went from Shanghai to Japan in September. A meeting had been arranged in the offices of one of the foremost Japanese steamship companies in Tokyo and immediately upon his arrival Mr. Holmes began a series of conferences with the Japanese. They made a proposal to him that might have led to the formation of a conference embracing all the Japanese lines; this was that the larger companies would persuade all the operators to become members provided that the Americans could give assurances that Section 28 and Section 34 of the Merchant Marine Act would be suspended indefinitely. This assurance could not be given by Mr. Holmes. Accordingly the smaller Japanese lines remained independent, although the larger companies (Nippon Yusen Kaisha, Osaka Shosen Kaisha and Toyo Kisen Kaisha) joined the reorganized Trans-Pacific Freight Tariff Bureau of Japan with the Shipping Board operators. The Canadian Pacific alone among the British lines became a member, the Blue Funnel and other powerful British companies refusing to join because of the non-membership of the smaller Japanese operators, whose rate-cutting has been a source of trouble on both sides of the Pacific, in the United States as well as in the Far East.

Information in Advance

While this series of conferences was progressing in Tokyo, a change was observed in the attitude of the principal Japanese. For this no reason was apparent at the time, but upon his return to Shanghai Mr. Holmes learned of the refusal of the President to abrogate treaties with other nations, as directed by Section 34 of the Merchant Marine Act, and he was inclined to attribute the about-face of the Japanese to advices from Washington forecasting the President's action.

Mr. Holmes was unable to shed any light upon the probabilities of American operators joining the China Homeward Conference, a deferred-rebate association controlling business between the Orient and Europe. All negotiations were being conducted by Washington and London.

American vessels plying to the Orient are getting what may be described as "their share of the business," said Mr. Holmes, in Japan as well as on the continent of Asia, although the Japanese shippers, as one might expect, favor their own vessels. The attitude of British shippers is not unfriendly; that of the British steamship companies is less good-natured, for they manifest a feeling that the Americans are encroaching upon trades that were exclusively British prior to the outbreak of the war.

Railroads Harm Pacific

Continued refusal of the transcontinental railroads to adjust the import and export rates will be exceedingly harmful to the Pacific Coast trade, in Mr. Holmes' opinion. The American rail service, moreover, is below par. An exporter in Manila said bluntly to Mr. Holmes that he would hereafter dispatch all freight by the Canadian Pacific in preference to shipment through the United States, because the time required for overland delivery by the C. P. R. was much less than by American rail lines; service given by the Canadian Pacific, such as tracing shipments, was much better, and, perhaps most important of all, the Canadian Pacific steamships were accepting freight payments in the depreciated Canadian currency, although the ultimate destination of the goods was in the United States. This is interesting testimony on a disputed point that was dealt with in Pacific Marine Review for February.

Australia Dull

We regret to report that this month will be a repetition of the last, in that the tonnage offering is far in excess of requirements, and agents are finding it increasingly difficult to obtain sufficient cargo for the vessels now loading, says Birt & Company's Australasian Shipping Bulletin of December.

Wool Sales Fail

As new wheat, too, is not available for berth steamers before February, this accentuates the position, especially as the wool sales are anything but a success, quite 70 per cent of the offerings at the sales being withdrawn. A quantity of old season's wheat and flour is available from Adelaide, Albany and Fremantle, but will not ease the position to any appreciable extent. Eastern steamers are still leaving Australia practically empty. For America, outside of a few parcels of wool, and chrome ore, little is offering, but several big shipments of eggs have been made by the mail steamers to San Francisco.

The export position remains much the same; outside of wool, practically all lines are stagnant. Permission has been granted for shipments to Hamburg, and this month the first steamer from Australia to Germany has been placed on the berth, but outside of 2/3000 bales of wool, very little cargo has been shipped. To date the wool sales have been very disappointing, the demand being still only for the first quality wools, and for medium and poor classes practically no offers can be obtained.

Personals

C. O. Burgin, chairman and secretary of the Shipping Board conferences of the Pacific Coast, has resigned to enter the service of the Luckenbach Line at its San Francisco office, and has been succeeded by J. H. Todd, formerly his assistant. Mr. Burgin was agent of the Pacific Coast Oriental Tariff Bureau, now the Pacific Westbound Conference, prior to joining the Shipping Board organization. He displayed marked executive ability and tact as well as a wide knowledge of steamship rate-making in his conduct of these offices.

Philip Albright Small Franklin, president of the International Mercantile Marine Company, observed the fiftieth anniversary of his birth February 1.

Mr. Franklin was born in Ashland, Maryland, of a well known Maryland family, and received his early training in the steamship business at Baltimore, entering the offices of the Atlantic Transport Company there as a boy. The foundation of his later success as a steamship manager was laid in that office, under the late Bernard Baker, one of the best known American shipping men of his day, whose last public act was to assist the government in establishing the United States Shipping Board.

Mr. Franklin went to New York in 1901 as traffic solicitor of the Atlantic Transport Company, subsequently becoming general manager of the company, and in 1902 its president. In 1903, on the foundation of the International Mercantile Marine Company, he became a vice-president in that company, and in 1916 its president.

The following staff appointments have been announced by the International Mercantile Marine Company, New York City:

James S. Mahool, assistant manager of the company's American flag ships, is appointed assistant manager of the Red Star Line at Antwerp.

A. E. Disney, assistant to the passenger traffic managers at New York, is made assistant manager for the company at Chicago.

David Lindsay, until recently in charge of the company's advertising and publicity, succeeds Mr. Disney as assistant to the passenger traffic managers, and has been placed in charge of the company's third-class passenger department at New York.

Direction of the company's advertising, as well as its general publicity, has been taken over by Winfield M. Thompson, formerly acting secretary of the American Steamship Owners' Association, who joined the I. M. M. forces in October last.

H. O. Shuster, chief engineer of the Southwestern Shipbuilding Company, East San Pedro, has been connected with the shipbuilding industry since 1907, when he left Toledo, Ohio, to assume the position of chief draftsman in the Craig Shipbuilding Company at Long Beach, the technical staff of which Mr. Craig took with him from Toledo.

Subsequently removing to San Francisco, Mr. Shuster was connected with the Mare Island Navy Yard in the capacity of chief estimator and later became chief draftsman for the Alameda plant of the Bethlehem Shipbuilding Corporation. At the beginning of the war, the Schaw-Batcher Company Ship Works was organized, at which yard Mr. Shuster was chief engineer until the completion of the government contracts. In May, 1920, he left San Francisco to become chief engineer of the Southwestern Shipbuilding Company.

Mr. Shuster, through his practical knowledge and clear-headed solutions of engineering problems connected with shipbuilding, has earned an enviable reputation among shipbuilding executives.

C. M. Bougless, assistant controller of the company, is appointed controller, to succeed M. W. Tingley, who will retire in April, after forty-eight years of continuous service, which began with the American Line in 1873. Mr. Bougless will be succeeded as assistant controller by Alfred R. Marshall, formerly with the company at Boston.

R. H. M. Robinson, president of the Merchant Shipbuilding Corporation and vice-president of the American Ship & Commerce Corporation, has been elected to the directorate of the William Cramp & Sons Ship & Engine Building Company to fill a vacancy.

Grover C. Foster of the Atlantic, Gulf & Pacific offices, San Francisco, has been appointed general freight agent of the Los Angeles Steamship Company from March 1.

W. E. Hostetter is the new purchasing agent of the Moore Shipbuilding Company, Oakland, succeeding the late M. G. Waites.

E. M. Cherry has been made Astoria representative of the Royal Mail Steam Packet Company, which will dispatch its vessels on the Pacific-Europe service, in conjunction with the Holland-America, within a few weeks.

Arthur C. Callan, president of the Pacific International Company, Portland, Oregon, has been appointed general agent of the Williams Line, which is operating vessels in the intercoastal service.

Captain W. J. Wilson was appointed assistant chief engineer of the Seattle Port Commission, a newly-created position. He had been field engineer.

Edwin D. Vincent has been made engineer of the Board of Harbor Commissioners, Los Angeles Harbor, with J. W. Ludlow as assistant. Mr. Vincent formerly was assistant harbor engineer under City Engineer Griffin, who prior to the November election was ex-officio harbor engineer.

L. H. Cromwell, assistant to the president of the Moore Shipbuilding Company, Oakland, has been selected to succeed L. V. Hedrick as secretary, and J. H. Thies has assumed the duties of auditor, succeeding Joseph Garrett. Messrs. Hedrick and Garrett resigned to enter the employ of the Los Angeles Shipbuilding & Drydock Company. W. D. Edwards, safety engineer, will act as insurance department adjuster, succeeding Mr. Thies.

A. P. Hammond, Pacific Coast manager of the Luckenbach Line, has been elected president of the Waterfront Employers' Union of San Francisco.

Robert E. Mansfield, traffic manager of the Los Angeles Shipbuilding & Drydock Company, has resigned to enter the employ of Hill & Hubbell, San Francisco. He has been succeeded by M. E. Cox.

W. D. Benson of New York, traffic manager of Frank Waterhouse & Company, has been elected vice-president, having charge of business east of Chicago.

Percy S. Laing is the head of the new shipping department of Frank Waterhouse & Company, Seattle. This department is the result of a consolidation of the operating and traffic departments.

The Steamship Bowling League has been formed in San Francisco with the following member teams: Struthers & Dixon, Matson No. 1, Norton-Lilly, Matson No. 2, Pacific Mail, Spreckels, Williams-Dimond, Grace. A. Kelly of the Matson Line is president.

H. W. Wooster, contracting freight agent of the Pacific Steamship Company's intercoastal department, has been appointed assistant general agent on Puget Sound of the Atlantic-Gulf & Pacific.

Major William A. Muirhead has succeeded Captain I. A. Peterson as traffic manager of the Port Commission of Seattle.

EQUIPMENT OF THE CURTIS STEAM YACHT LYDONIA

THE owners of this superb steam yacht, realizing the severe requirements made on auxiliary apparatus, have specified and installed the following Schutte & Koerting Company's equipment.

Oil burners and air registers of the LL type combine the perquisites of perfect combustion. The air, which can be regulated as to quantity, is given a swirl and mixes intimately with the finely atomized oil which comes from the tip in a cone of wide angle.

The oil heaters are of that type which absolutely prevents any leakage of the oil into the steam spaces having only external joints. The oil passages through the heater being straight heavy steel tubes, are easily cleaned. The design is one in which a maximum heat transfer is made to the oil for a moderate pressure loss to the flow through the heater.

A small coil heater having a charcoal fire box permits starting up on heavy oils and a small hand pump likewise replaces the steam driven, fuel oil fitted pumps at the same time.

Thorough straining of the oil is accomplished with 2¼-inch suction strainer and a 1½-inch pressure strainer. These are of the duplex type, which requires but one motion of a lever to shift from one side to the other. Either basket may be removed for cleaning without interrupting the flow of oil in the system. The burners are designed to operate at constant pressure, ranging from 100 to 175 pounds, and to eliminate the pulsations of the pump a special air chamber is connected in the oil discharge from the pump.

A feed water heater manufactured by Schutte & Koerting Company and having a capacity of 40,000 pounds of feed water, heating from 90 degrees to 210 degrees with steam at 5-pound pressure, is part of the equipment. This heater has the best arranged provision for expansion of any heater on the market, and the complete tube nest can be removed for inspection. The evaporating plant occupies a little space and is designed to produce greatly in excess of the yacht's maximum requirements when on a sea cruise. The standard No. 10 S. & K. cast iron evaporator produces the finest drinking water when operated to discharge into the No. 3 type Z distiller, and if it should be required will produce 16 tons of potable water in 24 hours' operation.

The distiller is unique as a vapor condenser, being efficiently baffled and constantly keeping the steam in contact with the intimate cool surfaces of the tubes.

The ventilating system combines all that could be desired for luxurious living conditions being arranged for a generous supply of air to all spaces. The air is passed through an S. & K. type Z thermofan which permits of heating, cooling or humidifying the air.

The new steam yacht Lyndonia

PACIFIC MACHINERY

MANUFACTURING WITH VERTICAL TURRET LATHES

THE Skandia Pacific Oil Engine Company in Oakland has one of the most completely equipped machine shops on the Pacific Coast, and with the high-grade machine tool equipment manufactures practically every engine part used in the full Diesel Werkspoor engines built at this plant.

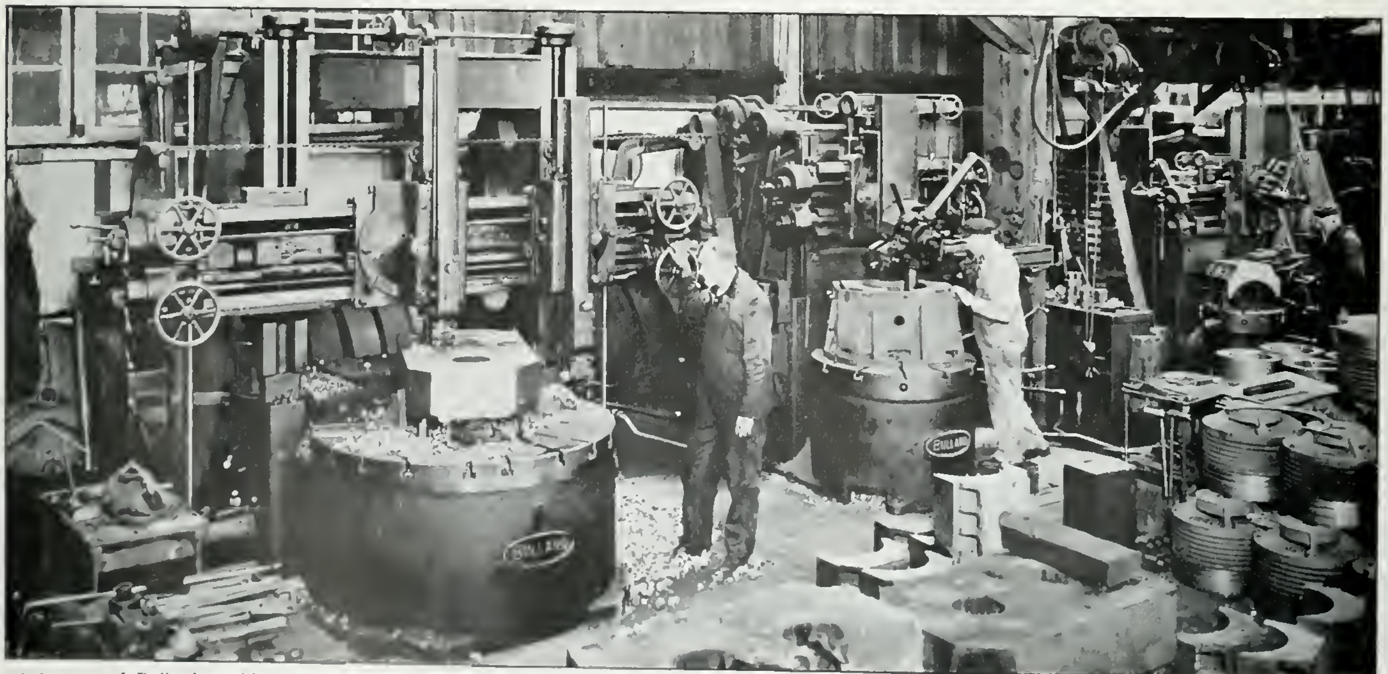
The illustration herewith shows a battery of Bullard Machine Tool Company's equipment machining Werkspoor engine parts. The Bullard Maxi-Mill in the foreground is shown machining a forged steel crankshaft web. This mill, which has a table diameter of 61 inches, is equipped for twelve changes of table speeds and eight feed changes.

The Bullard Maxi-Mill has been designed for convenience of operation with a minimum physical effort required of the operator. For maximum production a machine tool should be built upon the principle that a machine is only productive when actually cutting. Every effort in the Bullard design has been centered upon reducing the time necessary to chuck the work and remove it, to make adjustments, changes of speed, and other operations which are incidental to production, but only increase it as the time necessary to accomplish them is reduced.

The convenient location of control levers for power and speed change, feed change, power traverse for tool heads, and the safety hand wheels for tool setting which eliminate the dangerous crank handling, are important factors on the Maxi-Mill. The Maxi-Mill has been produced for the maximum amount of work within its range and to meet the exacting demands of accuracy of present-day requirements, and with certain fundamentals in machine tool design and construction this equipment is becoming very popular in manufacturing plants on the Pacific Coast.

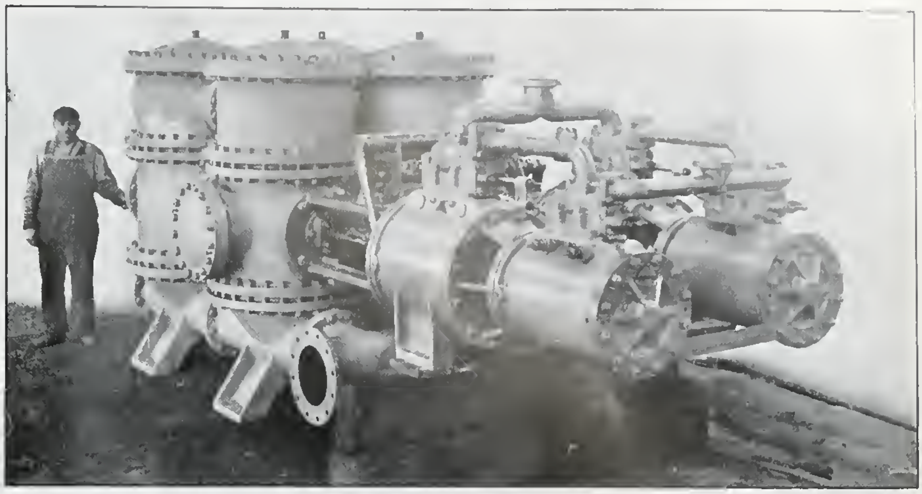
Besides the 61-inch Maxi-Mill, the Bullard line also includes the vertical turret lathe, this being a machine tool of universal adaptability, having in its design many structural and productive features of great advantage in the machining of face plate work.

The Bullard line is handled on the Pacific Coast by Harron, Rickard & McCone with sales offices and stocks in San Francisco and Los Angeles.



A battery of Bullard machine tools at Skandia Pacific Oil Engine Company. The 61-inch Bullard Maxi-mill is shown in the foreground facing a steel crankshaft web

A NEW CARGO PUMP



Heavy-duty cargo-pump showing the Duplex steam end

WE illustrate herewith a steam cargo oil pump of the horizontal duplex displacement type built at the Joshua Hendy Iron Works, Sunnyvale, California, for the Southwestern Shipbuilding Company.

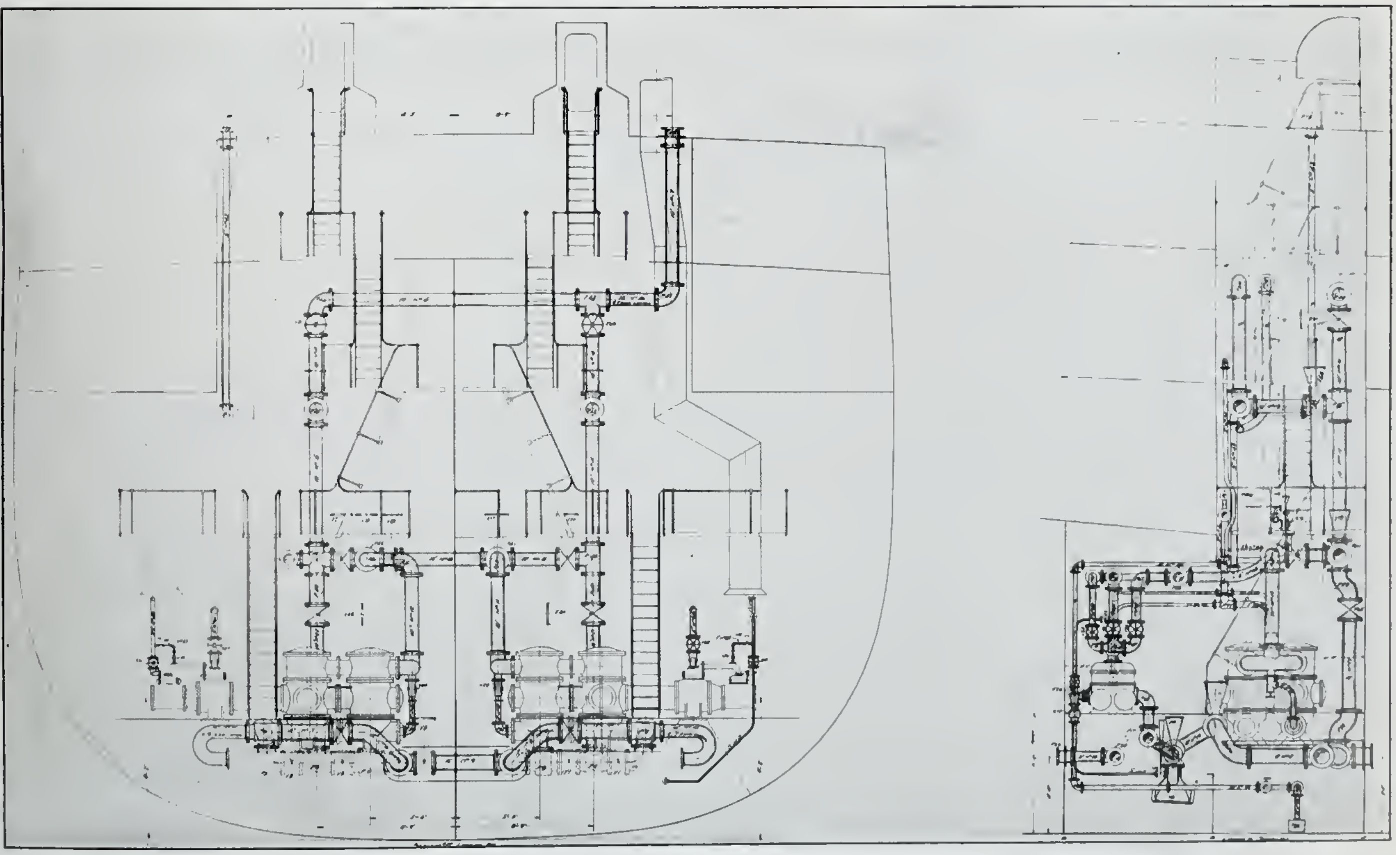
This pump, with others of identical dimensions, is to be used in the 12,000-ton tankers Montebello and La Placentia now being built at the Southwestern Shipbuilding Company for the Union Oil Company of California. They were redesigned from a type in use in Los Angeles by O. B. Kibele, works manager of the Southwestern Shipbuilding Company, with the idea of easy accessibility for repairs and increasing the ruggedness and reliability of the design.

The cylinders, both steam and oil, on this pump are of very dense gray cast iron. They were designed and built for a discharge pressure of 200 pounds per square inch and were tested successfully to 250 pounds. The normal working condition of the pumps will be with a steam pressure of 100 pounds and a discharge pressure of 125 pounds. The steam cylinders are 14 inches and 20 inches in diameter, and the oil cylinders 14 inches in diameter with a common stroke for all of 18 inches. The oil suction of the pump is 12 inches in diameter and the discharge 10 inches in diameter.

Under normal conditions the capacity of each pump is 2500 barrels per hour, and it is figured that with these pumps the entire cargo of these big tankers, 80,000 barrels, can be discharged in twenty hours.

Crane's semi-metallic packing is used on the rods, and Crane flat gasket packing on the flanges of these pumps.

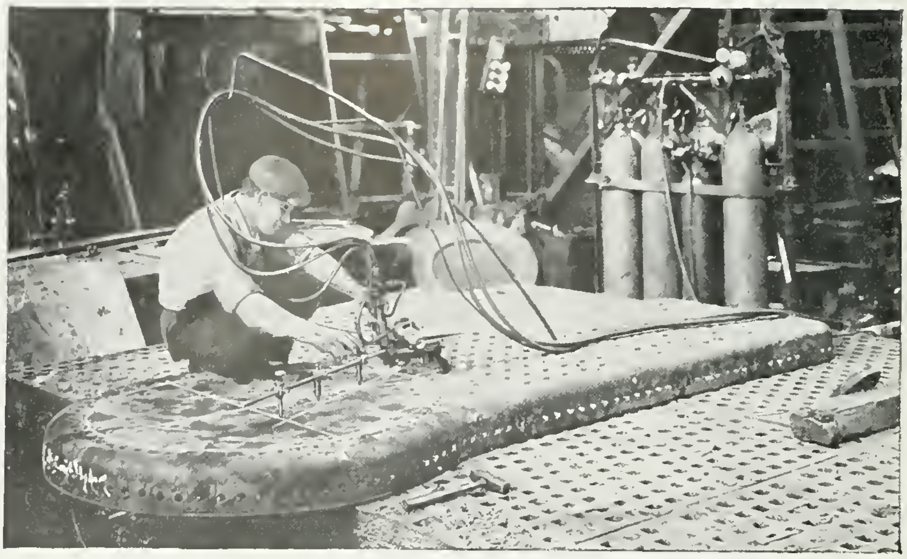
The illustration shows the arrangement of two of these pumps in the cargo pump room of the steamship Montebello. A complete description of this fine tank steamer and of her propelling machinery and auxiliary arrangements will be published in the April issue of Pacific Marine Review.



Oil-pump arrangement of the steamship Montebello

MACHINING WITH A FLAME

THE New York Shipbuilding Company of Camden, New Jersey, was one of the first shipyards to install a Davis-Bournonville Pyrograph in the boiler shop for cutting flanges of marine boilers to height and calking angle. It was also one of the first to use the radiagraph in conjunction for trimming and beveling boiler sheets, cutting openings in combustion chamber heads for the furnaces and for many other purposes to which this wonderful portable machine torch can be applied to advantage.

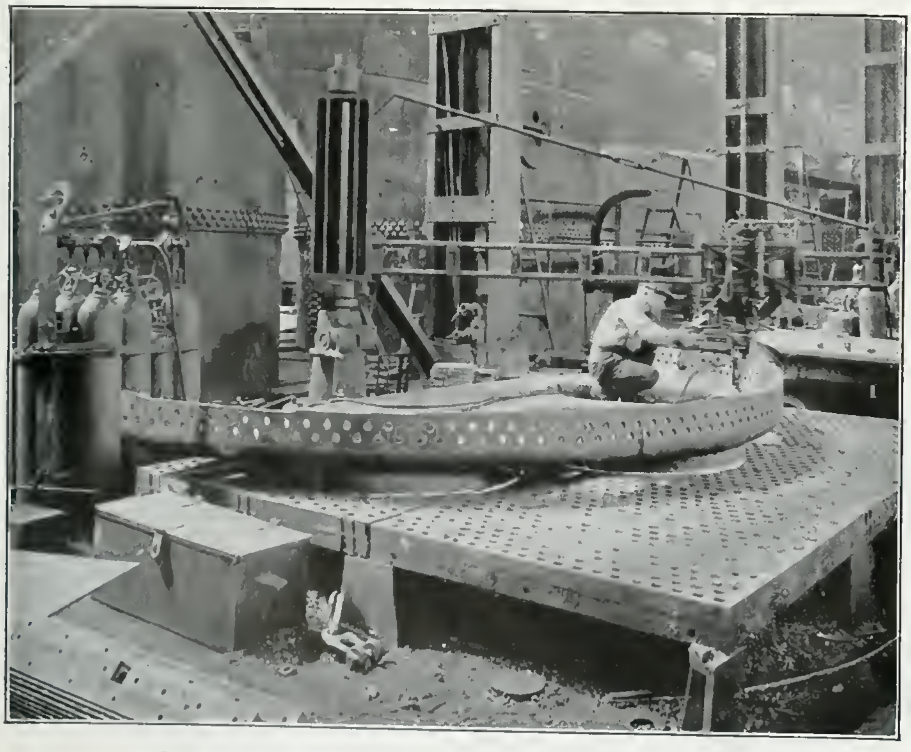

Combustion chamber head of marine boiler being trimmed with acetylene torch

An illustration shows the pyrograph cutting the flange of the upper part of a Scotch boiler head. The diameter of the head when the two parts forming it are assembled is nearly sixteen feet. The flanging is necessarily irregular and a considerable amount of metal must be removed to make the flange height uniform. The pyrograph cuts the flange to height and angle in the one operation at the rate of about ten inches per minute, the speed varying with the thickness of steel. The operation of the machine requires the torch to be guided to follow the layout line. Although the pyrograph arm swings in a plane parallel to the floor plate and accordingly the head and the torch should also travel in a plane parallel with the plate, thus making guidance by the operator unnecessary if the head were leveled up, it has been found to be more practicable to mark off the cutting line and let the operator guide the torch to follow the line. Time is saved in set-up by following this practice.

The layout line is marked from the rivet holes, using a wooden plug with a tee-head for the purpose. This marking block is stuck into the holes and a line scribed along the side of the head. The short lines are joined, making a continuous line for cutting.

Scotch marine boilers of the return tubular type have cylindrical furnaces, combustion chambers at the rear or in the center in the case of double end boilers, and flues through which the hot gases circulate to the uptake and stacks. A cut shows the combustion chamber head of a Scotch marine boiler, having the flange trimmed with the torch. The periphery of this head is about 27 feet and the time required for cutting the flange is about 30 minutes.

The final operation on these combustion chamber heads, cutting the oval opening for the furnace is done with the Davis-Bournonville radiagraph. The machine cuts the 10-foot periphery of the opening in less than 10 minutes. The shape requires the radiagraph to swing on three radii, 8½, 19 and 27 inches, respectively. The layout lines are drawn in chalk, and the respective centers punched with the prick punch. The center points are set on the radius bar at the required distances and these are manipulated by the operator while the machine is in operation so that it is not necessary to stop cutting. The centers have quick-acting sleeves by means of which the points are dropped into the punch marks as the arm swings over them. In describing the periphery the machine starts cutting on a radius of 8½ inches, changing to a radius of 27 inches and then to 19 inches. The latter is the radius of the opening at the top while the 27-inch radius is that used to describe the arcs on each side between the top and the lower or small end.

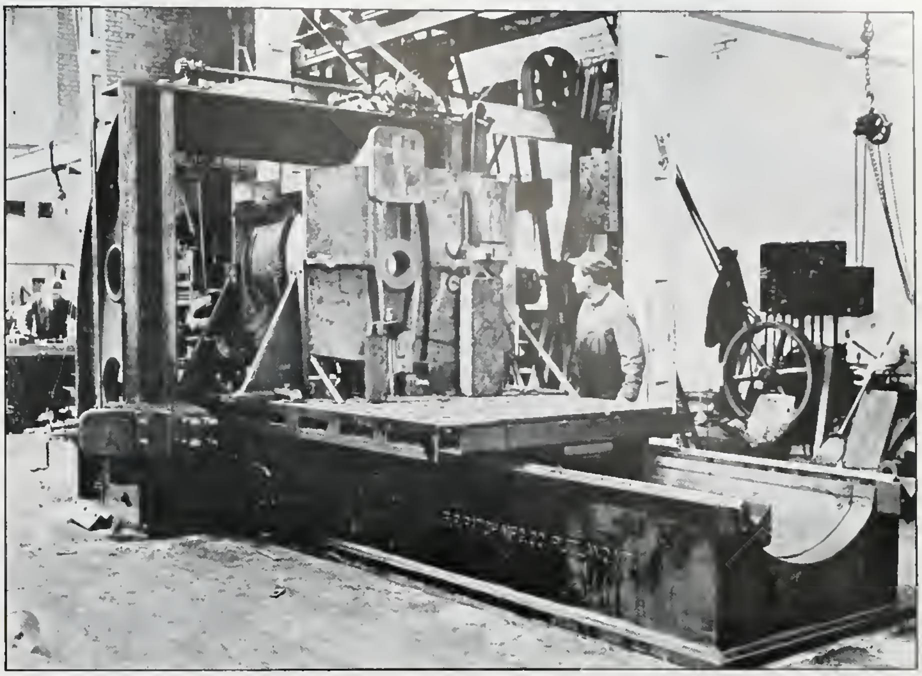

Cutting flange of upper part of Scotch boiler head with pyrograph

ADDITIONAL MACHINE TOOLS IN SAN FRANCISCO PLANT

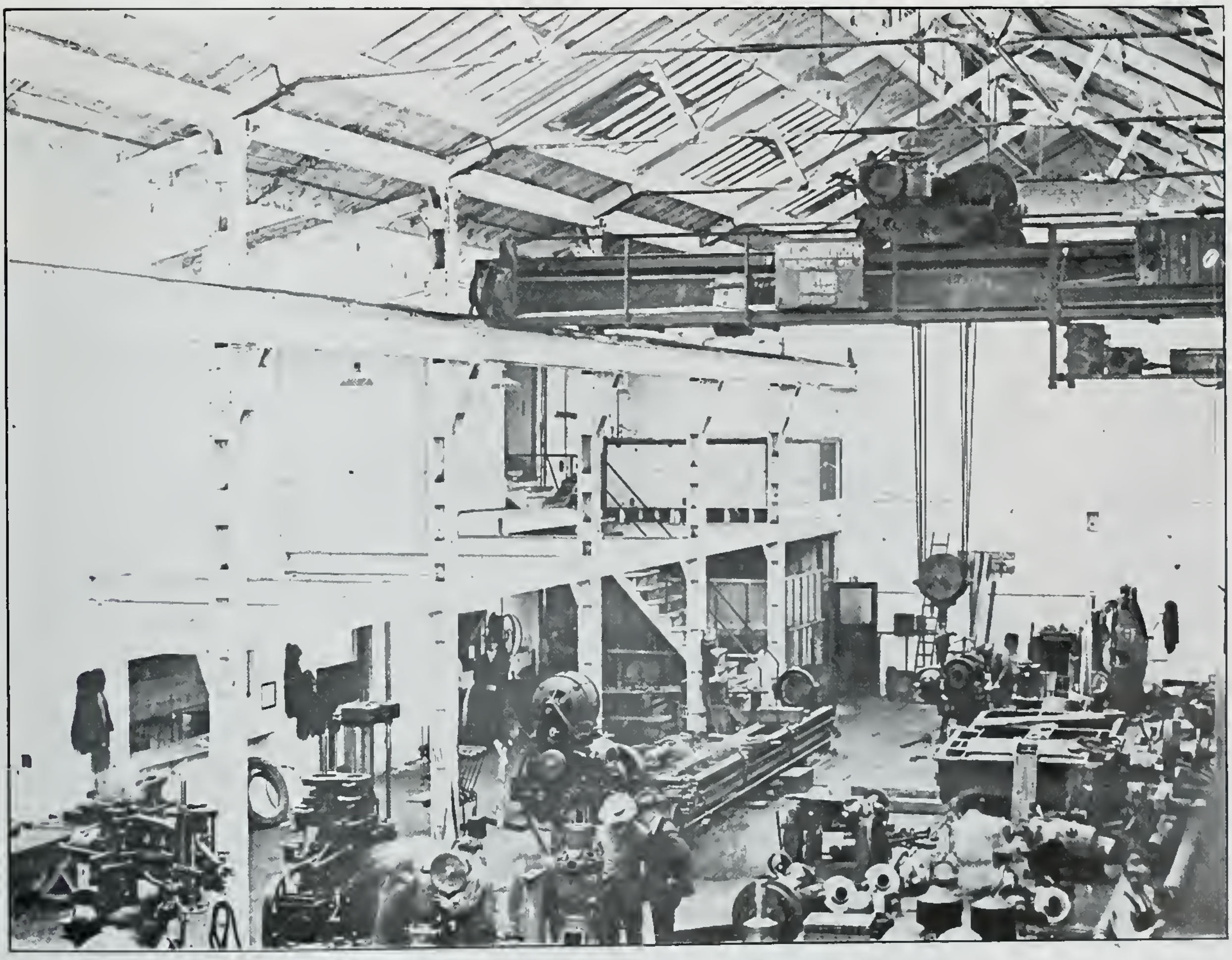
THE United Engineering Company operate a complete machine shop for ship repairing on the San Francisco waterfront, and have recently made some important additions to their high grade machine tool equipment.

A 6-foot planer with 15-foot bed has been installed. Our illustration shows this planer machining a L. P. cylinder for the steamer Willie Higgins. This heavy duty planer operates with four cutting heads, and has limit of 4 feet 6 inches under the cross rail.

Another recent installation at the United Engineering Company's plant is the 10-foot Betts boring mill. This machine is operated by a 20-horsepower variable speed motor, and is equipped with two cutting heads. The limits under the cross rail are 54 inches. A horizontal boring mill of large capacity has been added to the shop equipment for boring liners and cylinders and other similar work.

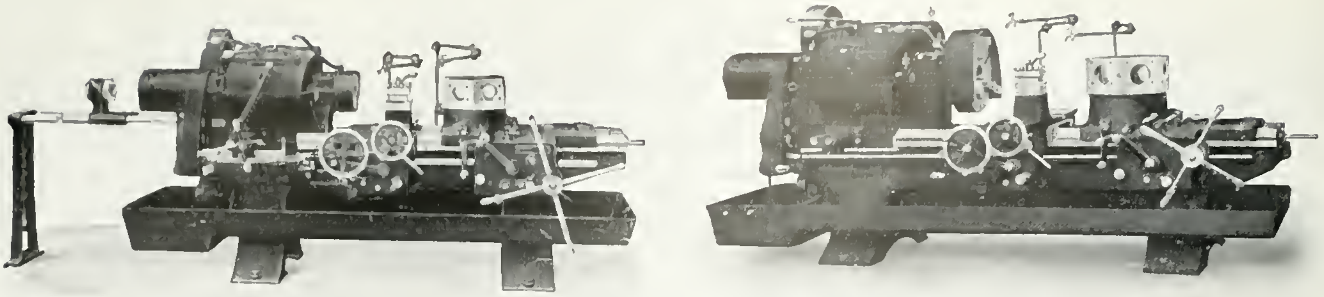


The six-foot planer recently installed at United Engineering Company's machine shop



A corner in the machine shop of the United Engineering Company, showing the 15-ton Pawling & Harnischfeger traveling crane

FOSTER TURRET LATHES



On left, 2-B Foster Universal turret lathe recently installed at Moore Shipbuilding Company. On right, a 3-B Foster Universal turret lathe

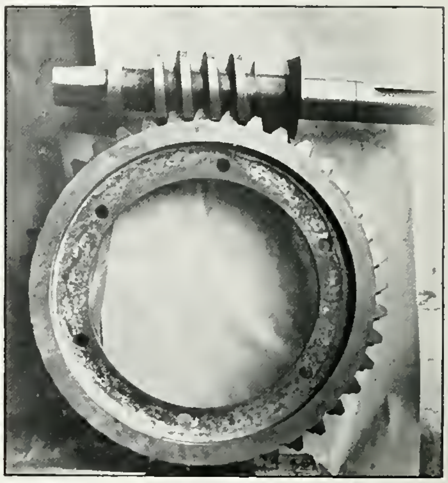
In the machine shop of the Moore Shipbuilding Company the modern screw machine department has been equipped for manufacture of various machine screw products used in machinery on ship board.

One of the latest installations is the No. 2-B Foster Universal turret lathe. This manufacturing tool has a capacity of 22 inches swing over bed and can accommodate in the automatic chuck round bars up to 3½ inches and square bars up to 2¼ inches. The three jaw chuck has a capacity of 12½ inches.

The Foster Universal turret lathe is claimed to be the most universal machine of its kind yet developed. The very powerful drive, in combination with provisions for mounting tools, makes it an easy matter to have several cutters working simultaneously, thus reducing the necessary cutting time. As many as eleven tools, several of which are capable of carrying multicutters, can be mounted on the two tool-carrying units at one setting. The range and usefulness of the Foster turret lathe make it available not only for manufacturing parts in large quantities, but also for the economical handling of a great variety of parts in small and broken lots. The Herberts Machinery & Supply Company are handling the Foster turret lathes in California and with their expert turret lathe men have made an enviable reputation in the proper tooling and solution of manufacturing problems in regard to the sequence of operations on the Universal turret lathe for the economical and large production of which it is capable. In addition to the selection of the proper combination of tools and sequence of operation many noteworthy economies have been obtained by the Herberts service men in designing of special tools for work requiring same.

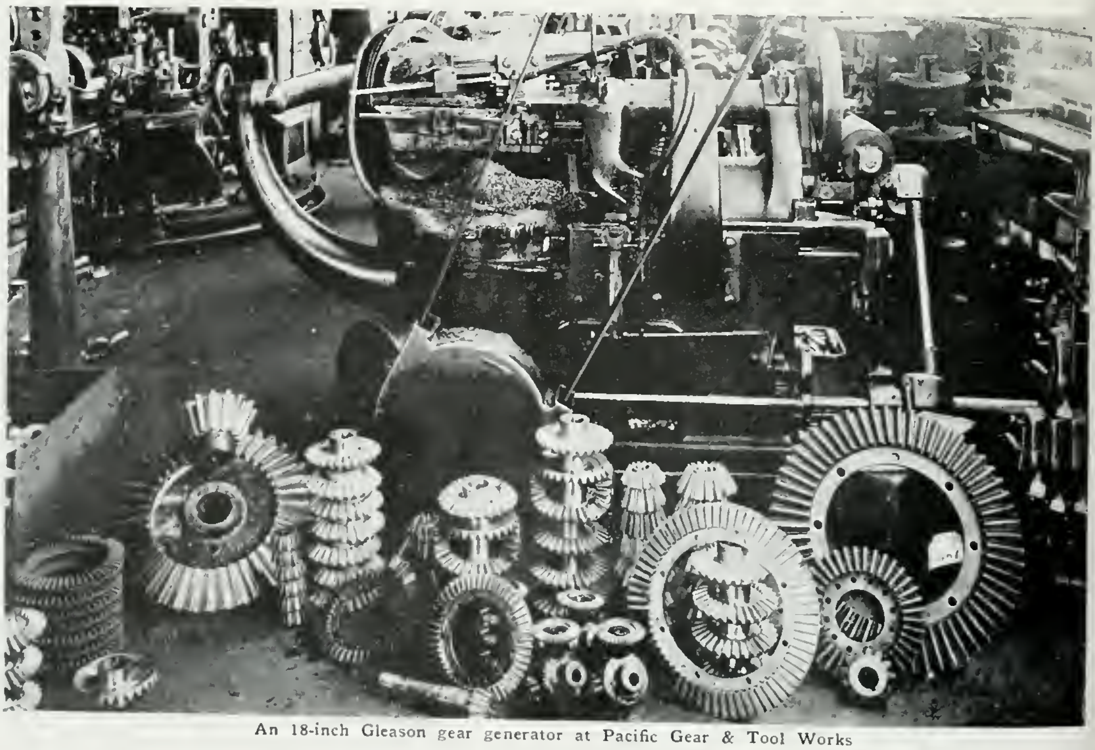
PACIFIC WORM GEARS

The Pacific Gear and Tool Works, San Francisco, have for many years manufactured cut gears of various types, and the modern equipment at their plant includes a great variety of hobbing machines, gear generators and other gear-making tools.



Cast-steel worm gear with one and seven-eighths circular pitch manufactured by Pacific Gear & Tool Works

Our illustration shows a rather difficult gear-making job. This worm gear, which is made from cast steel, is a single right-hand gear of 41 teeth one and seven-eighths circular pitch with a pitch diameter of 24.40 inches. The forged steel worm has an outside diameter of 5.80 inches and pitch diameter 4.62 inches. This worm was finished on a Lees-Brandner thread milling machine, and after finishing was hardened in the heat-treating plant and ground on a Landis cylindrical grinding machine.



An 18-inch Gleason gear generator at Pacific Gear & Tool Works

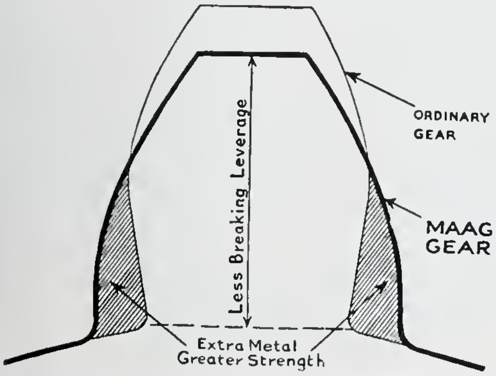
Super-Accurate Gears for Marine Turbine Use

HITHERTO the one weak spot in steam turbine practice has been the reduction gears. These have never been quite satisfactory because of two reasons—lack of accuracy in the gears and lack of strength in the pinions. Maag Gears overcome both these obstacles to success.

Cut, first of all, with an accuracy far beyond that possible in ordinary gears, Maag Pinions for high speeds are case hardened and then GROUND to final perfection.

By case hardening, the originally very strong Maag tooth—which is strongest at the base where other gears are weakest—is made still stronger. By grinding, any distortions due to the hardening process are not only remedied to produce a tooth outline of superaccuracy, but the grinding actually increases the resistance of the metal to wear and tear.

Maag turbo-reduction drives, made in this way, have given results that approach 100% efficiency. For example a standard set of Maag Gears, after being more than 12 months in continuous service, have shown no discernable wear whatever; the original fine grinding lines still remaining visible and unchanged.



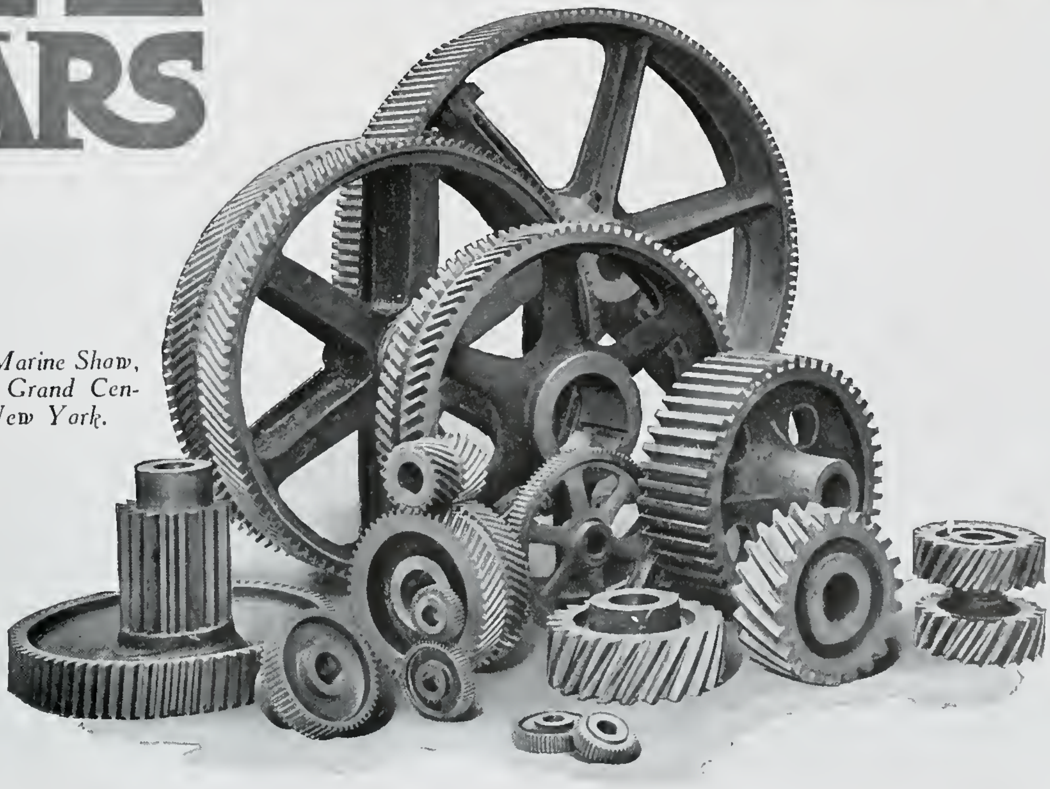
We'll be glad to give you figures on high speed Maag Gears for steam turbine, rotary pump, and electric motor reductions.

NILES-BEMENT-POND CO.

111 BROADWAY NEW YORK CITY

MAAG GEARS

See them at the Marine Show, January 24-29, Grand Central Palace, New York.



ENGINE ROOM PROBLEMS

A Series of Accidents During Several Years' Experience, Showing the Advisability of Having Practical Mechanics as Engineers

By T. ALFRED PORTER

No. 1. S. S. Tamaha

THIS vessel is one of the standard oil fleet under the British flag, with a capacity of roughly 60,000 barrels and engine power of 3000 I. H. P. developed by quadruple engines 24, 35, 50½, 73 by 51-inch stroke, steam supplied by three boilers, nine fires, at 220 pounds a square inch. The type of engine is open-fronted—that is, the crosshead has only one shoe—and to this fact, in a great measure, is due the following accident, because, had the engine been fitted with double columns and double guides, I have no doubt that much time, trouble and expense would have been saved.

The ship arrived from Shanghai about October, 1919, and on arrival at San Francisco it was learned that no engine repairs could be effected, since the great strike was in progress. The main trouble on the way across had been the inability to keep the high pressure gland (piston rod) steam tight, our supply of patent packing having given out. The packing originally fitted was Copeland's, which consists of seven rings, enclosed each in a separate housing, each ring being cut into three equal sections and held to the rod by a spring lying in a groove about three-eighths inch wide, in the manner of a garter or similar similia. This packing when new is as good as any on the market, including even the redoubtable U. S. packing (Bradford, England); but it cannot be replaced by ordinary cast iron, which it closely resembles, and when the rings are worn out there is only one remedy (the one we adopted): break the housings off the rod, remove all the packing and use the stuffing box with "Lion" or whatever you have on hand.

The day following our arrival we sailed for Beaumont, with the promise of new packing being sent there and the necessary repairs attended to. The trip round was made, without any trouble, at an average of 11¼ knots, and we dropped the hook off the Magnolia Company's wharf and awaited developments. The repair list (made out by the chief engineer) called for a new H. P. neck bush, and gland re-bushing with the refitting of a new set of Copeland's packing. The master mechanic of the repair shop there deemed the job, that of removing the H. P. piston and rod, too big, and flatly refused to tackle it.

A consultation was held by the superintendent from New York and the chief and the outcome was a suggestion that a neck ring one inch deep made of brass be placed at the upper end of the stuffing box and the stuffing box be repacked with "Lion" automatic. The ring was turned, cut across the Diameter, and placed in position, and four turns of "Lion" put in. Other repairs being effected, loading commenced and the vessel was ready for sea. From Beaumont to Sabine is forty-five miles and the last injunction of the superintendent was that a phone message be sent back telling of the success or otherwise of the venture, from the loading station at Sabine.

The trip down was about seven hours, and it was thought that ample time had been given for a try-out. Everything was A1. After a few initial puffs, the packing asserted itself and with careful swabbing the rod took on its accustomed shine. The message was sent in due course, and later we left for sea, en route to Antwerp. Eveything was as it should be, all hands congratulating themselves on having things their own way—for twenty-four hours—then came the debacle.

At 1:30 a. m. the chief was called, and the noise in the engine room, on opening the door, was almost enough to prevent speech being understood, but nothing was needed in the way of explanation. The engine room was filled with a blue haze. The smell of burning oil was sickening, and while the eyes were smarting with the smoke, the nose overpowered by the smell, the engine kept up a steady seventy to the minute—bang, thump, bang, which would have put terror into the heart of a layman. The chief at once ordered stopping, shut off the fuel, and then began the examination.

The rod was smoking hot, not by reason of lack of lubrication, but from some other cause, since the swab pot and brush were well in evidence and the second assistant's appearance spoke eloquently of its use. The remaining three engineers were called and the first job was to take down the gland (H. P.). All the packing was taken down, and each turn examined as removed. The whole four turns were charred and useless for replacing; and then we looked for the brass neck ring. One-half fell down. Did you ever work under a stinking hot cylinder, with a leaky stop valve permitting a fair quantity of 220 pounds steam to blow over your fingers, trying to dislodge a brass ring jammed up a stuffing box (nine inches deep), the temperature of the engine room about 120 degrees? If ever a man becomes disgusted with sea-going it is on occasions like these. After three-quarters of an hour's hard picking, we dislodged the other half of the ring and its appearance was testimony to what the rod had endured. The neck bush was about five-sixteenths inch slack with the rod bearing hard on the forward side. The expansion of the packing, together with the heating of the ring, had forced the ring up into this five-sixteenths inch space, and you can imagine the result. The brass had the appearance of having been in a fire, being cracked in several places. The engineers commenced repacking with one and a quarter-inch "Lion" and about 6 a. m. a preliminary turn was taken out of the engine. "Slow

The Standard Oil tanker Tamaha

γεννάω–I Produce!

ONE hundred and forty-four years ago Lavoisier coined the name *Oxygen.*

In choosing the Greek word Γεννάω "I produce," as his main root he had in mind a chemical reaction commonly associated with the gas.

Had Lavoisier been able to foresee the tremendous part that Linde Oxygen is playing in modern industrial development, he would have realized the vast significance of that word Γεννάω "I produce!"

The country over, Linde Oxygen is daily making possible greater production—everywhere it is saving time and cutting costs.

A chain of seventy-five Linde plants and warehouses assures American welders and cutters of a prompt supply of highly pure oxygen—wherever they are, whatever their requirements.

THE LINDE AIR PRODUCTS COMPANY
Carbide and Carbon Building, 30 East 42nd Street, N. Y.
Kohl Building, San Francisco

The Largest Producer of Oxygen in the World

L-502-21

ahead" was rung up on the telegraph and all hands below stood by—watching. Half a dozen revolutions served to show the damage wrought. Sparks were thrown off the forward end of the guide shoe and the engine was stopped again. The turning (jacking) engine was put in, and the engine turned over slowly. First thing that was observed was that the rod, 7½ inches diameter, was badly bent. In bending, it had dragged the guide shoe hard up against the forward astern guide and then beban the job of lining up the astern guides. Shims of three-eighths inch thickness were necessary, and the shoe itself had to come down for cleaning, the white metal being badly torn. After several turns of the jacking engine, with the feelers tried at top and bottom centers, it was deemed safe to proceed; so again the bridge was notified and away she went.

Ten minutes later: Stop again. The wildest noises and grunts were issuing from the H. P. cylinder's interior and looks of inquiry were freely exchanged. Speech was impossible, excepting whole-souled cuss words. The chief's only words were "Open her up." The junk ring was removed, then the rings (Lockwood & Carlisle's), and a pretty mess presented itself. The whole box of works was jammed full of burnt packing (asbestos) and the cylinder walls were scored badly. The only thing to do was to clean everything, put it back, and try again. By this time it was 1 a. m., twenty-four hours since the trouble commenced. The chief and second assistant were the only ones below now, and believing that nothing had been overlooked the engines were set running again. After a quarter of an hour the chief decided to lie down and went on top with a final word of congratulation to the second assistant on the success (as they all thought) of the repair. Two hours after the chief was called and again informed that things were "off color" again, the pounding having re-commenced (the vessel by this time was roughly 180 miles from New Orleans, and the chief's idea was to return to this port as the nearest and have things fixed up properly, if the temporary repairs did not act effectively). The second assistant stopped the engine and, it being just about time for the first to come below, two engineers took down the gland and removed one turn of packing, putting up the gland again, hand-tight. The chief had a conference with the captain and, despite the latter's protest that it was Antwerp and not New Orleans he wanted to go to, the vessel's head was turned, and the engines kept moving at fifty to fifty-three revolutions with the H. P. gland blowing into the crankpit. On arrival off Chalmette the anchor was dropped and all hands below smiled when the telegraph rang "Finished." Lloyd's surveyor came off and on inspection advised that the H. P. valve chest be bored, new valve fitted, H. P. cylinders bored, rod put in lathe and straightened, new neck bush fitted and the new box of "Copeland's" fitted. Also he advised a new neck bush for the M. P. 1 cylinder and the boring out and fitting of the first M. P. valve chest and new valve. Notice here that he did not advise boring the M. P. cylinder, a mistake costing four days' extra labor. The repairs were finished in ten days and the superintendent sent down from New York had a two-hour full speed trial (at seventy revolutions) before she left for sea. One hour passed with everything A1. Then trouble commenced. A terrific grunting commenced in the H. P., and even while the superintendent and the chief were on the middles, the latter swabbing the M. P. rod, an extra knock was heard at the first M. P. and the chief almost yelled "Stop her." The first M. P. rod had bent, even while we were watching it. The vessel was towed to her anchorage and the surveyor came aboard again and looked thoughtful. "You were right, chief—that cylinder wanted boring." The H. P. on investigation showed that the spare lockwood spring was too tight, so it was deemed advisable to run without it and the rings, the piston being new and a snug fit, and excellent cards, under the circumstances, were given from that cylinder. The M. P. rod when in the lathe showed that it was bent up against the piston and after a four-day sojourn to effect the repairs the engine was passed as satisfactory and she arrived in the Channel twenty days later. The idea of having to bore the cylinder when fitting the new neck bush did not appeal to the officials mentioned previously. They did not see (until later) that if the piston rod was held by the new neck bush more securely than previously, while the piston followed its old course (which in 99 per cent of cases in old jobs means that the piston is lying hard up on the forward wall of the cylinder), that more bending strain was thrown on the rod. Had the guides been of a form like some stationary jobs, with two semicircular faces, no doubt nothing would have happened, but since the engine was of the single guide type, the astern guides could not overcome the extra bending strain; hence the above. Since that date, when the two cylinders were bored, everything has worked satisfactorily, but several men now in San Francisco will remember November, 1919, and add it to their life's experiences.

ELECTRIC POWER FOR DECK MACHINERY

By REGINALD TRAUTSCHOLD, M. E.

WITH nearly half the power utilized in industrial fields ashore—omitting public utilities and railroads—electiric, and ships—naval and cargo—electrically propelled, it would seem almost unnecessary to advocate the use of electric power for deck machinery. Such use appears a logical—almost obvious—necessity for securing economy, safety and reliability in operation. Yet, many ship owners and some marine engineers are still prejudiced against electrical apparatus—in comparison with steam driven equipment—on account of claimed "unreliability."

The reason for this antagonism is not hard to find. It is due largely, if not wholly, to failure of the critics to appreciate the decided difference between past and present wiring practice for marine installations. Formerly, the electric wires (conductors), were run through metal conduits, seriously interfering with the flexibility of the conductors and inviting trouble and unnecessary expense. The conduits concealed possibly inferior wiring and tended to collect water—chiefly through condensation of moisture laden air—which was liable to cause grounding and short circuiting. The conduits were expensive to install and it was a difficult and costly matter to make water-tight joints through water-tight bulkheads, etc. Today, approved marine wiring practice stipulates the use of lead-covered, steel armored conductors, assuring flexibility and secure connections; ease, simplicity and low cost of installation; and virtual avoidance of all trouble from grounds and short circuits. Perhaps it is the very simplicity of the means of overcoming the past unreliability of marine wiring which leaves doubt as to the effectiveness of the remedy in the minds of the skeptical and question of the economy of well installed electrically operated deck machinery.

Reliability

Obviously, a high grade lead-covered, steel armored conductor is as nearly impervious to injury and accident as a

Controlling the Electrical Equipment for Merchant Ships

A series of discussions on the following subjects will appear in succeeding issues of this publication, relative to the practicable application of electricity to the main propulsion and auxiliaries of merchant vessels, particularly of the motorship type, and illustrating how the successful control of these installations is being accomplished.

1. Growth of electricity in the marine field and its successful adaptation.
2. Electric propulsion of merchant vessels.
3. Electric steering gear equipments.
4. Deck winch equipment.
5. Anchor windlass equipments.
6. Capstan equipments.
7. Engine room auxiliaries, including pumps, compressors, refrigerating machines, etc.
8. Electric heating and similar miscellaneous applications.

In the meantime ask our Marine Dept. to mail you a copy of our Publications 819 and 890, which show some of the controllers designed and built for the above applications.

Our engineers will also be pleased to render you all assistance in connection with any of these problems.

MARINE DEPARTMENT

The CUTLER-HAMMER MFG. CO.

50 CHURCH ST., NEW YORK CITY

WORKS: MILWAUKEE AND NEW YORK

C-H

DISTRICT OFFICES: Chicago, 323 No. Michigan Ave.; Pittsburgh: Farmers Bank Bldg.; Boston: 77 Franklin St.; Philadelphia: Commonwealth Bldg.; Cincinnati: Gwynne Bldg.; Cleveland: Guardian Bldg.; Detroit: Kresge Bldg.; St. Louis: Railway Exchange Bldg. SELLING AGENTS: H. B. Squires Co., San Francisco; 583 Howard St., Los Angeles; 308 E. 3rd St., Seattle; 552 First Ave., So. Igranic Electric Co., Ltd.; Bedford, and London, England.

NEXT AD OF SERIES WILL DISCUSS "GROWTH OF ELECTRICITY IN THE MARINE FIELD AND ITS SUCCESSFUL ADAPTATION."

transmitter of energy can very well be made. Certainly it is more nearly perfect in that respect than a steam pipe with its necessarily numerous joints, each one liable to leakage or rupture if not properly cared for. An electric motor is a much more reliable mechanism than such a steam engine as is commercially used to drive a winch. The records of one of the most prominent manufacturers of electric motors show that if high grade electric motors are properly installed—and there is no reason why they should not be properly installed on board ship—only about one-tenth of one per cent show any electric trouble in a period of ten years.

Compare such a record with that of even the most satisfactory of steam driven equipment and it is certain that the electric mechanism cannot justly be charged with "unreliability." If trouble develops, it is probably traceable to the wiring and this can be avoided if steel-armored flexible conductors are employed and secure connections made at the terminals.

Efficiency

As virtually every modern power vessel maintains an electric plant for wireless, lighting, cooking, cleaning the hull, etc.; the relative efficiency of utilizing the steam output of the boilers direct for operating deck machinery or of using current from the dynamos to operate similar electrical equipment can and should be given consideration. Though the generation of electricity cannot be accomplished without some loss in energy between the boilers and the electric switch board, the loss in the compact power plant of a vessel should be relatively no greater than that occasioned by drop in steam pressure and temperature between the boiler and the steam chests of the more remote winches and other steam driven deck machinery.

Substantially, therefore, the same proportion of boiler derived energy is delivered to the steam chest of steam driven equipment and to the terminal connections of similar motor driven apparatus. The mechanical efficiency of the electric motor is admittedly higher than that of the reciprocating steam engine—or of a rotary steam unit, for that matter—so there is an economy—basic—in the use of electricity, even under normal conditions.

CHASE COMPANIES OF CALIFORNIA

THE formal announcement appearing in this issue of Pacific Marine Review, of the recent incorporation of the Chase Companies of California, is of particular interest to the shipbuilding industry on the entire Pacific Coast.

Mr. Frederick S. Chase, president of the large marine brass and copper mills, the Chase Companies of Waterbury, Connecticut, confident of the industrial growth and belief in the importance of shipbuilding in the West, has, during the last year, had under consideration plans to bring the services of their mills in Connecticut in closer contact with the industry on this coast.

Desiring to identify his large interests directly with the permanent future of industrial growth in the West, he has organized the Chase Companies of California, Inc., for the purpose of dealing in the products of the Chase Metal Works and Chase Rolling Mill Company of Waterbury. San Francisco has been selected as a strategic point for the location of their warehouse and general offices. Comprehensive stocks will be carried for quick service to the coast trade with whom they have had a large volume of business for many years.

Of particularly pleasant interest to the shipbuilding industry is the present personnel of the Chase organization. Captain Harry George, U. S. Navy, retired, who was called back to service by the Navy to interject his administrative energy into the management of the Navy Yard at Mare Island, California, during the war, has been associated with the Chase Companies for a number of years and since his release from duty at Mare Island has assumed direct supervision of the research laboratories and metallurgical departments of the Chase Companies at Waterbury. Captain George's remarkable war record at Mare Island, when that yard successfully carried through with great credit the destroyer program, is well known to the coast and the industrial manufacturing centers.

Associated with him during —now associated with the his war administration were two other former Naval officers Chase interests. Captain Henry M. Gleason, formerly Construction Corps, U. S. N., during his ten-year career as Chief Naval Constructor at Mare Island, has a host of friends among shipping circles. As Chief of the Department of Construction and Repair on the war staff of Captain Harry George, Captain Gleason made for the Nvay world's records in ship construction and for himself a national reputation.

His phenomenal launching of the Liberty destroyer U. S. S. Ward in fourteen and a half days from the laying of her keel, will long remain a spectacular achievement in shipbuilding. His superintendence of the designing, building and launching of the 32,000-ton U. S. S. California, the largest class superdreadnaught afloat in the Navy, is of more recent memory.

Following completion of his duty in building and turning over the U. S. S. California, Captain Gleason resigned from the Navy Department after twenty-five years' professional service and upon the invitation of Mr. Frederick S. Chase became consulting technical engineer for the Chase interests and again in association with Captain George at Waterbury.

Mr. Ralph L. Phelps, an electrical and industrial engineer of San Francisco, who volunteered in the Navy during the war and had been ordered as divisional accounting officer on the staff of the Commandant of Mare Island Navy Yard, Captain Harry George, served during the war for three years with Captain George and Captain Gleason. Since his retirement from Naval service Mr. Phelps has been selected by the Chase interests as the managing head of the California companies and has recently been elected vice-president and general manager, with headquarters in the Balfour Building, San Francisco.

Both Captain Gleason and Mr. Phelps are directors with Mr. Chase in the new California company and resume a continuance of their intimate association begun during the war. Both of these former officers have a wide circle of Pacific Coast friends who will be interested in this recent industrial development and who will wish for the Chase Company's continued growth and prosperity in keeping with the Chase Company's faith in the Pacific Coast.

The Chase Companies have been manufacturers of marine rod, wire, sheet, seamless and brazed tubing from brass, bronze, copper and nickel silver for three generations in the brass manufacturing center of the United States—the Connecticut Valley — employing some 16,000 skilled mechanics in their five plants at Waterbury and Waterville.

During the war the Chase Metal Works, the latest addition to these mills, was built at Waterville, in order to secure straight line production from the billet casting shops, through the extending presses, drawing benches and brazed tube department to the shipping platforms. This plant alone is over 3600 feet long and required the moving of the Nagatuck River in order to secure the twenty-five acres necessary to accommodate the entire plant.

One of the Chase plants manufacturers over 35,000 separate articles of brass and copper and is the largest cut up shop in the United States.

With their large productive abilities the Chase Diamond Brass quality has a world-wide reputation and there is nothing of brass and copper that they do not manufacture.

CANADA'S EXCLUSIVE WHOLESALE AND RETAIL MARINE ENGINE, PROPELLER JOBBERS. Dominion's Largest Distributors. Free illustrated catalog. Mention this publication.

CANADIAN BOAT AND ENGINE EXCHANGE, LTD.
Toronto, Canada

R. M. S. P. & P. S. N. C.

The ROYAL MAIL STEAM PACKET CO.

(Royal Charter dated 1839)

Mail, Cargo and Passenger Services

between

New York---Cherbourg
Southampton and Hamburg

Halifax to West Indies

Other Services from Europe to Brazil, Argentine, China, Japan, West Indies, Morocco, Egypt, Etc.

The PACIFIC STEAM NAVIGATION CO.

(Established 1840)

Mail, Cargo and Passenger Services

between

New York, Peru and Chile

also

Liverpool to South America

VIA PANAMA CANAL and
VIA MAGELLAN

Seattle--R. M. S. P. CO., Rainier Bldg.
Vancouver--R. M. S. P. CO., Pacific Bldg.
San Francisco--W. L. COMYN & CO., Inc., 310 California St. *(for Freight)*
THOS. COOK & SONS, 53 Post St. *(for Passenger)*
Halifax--R. M. S. P. CO.
Chicago--R. M. S. P. CO.
New York--R. M. S. P. CO., 26 Broadway

HOLLAND-AMERICA LINE

NORTH PACIFIC COAST LINE

(Joint service of Holland-America Line and Royal Mail Steam Packet Co.)

— between —

Vancouver, B. C., Puget Sound, Portland, San Francisco and Los Angeles Harbor

— and —

Rotterdam, Antwerp, London, Liverpool, Hamburg

FREIGHT ONLY

Sailings will take place as follows:

SS "KINDERDYK" (12,000 tons d.w.)...... loading middle March
SS "MOERDYK"...... loading middle April
And regularly thereafter

Steamers are specially fitted with *large coolrooms* and *refrigerators* for the *transportation of fresh fruit, fish, etc.*

For freight rates and particulars apply to

HOLLAND-AMERICA LINE

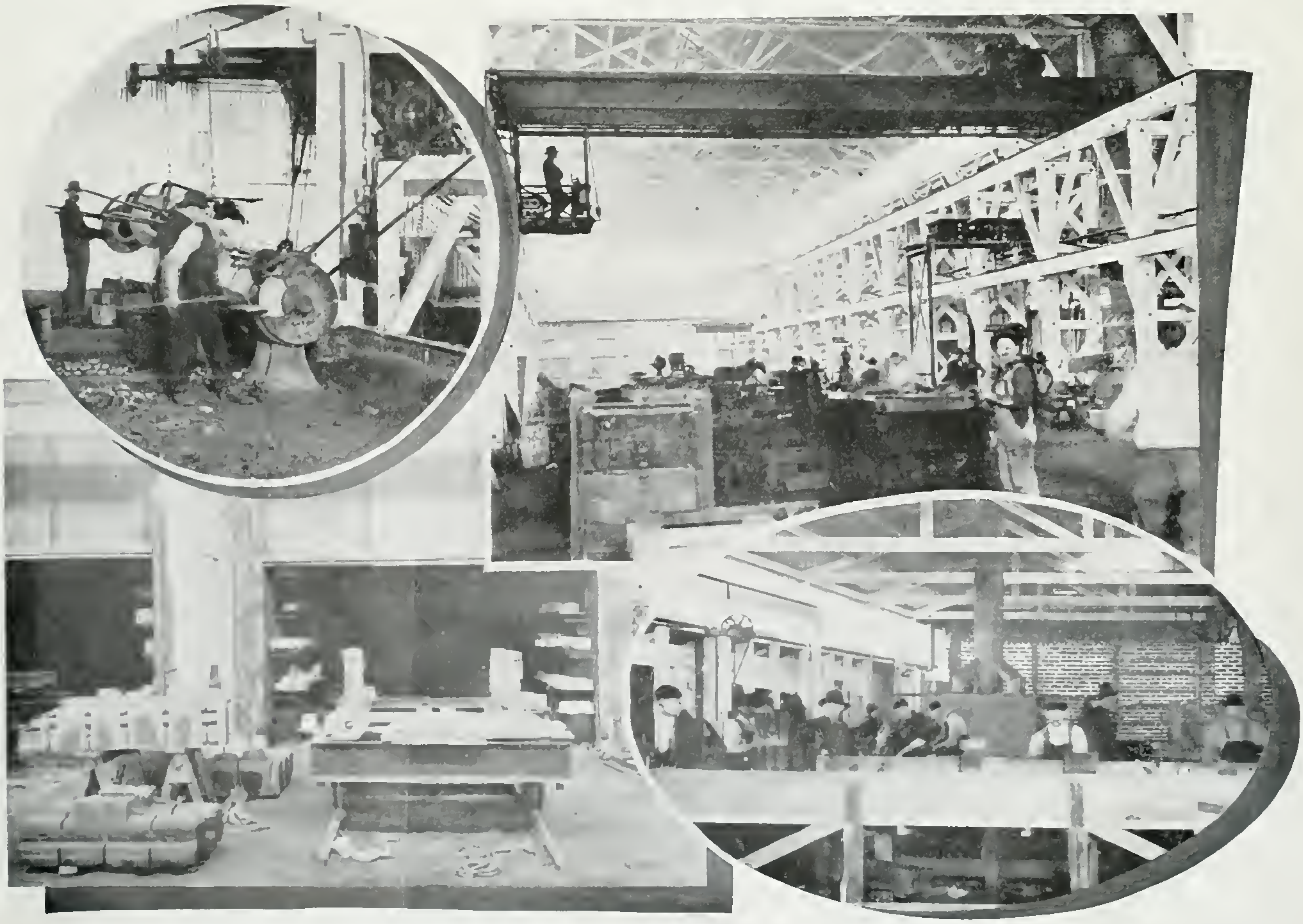
401 MARKET STREET SAN FRANCISCO
ROYAL MAIL STEAM PACKET CO., Seattle, Wash.
OREGON PACIFIC COMPANY, Portland, Ore.
ROYAL MAIL STEAM PACKET CO., Vancouver, B. C.

The Best Steel Casting Company's plant, Oakland, California

THE BEST STEEL CASTING PLANT

THE Best Steel Casting Company, which operates a large steel and grey iron foundry in Oakland, has during the past two years made extensive improvements and additions to its plant. Operating a six-ton Heroult electric furnace and a three-quarter-ton Renfeldt electric furnace, and two two-ton converters in connection with two 60-inch cupolas, the modern steel foundry is producing a large tonnage of steel castings. With its electrical equipment in the steel foundry, this firm is a heavy consumer of electric current. In the transformer house a 6000-volt current is stepped down to 1100 volts and again to 120 volts, which is the current used in the furnaces.

The Best Steel Casting plant is well equipped with annealing ovens and large sand blast rooms. The equipment in the finishing department includes seventeen swing grinders. Other equipment in the steel plant includes two two-stage air compressors, and one single stage compressor. The handling equipment includes three 10-ton Whiting cranes in the main bay and one 10-ton Shaw crane and one 10-ton Cyclops crane in the side bays.



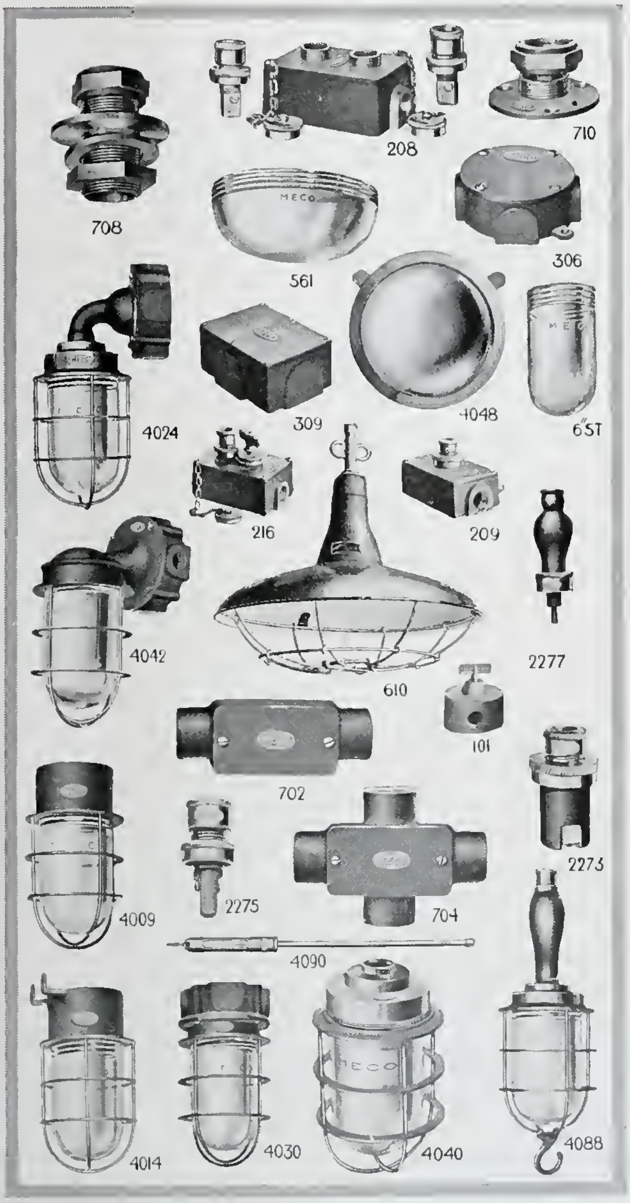
Interior views in the shops of the Best Steel Casting Company. Upper ight: Molding floor in foundry. Upper left: Corner of finishing department. Lower right: Core-making. Lower left: Core ovens

Established 1886

Manufacturers and Distributers of

MECO

Marine Watertight Fixtures and Fittings



MARINE ELECTRIC COMPANY

195 FREMONT STREET
San Francisco, Calif.

Cable Address
MECO

Codes:
A. B. C. 5th Ed. (Imp.)
Western Union

The R & D PARACOIL Feed Water Heater

Constructed with cast iron or steel plate shells, and with coils of a very high thermal efficiency. Improved cleaning facilities make maintenance extremely low.

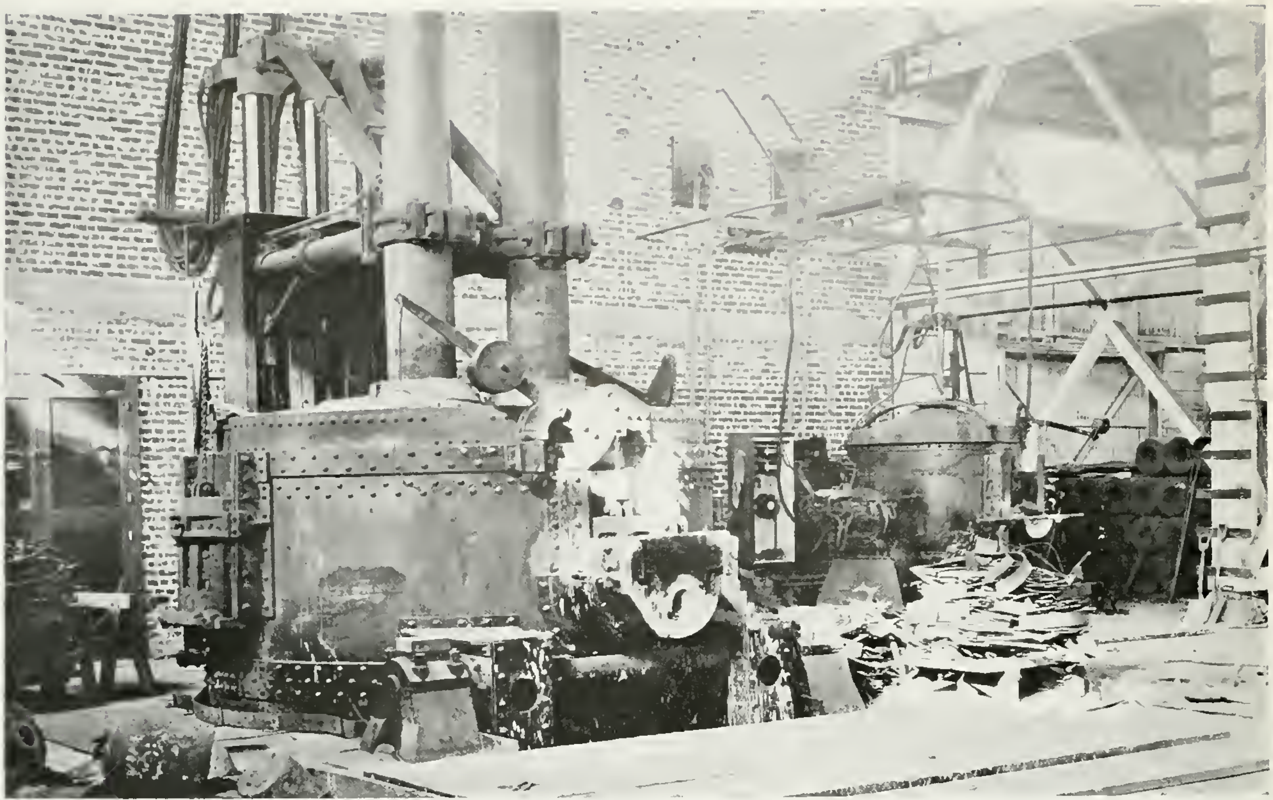
Write for catalog and complete information.

21

ROW & DAVIS ENGINEERS, Inc.

Feed Water Heaters, Evaporators, Condensers, Distillers, Ash Ejectors, Feed Water Filters, Grease Extractors, Fresh Water Stills. Consulting and Contracting Engineers.

90 West Street, New York, U. S. A.
Cable Address: Roviseng, New York
SEATTLE, Wash. VICKERS & CO.



The electric furnaces at the Best Steel Casting Company. At the left foreground is the 6-ton Heroult furnace with its huge electrodes, and at the right rear is the Renfeldt ¾-ton furnace

The grey iron foundry is housed in a building 340 feet in length by 40 feet width, with two side bays of the same length with 34-foot width. The grey iron foundry has three cupolas of large capacity, and is served by one 10-ton Pawling & Harnischfeger traveling crane and one 10-ton Champion crane. The iron foundry is also equipped with eight grinding machines, sand blast rooms, core ovens, etc. It is said that the Best iron plant has the most modern core-making equipment yet developed. A labor-saving system of charging the cupolas is to be seen in the use of lift trucks. Pattern shops and pattern storage, and a machine shop complete the equipment at the Best Steel Casting plant.

With this modern equipment and well experienced executives, this plant is in position to produce steel and iron castings to any specification.

ECONOMICAL AMERICAN MOTORSHIPS

Pacific Motorshio Company's motorship Boobyalla, one of a fleet of eight motorships operated by this company in Pacific Ocean trading. These vessels are engined with twin McIntosh & Seymour direct reversible full Diesel motors and are making money for their owners even under present adverse freight conditions.

Pacific Marine Review

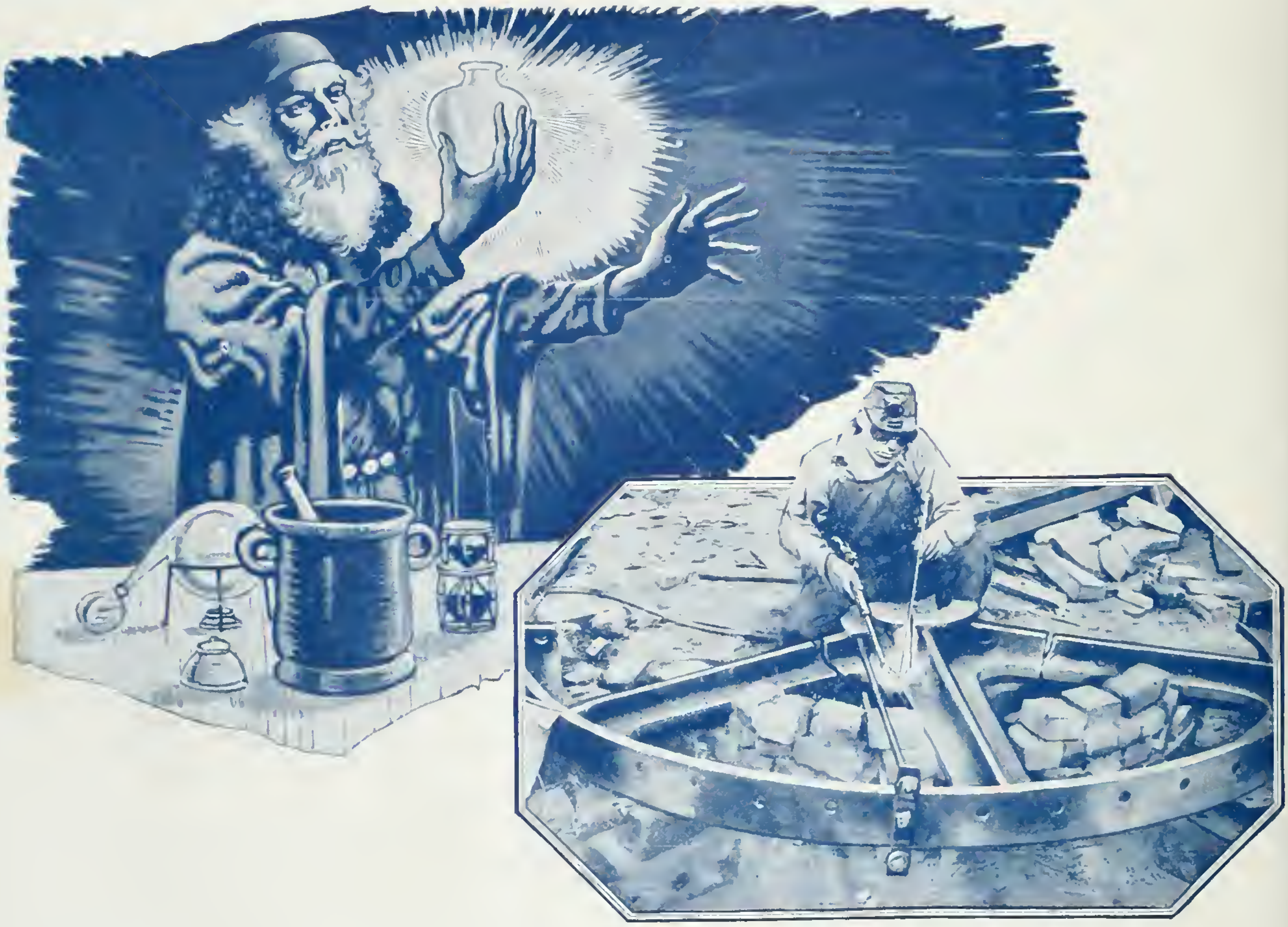
The National Magazine of Shipping

THE GOLDEN STATE
in the
GOLDEN GATE

APRIL
1921

25
Cents

Pacific Marine Review, Vol. 18, No. 4. Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.



The age-old dream of the alchemist is realized because of Linde

THROUGH countless centuries man dreamed of transmuting the baser metals into gold. Patiently, laboriously, often consecrating their very lives to the work, the Alchemists of old toiled on toward their elusive goal.

As late as 1873 James Price, the last of the Alchemists, sought death by his own hand rather than acknowledge the failure of his experiments.

Linde Engineers of to-day have made this dream of by-gone ages come true.

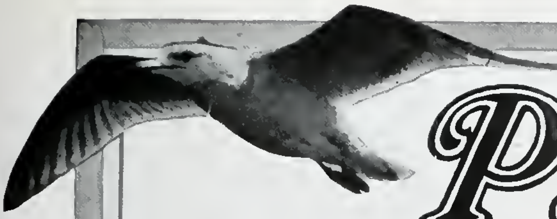
By producing uniformly pure oxygen in industrial volume, they have made it possible for oxy-acetylene welders and cutters to reclaim thousands of tons of metal machinery annually—turning base metal into gold—a saving in money far in excess of any vision of wealth dreamed of by ancient philosophers.

And Linde does more than supply oxygen of absolutely uniform purity. Thanks to a chain of twenty-nine plants and forty-six warehouses it delivers Linde Oxygen when and where it is wanted in any volume.

THE LINDE AIR PRODUCTS COMPANY
Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco

THE LARGEST PRODUCER OF OXYGEN IN THE WORLD

L-500-21



Pacific Marine Review

CONTENTS

APRIL, 1921

Hakon Thomsen .... Frontispiece

The "Bethlehem-Frear" Combination Ore and Oil Steamer, by Hugo P. Frear ... 197

The Golden State 200

New York Shipbuilding Corporation 201

Industrial Waste, by Herbert Hoover 205

Editorial 206

Oil Engines and Motorships 210
Motor Shipbuilding in America; The Diesel Engine V; Motor Shipbuilding in Europe.

Panama Traffic 215

Island Wrecks, X, by Andrew Farrell 217

Pacific Coast Foreign Trade, by Edward N. Hurley 219

European Marine Notes 221

White Star Buys Bismarck 223

Liners for "Third Class" 224

Material Handling 225
New Machinery Developments; Appraisal of Terminal Properties, by H. McL. Harding; The Thermos Box.

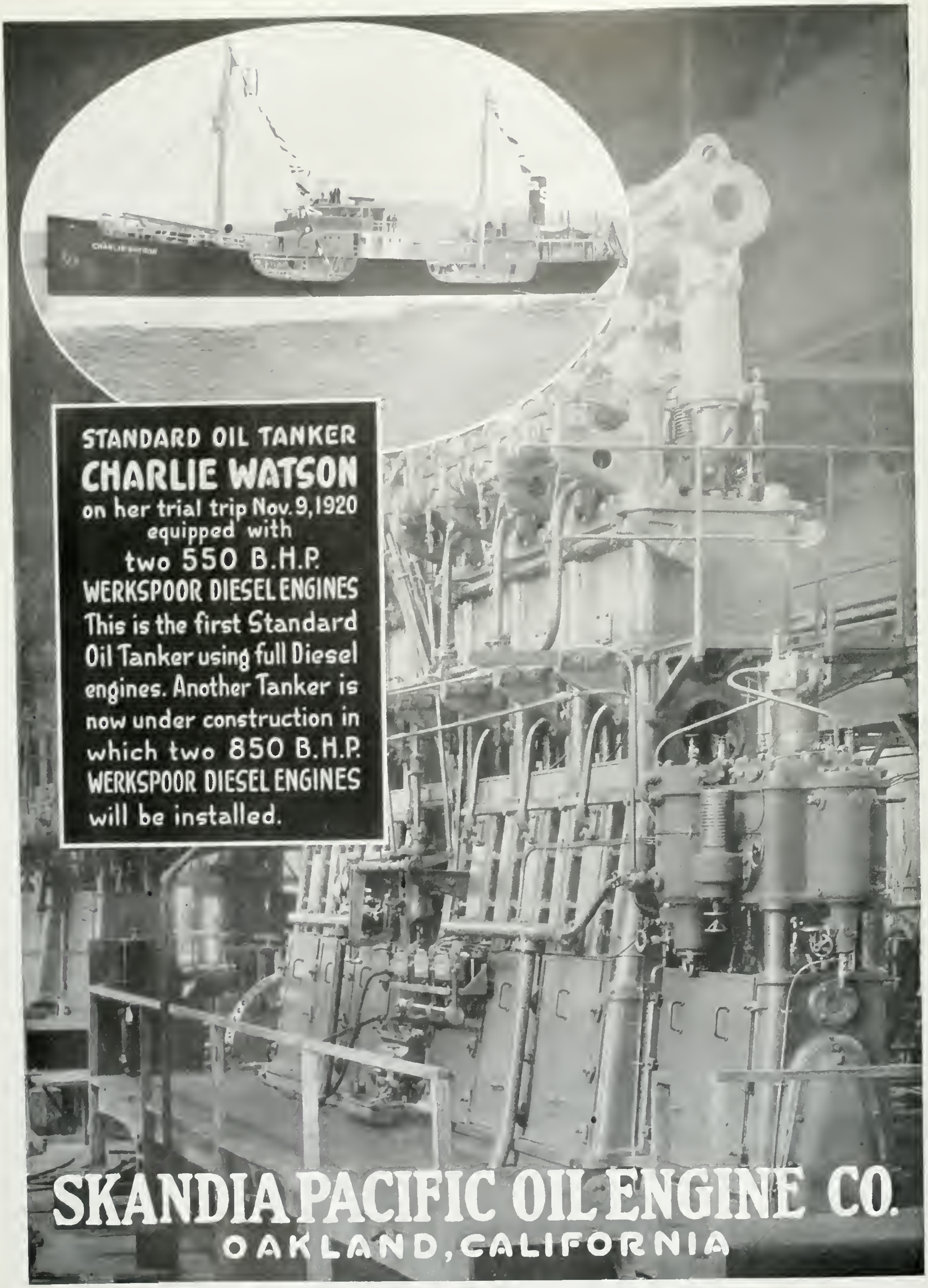
Two "Southwestern" Tankers 231

Book Reviews 234

Marine Insurance 235
Developments in Marine Insurance, by Charles F. Howell; A Record Repair Job on the Steamship Liebre.

Full Speed Ahead 238
Atlantic, Great Lakes and Pacific Shipbuilding; Foreign Trade; Steamship Operations.

Pacific Machinery 260



STANDARD OIL TANKER
CHARLIE WATSON
on her trial trip Nov. 9, 1920
equipped with
two 550 B.H.P.
WERKSPOOR DIESEL ENGINES
This is the first Standard Oil Tanker using full Diesel engines. Another Tanker is now under construction in which two 850 B.H.P. WERKSPOOR DIESEL ENGINES will be installed.

SKANDIA PACIFIC OIL ENGINE CO.
OAKLAND, CALIFORNIA

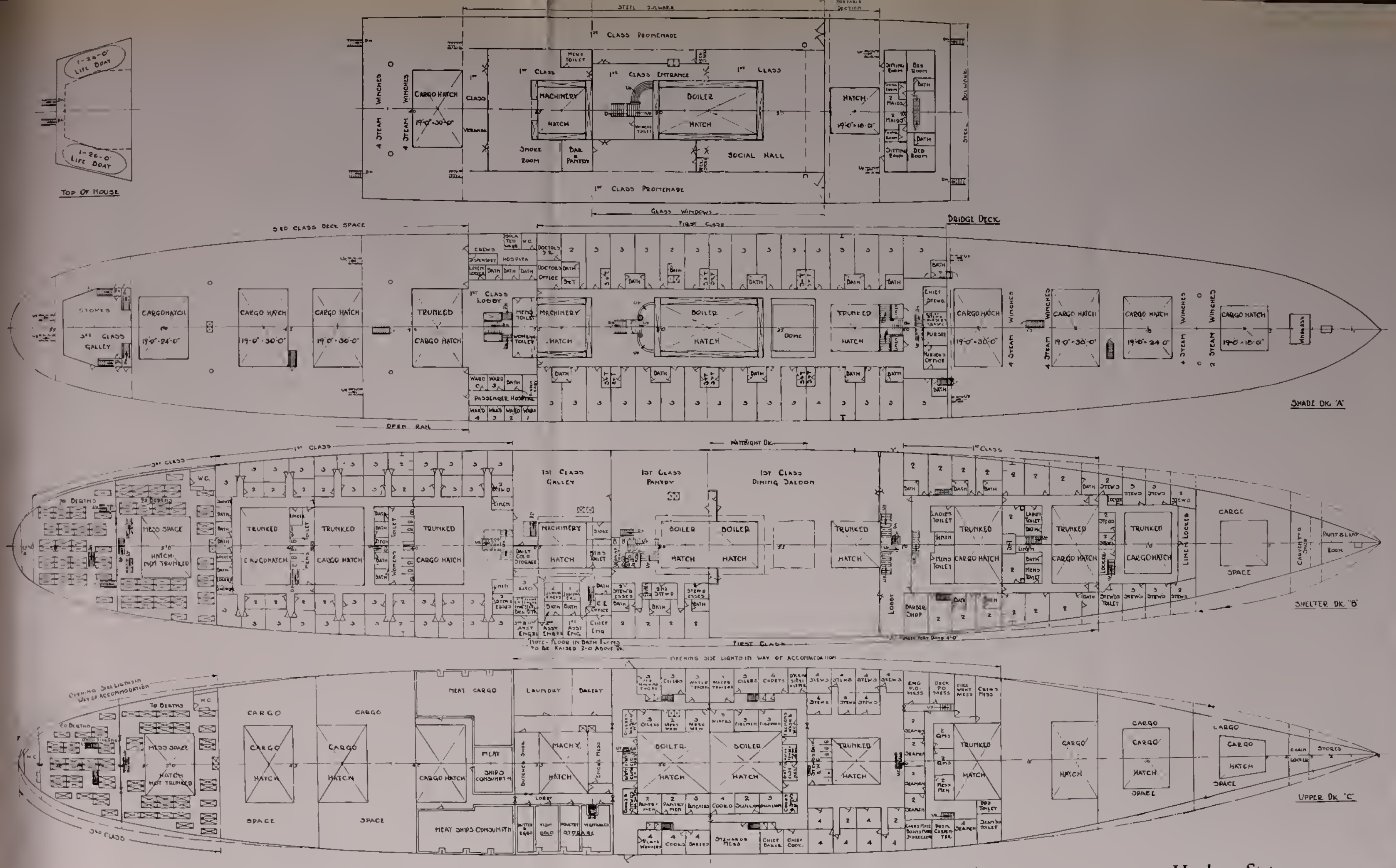
HAKON THOMSEN

Mr. Hakon Thomsen president, Equity Steamship Company, Inc., of New York, came to the United States during the war, when the Allies' blockade of Germany and the German submarine warfare made it hopeless to maintain sailings out of Scandinavian ports and made it impossible to replace tonnage lost.

As president of Equity Steamship Company, Mr. Thomsen has established a well-merited reputation for thoroughness and efficiency. His knowledge of European conditions has greatly benefited American steamship interests, and it is a well-known fact that he was instrumental in finding for the United States Shipping Board the greater part of the considerable quantities of lumber and wood-pulp carried in Shipping Board steamers out of Scandinavian ports during 1919 and 1920. His early training was with the East Asiatic Company, Ltd., and C. K. Hansen, Copenhagen, Denmark. From experience gained with the East Asiatic Company, whose beautiful motorships are well known in our waters, Mr. Thomsen is a great believer in the Diesel engine as the future means of propelling in our merchant marine.

CHARACTER in shipbuilding is the surest safeguard of the shipowner; it is expressed in the character of the ship—her assurance of a long and honorable career. Character in shipbuilding is the expression of an organization of which every member, from the lowest to the highest, possesses a profound sense of loyalty and a pride in his work which insures his doing that work honestly and well.

NEW YORK SHIPBUILDING CORPORATION
Camden, N.J.



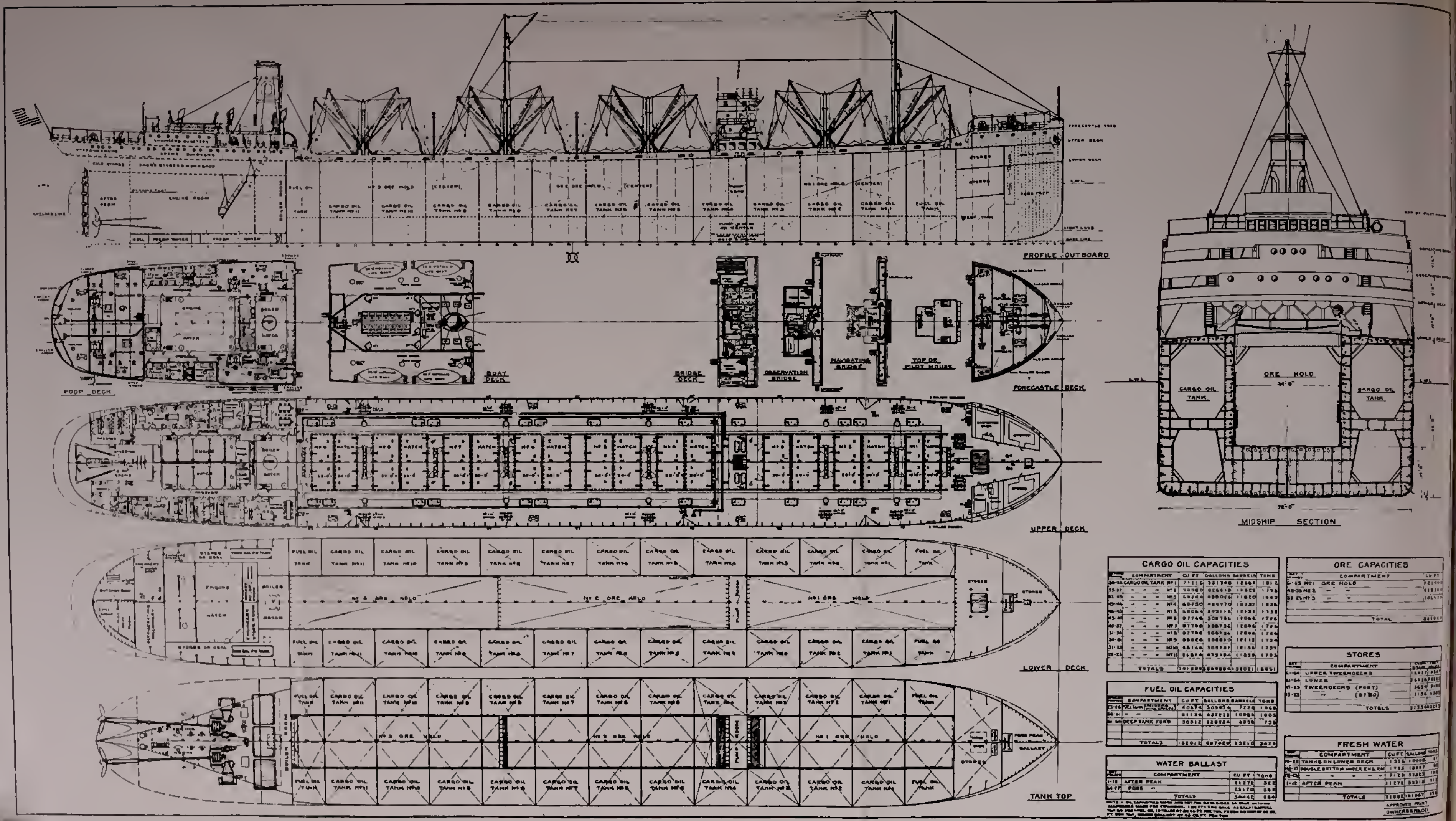
Golden State—Wenatchee

Deck Plans of 535-Foot Passenger Liners of U. S. Shipping Board

Hawkeye State

NOTE:—These are the passenger accommodations as originally planned and as published in Pacific Marine Review for February, 1920. The only substantial change is a widening of the trunked hatch between frames 21 and 23.

Combination 20,000 Ton Ore and Oil Carrier Building by the Bethlehem Shipbuilding Corporation for the Ore S. S. Corporation



Pacific Marine Review

The National Magazine of Shipping

April, 1921

Copyright, 1921, by J. S. Hines

"BETHLEHEM-FREAR" COMBINATION ORE AND OIL STEAMER

By HUGO P. FREAR

Naval Architect, Bethlehem Shipbuilding Corporation

IN the latter part of 1912 shortly after C. M. Schwab had acquired valuable iron ore interests at Cruz Grande, Chile, a study was started to determine the most suitable and economical dense cargo carrier for ocean service. A type of vessel believed to be ideal for this special duty was finally evolved and steps taken to have a number ready for service by the time the canal was put in commission. It was believed that a fleet of from 12 to 15 of these vessels would ultimately be required. The earlier designs related to ore carriers of 17,200 deadweight tons and arrangements were consummated for the construction of six steamers to start with. In order to reduce the cost of operation a contract was made with A. F. Klaveness and Company of Christiania, Norway, to furnish five of these vessels on a time charter basis, but the program was interrupted by the war. The fabrication of the sixth vessel under construction at the Bethlehem Sparrow's Point Plant was well advanced when war was declared by the United States. All of the material had been received and the steel structure was about half fabricated when the Shipping Board Emergency Fleet Corporation ordered the work stopped and the material scrapped or allocated to other work at enormous waste and loss. This was a most unaccountable procedure considering the scarcity of steel and labor, together with the fact that hundreds of tankers no more economical or efficient as oil carriers were being contracted for.

In addition to being equal to the best tankers these vessels when carrying liquid cargo had a clear central hold served by exceptionally large hatches affording space unusually well adapted for locomotives, guns, trucks and similar articles in great demand.

As there was no salvage from the earlier program and it seemed reasonable to expect that a greater draft would be permissible in the near future it was decided to plan for vessels of greater capacity with the result that the vessels now under construction will have a deadweight tonnage of slightly over 20,500 tons.

The 20,500 deadweight steamers following the original designs of the 17,200 ton vessels include a narrow elevated hold of great length and with sufficient capacity for a full deadweight cargo of iron ore. The space on each side and underneath the ore hold is divided into tanks 30 feet long which also have a combined capacity for a full deadweight liquid cargo. The effect of this combination is such that the center of gravity of both the ore and liquid cargoes is approximately the same height as the center of gravity of a general cargo properly stowed in a freighter of the ordinary type. This characteristic in combination with the small sectional area of the ore hold extending over the greatest possible length of the vessel will have the tendency of reducing all stresses incident to carrying dense cargoes on an ocean voyage. In fact it is believed that the ore cargo, due to its distribution and elevated position, will be much easier on the vessel in a seaway than many of the average general cargoes less favorably stowed.

Framing

The vessels are built on the longitudinal system of framing with transverses spaced generally 10 feet apart. The ore space, which is 14 feet above the base, is 30 feet wide and has a combined length of 360 feet, is divided by water tight bulkheads into three compartments. The forward hold, which is 120 feet long, is served by two hatches 30 feet long and one hatch 19 feet long; the middle hold is 130 feet in length, served by three 30-foot hatches; the after hold is 100 feet in length, is served by one 25 foot and two 30 foot hatches. These hatches are all the full width of the ore holds which, as stated above, are 30 feet, giving unexcelled facility for loading and discharging. The 14-foot space below the ore holds and the 21 feet of width on each side of same form cargo or fuel oil tanks, divided as in an ordinary tanker, by a centerline bulkhead extending from the keel to the floor of the ore hold and by transverse bulkheads spaced 30 feet apart. The oil spaces differ, however, from the ordinary tanker in that there are no summer tank spaces. The wing spaces act as expansion trunks and on account of their depth afford the greatest possible flexibility for carrying liquid cargoes of varying density and adjusting the trim under all conditions of load. Each oil tank is served by an oil tight hatch, 80 inches by 39 inches, with 30-inch coaming. The weather or strength deck is exceptionally heavy, ⅞-inch plating being used throughout, with ⅞-inch continuous doubler strakes at stringers and main hatches. The sheerstrake amidships is also of ⅞-inch plating with doubler of same thickness; 8 inch by 8 inch by ⅞ inch bars are fitted at both the gunwale and hatch coamings.

Ore Holds

The ore hold side bulkheads are supported at every transverse by a wide transverse web reinforced by 18-inch by 50-pound channel below the 14-foot level with web fore and aft, and at each oil tank bulkhead by a 45-inch fore and aft web. The longitudinal wing bulkheads are of 9-16-inch plate and are sheathed to above the height at which ore will be loaded by 2½-inch Virginia pine. The floor of the ore hold, however, is not sheathed but formed of ⅞-inch plate with sight edges of seams facing inboard so as not to catch the unloader grab buckets. The longitudinals under the ore hold floor are 18 inches by 45 pound channels spaced 30 inches. This differs from the Great Lakes practice, where the floor of the hold is of 24-pound plate, with 7-inch channel longitudinals spaced 18 inches apart.

The framing of the bottom and side shell follows the usual practice for tankers. The bottom longitudinals are 18-inch by 45-pound channels, spaced 30 inches. The span of the side transverses is shortened by the introduction of a transverse horizontal girder across to the ore hold between longitudinals 10 and 11. The depths of the transverses above this girder are varied with the increase in depth due to sheer, being 36 inches where the depth is 44 feet and attaining a maximum of 42 inches where the depth is 47 feet 8 inches.

The centerline bulkhead below the ore hold is vertically stiffened by 12-inch by 30.6-pound channels spaced 30 inches. The transverse bulkheads within the ore hold are vertically stiffened by 18-inch by 55-pound channels spaced 30 inches. These bulkheads are sheathed only in way of brackets at bottom of stiffeners. The oil tank transverse bulkheads and ore hold siding bulkheads are horizontally or longitudinally framed, respectively.

Oil Tanks

The foremost and aftermost of the oil compartments abreast the ore holds are for fuel oil, and between these are eleven cargo oil tanks on each side. The pump room is located between holds Nos. 1 and 2 below the ore hold 30 feet long by 30 feet wide, with trunk 10 feet long by 30 feet wide, extending to the weather deck. Under the pump room floor is a sump tank for draining holds Nos. 1 and 2. A sump tank is also fitted at the after end of No. 3 hold.

The hatch covers to the ore holds are of the Hogg Carr Steel corrugated hinged type made of ⅜-inch plating. The covers are in two parts, one-half hinging forward and the other hinging aft. Each cover is fastened down by 58 1½-inch dog bolts, and the joint between the two parts is drawn up tight by 13 1½-inch bolts. The covers are lifted through tackles and winches, and when open are secured against chocks on the hatch rests by two 1⅛-inch turnbuckles. Cargo hatches, 11 feet 6 inches by 9 feet, located between frames 62 and 63 on upper and lower decks, provide access to the tween deck storerooms between the fore peak bulkhead and the ore hold bulkhead. On the sides of the upper deck under the forecastle deck, are located boatswain's stores, the carpenter shop and paint and lamp rooms. The forecastle deck, 8 feet above the upper deck, is completely plated and planked with 3½-inch Oregon pine.

Quarters

The midship superstructure or navigating bridge is located over the pump room between holds Nos. 1 and 2. The bridge deck is supported on five transverse frames, the sides between bridge and upper decks not being plated above the 42-inch height of bulwark. The bridge deck, 10 feet above upper deck, is completely plated and planked with 3½-inch Oregon pine. The steel house on this deck contains the captain's office and purser's room and bath, the first, second and third officers' staterooms, an officer's bath, the radio room and a medicine locker. It should be noted that no officers' dining saloon is located in the midship quarters. The observation bridge is decked with 3½-inch Oregon pine, and in the steel house are the captain's stateroom, sitting-room and bath. The quarters on this deck and the bridge deck below are finished in white enamel with mahogany trim. Stateroom floors are covered with carpets and bathroom floors with hexagonal tile. The outside of the pilot house is of white pine and it is finished inside in tongued and grooved oak.

The poop deck front contains two Bethlehem-Harlan standard watertight doors opening into passages leading through the crews' quarters. On the port side, in consecutive order, come the petty officers' messroom and pantry, the seamen's messroom, crew's pantry, and firemen's messrooms. On the starboard side are the officers' dining saloon, saloon pantry and galley stores. Dumb waiters and companions on each side lead to the galley, situated on the poop deck between the boiler and engine hatches. This arrangement gives a very compact layout. The galley is floored with square vitrified red tile and the mess quarters with "asbestolith." The officers' dining saloon walls and ceiling are paneled in oak, and the other messrooms are of cypress finished bright. Aft of the messrooms are the crew's quarters, with the crew's toilets grouped together at the aft end of the upper deck on the port side. The hospital is opposite on the starboard side. The crew's quarters are all of cypress, finished bright. The steering engine room, on this deck, is entirely enclosed. The upper deck, in way of the quarters aft, is planked with 3½-inch Oregon pine.

The poop deck is planked with 3½-inch Oregon pine, except at the extreme after end. Quarters for the engineer officers are located on this deck, abreast the engine hatch. On the port side are the first assistant engineer, engineer's bath, fourth assistant and one junior engineer, and the third assistant. On the starboard side is the chief's enginneer's stateroom, bath and office and the second assistant's room.

Two junior engineers are quartered at the after end of the engine hatch. These quarters are finished similarly to those in the midship houses.

Loading and Unloading

The taking on of an oil cargo at Tuxpan, Mexico, presents no different problem from the ordinary tanker. Three oil hose cranes and filling manifolds are located on each side of the upper deck and fill through 12 risers to the hold. For discharging oil, 10 suctions in each tank discharge into the 14-inch fore and aft hold suction lines, one on each side of ship. The two horizontal duplex cargo pumps discharge through port and starboard 12-inch risers and through 12-inch discharge lines on the upper, boat and poop decks leading over the stern.

Ore is loaded at Cruz Grande, Chile, after the oil cargo has been discharged. The discharging of ore at Sparrow's Point is done under two 15-ton grab bucket unloaders, and can be done in about 40 hours. The area of the ore holds is so proportioned to the speed of the unloaders that the surface of the ore remains at a constant level relative to the unloaders as the ship loses draft due to the decreased weight.

Ten kingposts, with 18 36-foot Oregon pine booms of three tons capacity are provided for the handling of cargo in the event of these ships becoming engaged in some other trade not having terminal facilities for loading and unloading. The ten 8¼-inch by 10-inch winches which handle the tackle for opening the Hogg-Carr hatch covers are available for the working of the ¾-inch diameter wire rope whips on the cargo booms.

Standing Rigging

Pole topmasts are fitted at the center of the spans between the first and fourth pair of kingposts. The fore topmast extends to a height of 129 feet above bottom of keel. Fore stays, back stays, shrouds and stack guys are of ¾-inch diameter 6x7 cast steel wire rope, fitted with Roebling open sockets at each end and 1⅛-inch Bethlehem rigging screws. The spring stay is portable and can be lowered through blocks when the ship is at the unloaders.

Warping and Mooring Gear

The warping gear on these ships has been given very careful attention. The Bethlehem-Moore triple spur geared 13x13-inch windlass handles the 2⅞-inch anchor chain. Aft of this on the forecastle deck is a Bethlehem-Moore compound geared 9x12-inch winch with extension heads. On the upper deck forward, on the poop deck forward of the wing houses and again on this deck aft, special mooring winches are fitted. These are of the Bethlehem-Moore 10x12-inch type and are intended for mooring to buoys at sea in a relatively fixed position, or to wharves while loading or unloading. In operation it automatically pays out the warping line when under excessive tension and establishes the necessary tension should the line become slack for any cause.

A complete steam heating system designed for 65 pound working pressure is installed in all quarters. The cargo and fuel oil tanks are also provided with an efficient steam heating system.

Officers and engineers' baths are provided with showers and heaters having hot or cold salt water, and lavatories having cold fresh water. The crews toilets aft have hot or cold salt water to showers and cold salt water to wash basins. Fresh water is carried in two 5000-gallon tanks on the lower deck in the machinery space and in a 500-gallon gravity tank on the boat deck and a 150-gallon gravity tank on the wheelhouse top. Plumbing fixtures are of good quality throughout.

The fire room is ventilated by two 36-inch and the engine room by four 30-inch dia. cowls, operated from below. The quarters are ventilated by 10-inch mushroom vents and the pump room by two 24-inch cowls. Fourteen 20-inch diameter ventilators with hinged tops are provided for the ore holds. The oil tanks are vented as follows: The forward deep tank by two, and the remaining fuel oil tanks by one each, 6-inch gooseneck vents. Cargo oil tanks Nos. 6, 7, 9 and 10 are vented through 3-inch pipes led up the nearest kingpost to about 20 feet above the deck. Tanks Nos. 3 and 4 have pipes led up the midship structure. Tanks Nos. 1, 2, 5, 8 and 11 are vented through the kingposts. Bethlehem standard 4-inch vapor valves are fitted to each vent pipe and at top of king posts.

The steering engine is of Bethlehem-Moore 16x12-inch screw gear type, with the three hand steering wheels located forward of the engine. The control is by the Bethlehem duplex ram hydraulic telemotor from the transmitter stand in the pilot house. The ship can also be steered by an emergency gear connected to the spring quadrant and operated by the mooring winches on the poop deck.

View of bow of S. S. Hawkeye State taken at the San Francisco pier of the Matson Navigation Company

Steam will be furnished by three four-furnace Scotch marine boilers 12 feet in length and 17 feet 6 inches diameter, oil-burning, under the Bethlehem-Dahl system, with a total heating surface of 12,861 square feet. Howden forced draft system will be used and superheaters installed, giving a working pressure of 220 pounds per square inch at 600 degrees Fahrenheit. Two Curtis turbines built at the Fore River plant of the Bethlehem Shipbuilding Corporation will drive the shafts through Falk single reduction gear developing a normal shaft horsepower of 4500. The Scotch boilers are being made at the Sparrow's Point plant and the fuel oil-burning apparatus at the Redington plant. The majority of the pumps are manufactured at the Moore plant of the Bethlehem Corporation.

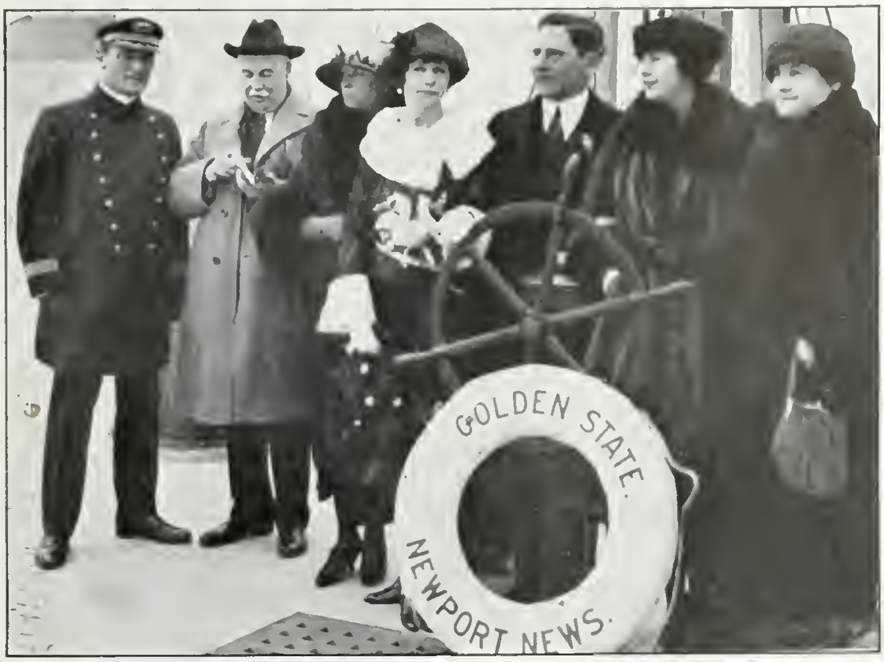
The propellers will be of the solid type, three-bladed and machined, with a diameter of 15 feet 8 inches and a pitch of 12 feet 8 inches. These revolving at a speed of 105 revolutions per minute will drive the huge hull at a sea speed of 11½ knots loaded trial. The cruising radius on fuel tank capacity will be 20,000 miles at 10½ knots.

At the lower deck level, on a flat between the boiler and engine rooms, are located the donkey boiler room and an engineers' store room. On the port side on this same deck is another engineers' store room and on this deck aft of the engine hatch is the engineers' workshop on the port side and in a gastight compartment on the starboard side is the refrigerating machinery room. At the extreme aft end of this deck are the meat room, chill room and butcher shop.

The vessels described above are the Bethlehem Hulls 4212 and 4213, named the Marore and Steelore. Bethlehem Hull 4210, building for the International Petroleum Company, is not yet named, and Hull 4211, for the Ore Steamship Company, is called the Bethore. These last two hulls are similar to those described above except that the main engines are triple expansion reciprocating with 25-inch, 41-inch and 68-inch bore of cylinders and a 48-inch stroke, and that there is some difference in arrangement of quarters aft. Bethlehem Hulls 5309 and 5310, building at the Union plant of the Bethlehem Corporation at San Francisco, are called the Chilore and Lebore, and are similar to the Marore except that the hold space is designed to carry coal and ore instead of oil and ore. A description of the special construction adopted for this purpose will be given in a later issue.

The United States Shipping Board 535-foot type passenger liner Hawkeye State of the Matson Navigation Company steaming along the San Francisco waterfront

THE GOLDEN STATE



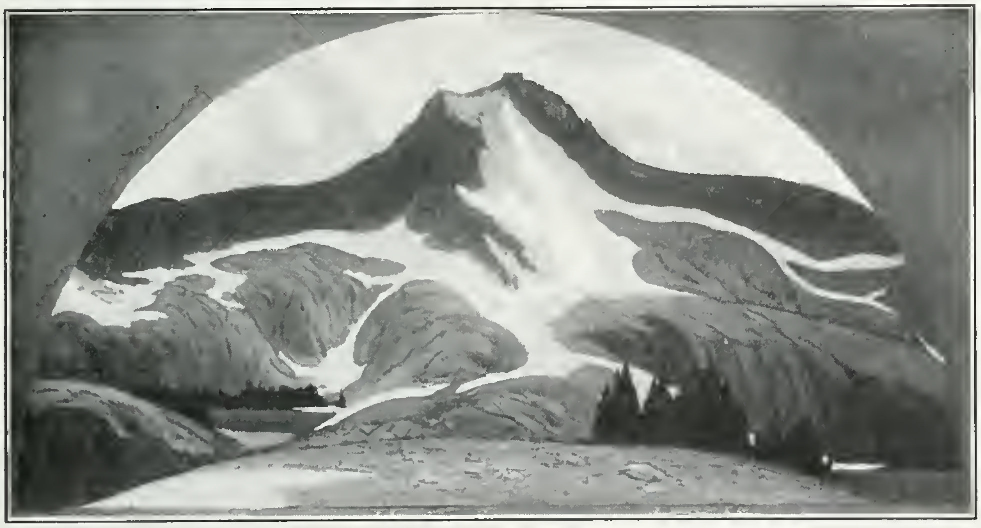
At Her Home Port

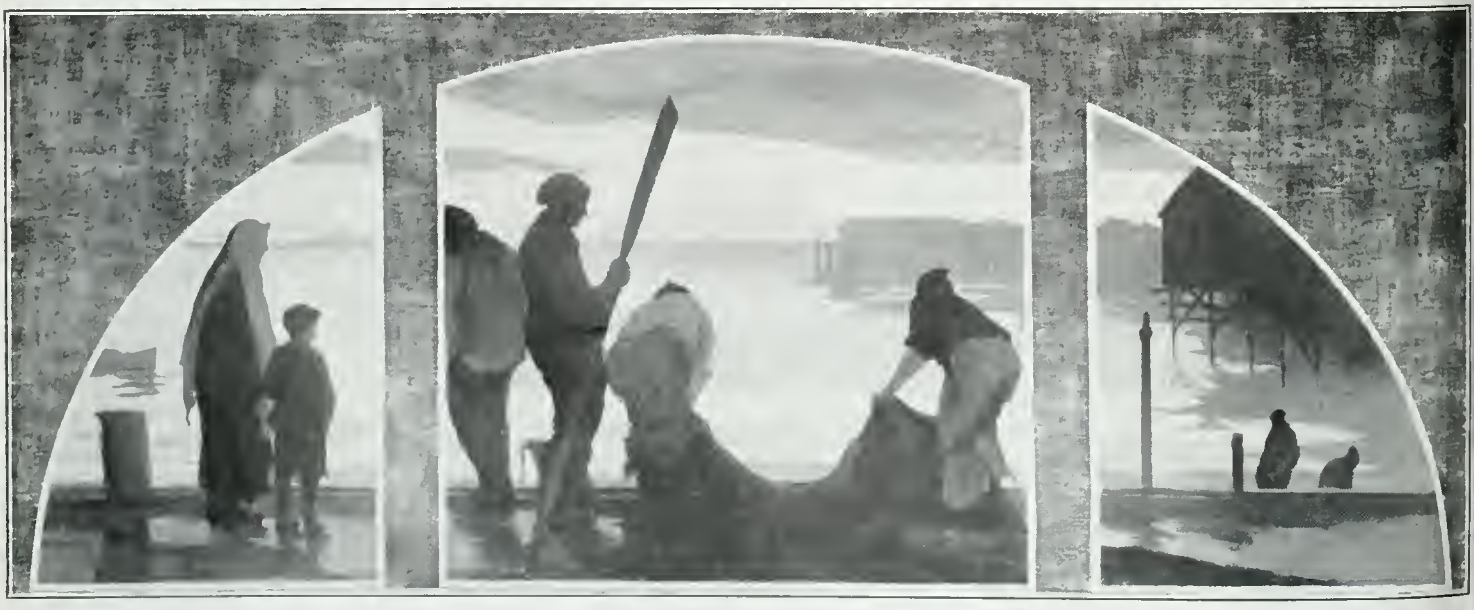
NO single ship that has ever come into San Francisco Bay was accorded a more enthusiastic and elaborate reception than California's namesake, the United States Shipping Board passenger liner Golden State, operated under the house flag of California's pioneer trans-Pacific steamship company, the Pacific Mail. Among the passengers on her list were J. H. Rosseter of San Francisco, vice-president and general manager of the Pacific Mail Steamship Company, and Mrs. Rosseter, accompanied by a number of distinguished San Franciscans. On Monday, the 14th of March, the Golden State was met at quarantine by the tug Golden Gate and other bay craft with five or six hundred guests of the San Francisco Chamber of Commerce and of the Pacific Mail Company headed by an official reception committee under Mayor James Rolph, Jr.

On the afternoon of Tuesday, March 15, a reception was held on board the Golden State for the unveiling of the mural panels which had been painted for this vessel by California artists. George C. Boardman, vice-president of the San Francisco Chamber of Commerce, presided and opened the ceremony with an eloquent address on art, industry and shipping. H. H. Ebey of the United States Shipping Board, J. N. Laurvik of the San Francisco Art Association, Captain George W. Yardley, master of the Golden State, and J. H. McCallum, president of the Board of State Harbor Commissioners, representing Governor Stephens, also participated in the program.

At the close of the addresses the mural paintings, which had been concealed by draped American and California Bear flags, were unveiled by the Misses Irene Spreckels and Geraldine Grace. The paintings unveiled were: two in the dining salon by Armin C. Hansen, two over the stairway by Maurice Del Mue, and two by Henry V. Poor, one in the social hall and the other in the smoking room.

On March 16 the Golden State was thrown open for general inspection, and it is estimated that fully 12,000 people visited the ship.





Above, left to right: Captain G. W. Yardley; Colonel William Hamilton, customs service; Mrs. J. H. Rosseter, Mr. Rosseter; Miss Geraldine Grace Mrs. Joseph T. Grace of San Francisco. In the center is a painting of the Sierras by Maurice Del Mue, and below is a mural by Armin Hansen symbolizing the California fisheries. Engravings of paintings by courtesy of San Francisco Business.

THE NEW YORK SHIPBUILDING CORPORATION

SHIPPING activities of the Pacific Coast have in the past contributed largely to the development of the New York Shipbuilding Corporation, whose plant on the Deleware River at Camden, New Jersey, is now contributing nine of the fifteen new Shipping Board liners which have been allocated to West Coast operators. The first two of these liners to get into service, S. S. Creole State and Wolverine State, are among the nine.

New York Shipbuilding Corporation is one of the successful products of the great industrial revival which ushered in the twentieth century with a spirit best termed as "large." Renewed talk at that time of national subsidy of passenger liners influenced the planning of this yard, which was the conception of the late Henry G. Morse, a veteran bridge builder with experience as chief executive of an old-line shipbuilding concern. It was Mr. Morse's idea that the advanced technique of bridgebuilding, with its emphasis on labor-saving machinery and on development of the work in the shops to simplify the final processes of erection, could be successfully adapted to the construction of modern steel ships. The keystone of this plan was the application of the templet system to shipbuilding. Since then generally adopted by shipyards and strikingly vindicated by making possible such huge ship assembling yards as Hog Island and Submarine Boat, this system was originally greeted by old-line shipbuilders as a new-fangled fad of no worth.

The Templet System

Because of the importance which this system has come to assume in the development of American shipbuilding, it may be worth while to consider briefly how the templet functions. It is a commonplace that the structure of a ship consists of many thousands of plates and angles of varying sizes, shapes and degrees of curvature, and that they are held together by many more thousands of rivets which must be placed in exactly the right places to provide the strength and tightness necessary to a seaworthy vessel. In the old days of wooden ships, the various parts could be sawed on the ways and fitted on the hull where hand augers could cut the holes for the bolts. Transition to steel made no change in method, except that it became necessary to return the material to the shops for fitting and the punching of the rivet holes, a laborious and costly practice which likewise confined shop output to the rate of progress in hull erection.

The introduction of templets, or patterns of paper or wood, revolutionized the whole procedure. As soon as the design and specifications of a vessel were decided upon, the draughtsmen in the shipyard's mold loft could begin to prepare a series of templets, one for each of the ship's parts. Such a templet is made to the exact size, shape and curvature of the part for which it is the pattern, and it shows exactly where the rivet holes are to be punched. Once these templets are in hand, the shops can proceed in the fabrication of the material without thought of its erection on the ways, for each part will fit its appointed place in the ship's structure when it is needed, just as will any piece fit into its place in a jig-saw puzzle picture. Furthermore, if the shops of the shipyard are overloaded, any number of the templets can be sent to any steel fabricating plant in any part of the country and the parts made just as effectively as if they had been produced a hundred yards from the ways. So exact is the science of production from templets that in cases where two plates overlap and are riveted together to an angle, the rivet holes on all three places will line up exactly when they are assembled in the ship's hull. When the great Hog Island plant was planned a plate and angle shop was included, with a capacity of 10 per cent of the entire hull material needed, to make the corrections considered inevitable in the production of the thousands of tons of ship's parts ordered from plants in all parts of the country; in actual practice, however, only 2 per cent of the material was found to need correction and the output of the shop became largely new material. It is interesting to note in this regard that the New York Ship organization was responsible for the production of all the templets for the 110 cargo carriers built at Hog Island.

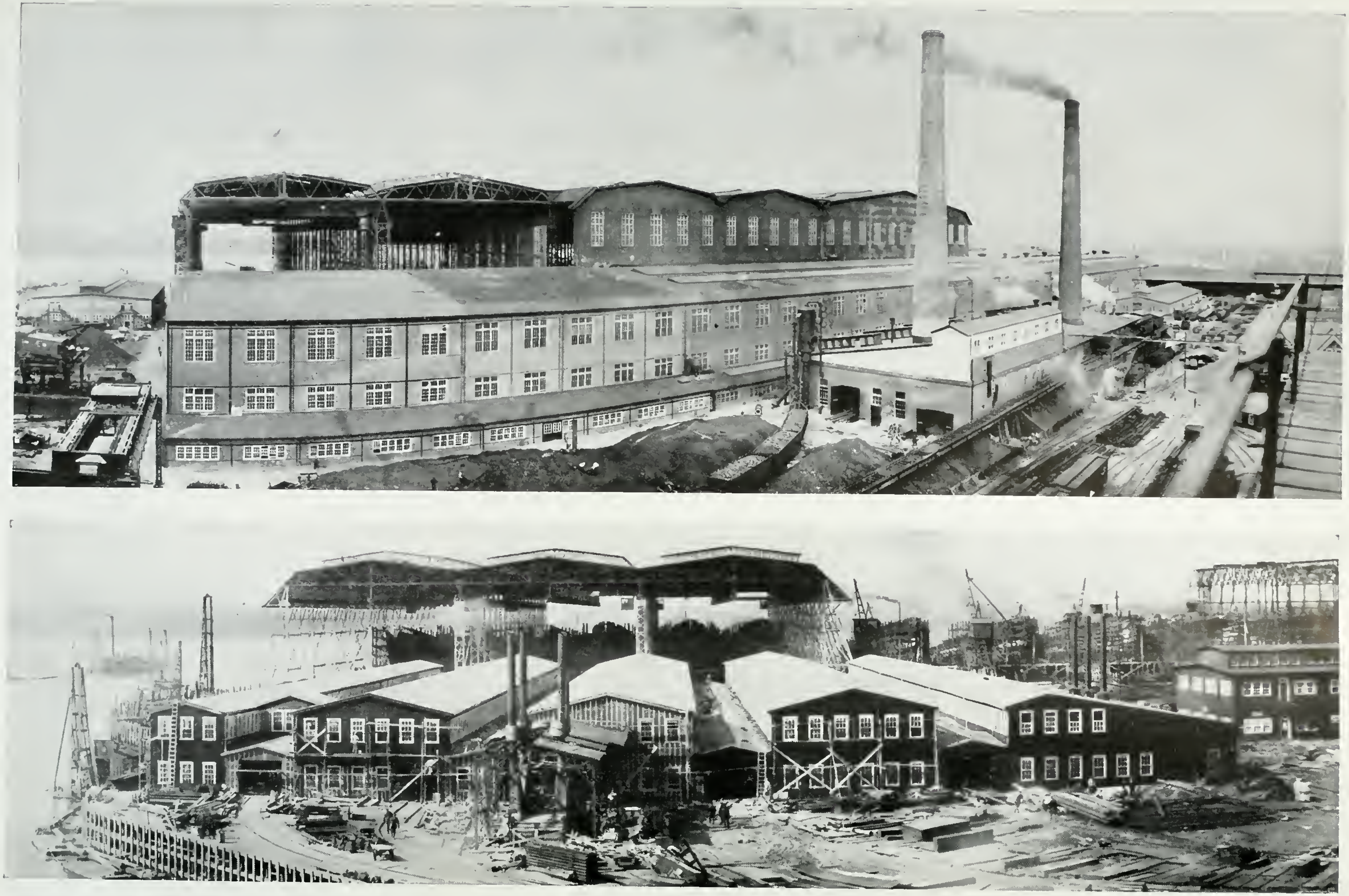
But the templet was not the only feature which Mr. Morse incorporated in his plans. The entire plant layout was carefully devised to insure a steady flow of material from the receiving and storage yards through the shops to the ways with a minimum of rehandling and doubling on its tracks. The shops were equipped with the most modern and specialized machinery, which was supplemented by the new inventions of the expert shipbuilders and steel men whom he gathered into his new organization. This is notable in the case of the Lysholm plate-punching table, which was designed and perfected at the yard and which has since been adopted in many other plants. Three double ways and a wet slip for outfitting were built under a single roof to permit of uninterrupted work despite winter storms and the intense heat generated in an unprotected hull by a summer sun. The finishing touch was the installation of the strongest and most complete overhead crane system available in any shipyard.

Construction for West Coast

Such was the plant at which the first keel was laid on November 29, 1900. The vessel was the M. S. Dollar, a freighter of 3603 deadweight tons, which was changed while in the course of construction to a tanker, and renamed the J. M. Guffey. The next three contracts were for cargo boats for the American Hawaiian Steamship Company, the Texan, of 12,313 deadweight tons, and the Nevadan and Nebraskan, each of slightly under 5300 deadweight tons. Then followed the Mongolia and Manchuria, the largest passenger liners ever built in an American yard. Of 26,820 tons displacement and 13,639 gross, they are 615 feet over-all and have accommodations for 346 first, 66 second and 1300 third class passengers, and a speed of 16 knots. Delivered in the early part of 1904, they were the crack liners in the Sunshine Belt to the Orient of Pacific Mail Steamship Company until 1915 when they were sold to the American Line; after a distinguished record as troop transports during the war, they established the Hamburg service of the American Line in December, 1919, and are still operating on this run.

This early identification of New York Ship with American enterprise on the Pacific was followed by the construction

The original covered ways and shops



(Upper) A recent view of the north end of the yard. The two succeeding additions to the machine shop which, with the boiler shop, extends along the head of the ways, and the new powerhouse unit, are evident. At the left is the traveling crane and beyond it is the cafeteria.

(Lower) Rear view of the destroyer yard. Destroyers are under construction in all of the six covered and four open ways. The shops in the foreground, replacing those which were destroyed by fire on September 11, 1918, had been rebuilt by October 30, 1918. On the right is a part of the superstructure of Ways T and U.

of S. S. President, Governor and Congress for the Pacific Coast Company, which is now a part of the Admiral Line organization, and of the knock-down ferryboats Alameda and Santa Clara for operation by the Southern Pacific Railroad Company in San Francisco Harbor. The launching on January 22 of the tanker Solana, of 9820 deadweight tons, which is being built for Pacific Mail Steamship Company, brings this connection with West Coast operators up to date.

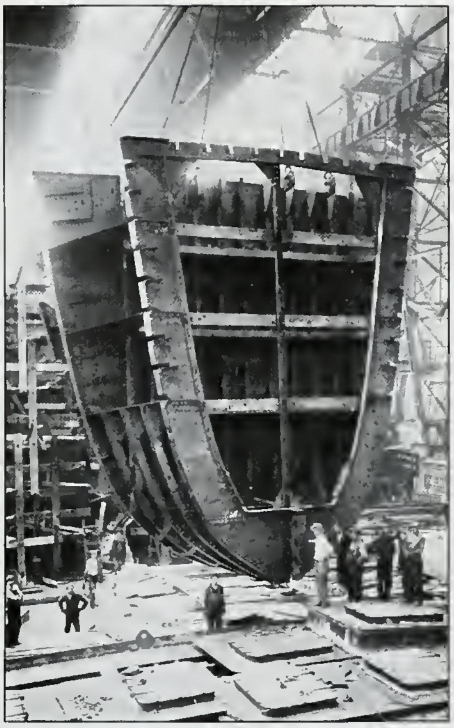
Naval Construction

The expected subsidy for passenger liners failed to materialize and the American shipbuilding industry entered into a lean period soon after New York Ship was organized. Nevertheless, this new shipyard obtained its fair share of the tonnage that was ordered; further, it broke into the naval construction field which until then had been monopolized by a small group of established yards. Forerunner of a great line of fighting ships for our own and foreign governments, for which the yard has become famous, was the armored cruiser Washington, the contract for which was signed on February 10, 1903. Construction of this warship reopened the question of the worth of the templet system. Even some of those within the organization itself doubted the practicability of applying this system to such large and complicated work as was called for in building the cruiser. However, templets were used and proved even more efficient on such work than on the usual work of merchant ship construction; and undoubtedly this system was largely responsible for the speed with which the cruiser was turned out despite the yard's lack of experience in building naval vessels.

A few months after obtaining the contract for the Washington, Mr. Morse died suddenly. The next day bids were opened for three warships of the Kansas type and New York Ship was awarded the Kansas, which was rated at the time as a first-class battleship. Soon after her delivery she gave a particularly good account of herself on the historic around-the-world voyage of the American fleet. Other orders followed from the Navy Department and at no time since the laying of the Washington's keel has the yard been without naval vessels in process of construction. Conspicuous in the New York Ship fighting fleet are the battleships Arkansas, Michigan, Oklahoma and Idaho, the old-type destroyer Downes, the Argentine, superdreadnought Moreno and the thirty destroyers ordered by the United States Navy during the recent war. Constuction is now proceeding on two 32,600-ton battleships and a 43,500-ton battle-cruiser. In their respective classes, these three vessels are representative of the largest and most powerful warships under construction anywhere. The battle-cruiser is 874 feet in length and will have turbines generating 180,000 horsepower to drive her by electricity at her designed speed of 33 knots.

Reorganization

In the fall of 1916 American International Corporation, which a year before had taken a prominent part in the purchase and expansion of Pacific Mail Steamship Company, engaged a commission of engineers and naval architects to make a study of Atlantic Coast shipyards. As a result of this commission's report, New York Shipbuilding Corporation was formed, Messrs. W. R. Grace & Company, Pacific Mail Steamship Company, and International Mercantile Marine Company participating with American International Corporation in its organization. This new corporation took over the plant and assets of New York Shipbuilding Corporation, and a few months later Marvin A. Neeland, who had earlier been assistant vice-president and chief engineer of United States Steel Corporation, was elected president; George J. Baldwin, president of Pacific Mail, had already been elected chairman of the board.


View in a building slip of the New York Shipbuilding Corporation, showing 40-ton section of forward web framing for the collision bulkhead and chain locker of a big tanker.

This change in the control of New York Ship was the first step in a policy of expansion which has made the plant the largest self-contained shipbuilding unit in the United States and equal to the largest British shipyard. At the time of the change two double ways were nearing completion as an addition to the original covered unit of building ways and wet slip. This work was continued and plans made for further expansion of the shop and way facilities.

War Activities

Then the United States entered the war and the government, recognizing the importance of New York Ship's plant and personnel to the success of its huge shipbuilding program, aided the corporation not only in rushing construction of the contemplated additions but also in putting through an even larger policy of expansion. A pair of great, single open ways, capable of extension to 1000 feet in length, was built, a large plate and angle shop was erected, the original machine shop was extended 124 feet along the head of the covered way unit, and the power plant was doubled in size. When the Navy Department followed an initial order of ten destroyers with a supplementary one for twenty more a few weeks later, it authorized the construction of a sepaate destroyer-building unit of six covered and four open ways, plate and angle shop and blacksmith shop on part of the plant property.

The capacities of the machine and boiler shops of the original, or north yard, unit of the plant, were already so crowded with other government work that it was arranged to supply the boilers and turbines for these last twenty destroyers from outside companies; the forge shop, however, with its giant hydraulic press of 1200-ton capacity and its other equipment, was equal to the increased strain on its output. At the same time the machine shop was extended another 124 feet along the head of the covered unit.

Emergency Fleet Orders

Then came an order from the Emergency Fleet Corporation for the construction of sixteen large vessels. Originally designed as troop transports, the signing of the armistice caused a sweeping change in plans, these vessels now being completed and delivered as the big passenger-and-cargo liners of the Shipping Board fleet. Orders for twenty-six of these vessels were distributed among three Atlantic Coast shipyards, New York Ship being allotted the construction of all seven of the 502-foot class and nine of the 535-foot class, a total of sixteen. After the armistice three of the latter class were cancelled at another yard, but the Fleet Corporation's program at New York Ship was left untouched.

No shipyard, either here or abroad, had ever been given so large an order for passenger liners at any one time, and the crowding of New York Ship's expanded facilities with other government work made a still further expansion immediately necessary. To this end the shipbuilding company, as agent for the Fleet Corporation, constructed on its own property what is known as the South Yard unit, which consists of four large shipways, each 103 by 750 feet, machine shop, plate and angle shop, blacksmith's shop and power station. Equal in capacity to a good-sized yard of pre-war days, the South Yard has now become a permanent part of New York Ship's facilities, the corporation having exercised last summer its option to take over this development.

SHIPS BY THE MILE

Summary of Vessels Built and Building by New York Ship Since First Keel Was Laid on November 29, 1900

Type	No.	Length in Miles	I.H.P.	Tonnage Gross	Tonnage D.W.T.	Tonnage Disp't
Naval	57	3.125	1,408,261	....	....	380,183
Passenger and cargo	27	2.50	209,828	271,654	....	463,589
River passenger steamers	7	.375	14,702	....	....	13,299
Tankers	31	2.375	87,848	....	284,739	....
Colliers	22	1.50	47,852	....	161,425	....
General cargo	13	1.125	35,565	....	105,887	....
Misc. gov't boats	26	.750	16,597	....	....	19,613
Barges	23	.875	....	....	35,260	....
Carfloats	51	2.875	....	....	....	56,928
Dredges	7	.125	8,046	....	....	6,005
Totals	264	15.625	1,828,699	*271,654	587,311	939,617

* Passenger liners also figured in displacement tonnage.

Plant Expansion

The enormous expansion of physical equipment was necessarily paralleled by a great increase in the working force; from 4500 on the last day of 1916 it rose to 12,000 on December 31, 1918, to 17,500 at the end of 1919, and to 18,000 by the first of this year. The problem of recruiting and holding the men was intensified by the lack of housing facilities. The whole shipbuilding program of the government at New York Ship being at stake, the Fleet Corporation co-operated with the yard in the construction of a housing development providing approximately 1800 families with modern homes conveniently located. The major part of this development, Yorkship Village, was so attractively designed and laid out that its plans have since been used by Jacques Greber, chairman of the French Commission on Reconstruction, to bring home to French architects the possibilities of putting through large scale reconstruction projects without the necessity of sacrificing variety of style. The method of co-operation in this housing development was that New York Ship bought the necessary land and supervised the construction of the village which was financed by the Fleet Corporation through building loans. Ground was broken for these houses in the spring of 1918 and work was pushed so rapidly that the first house was rented the following December; but the signing of the armistice came even more rapidly, and, the need having passed a year later, New York Ship withdrew its interest in the active management of the development and transferred its ownership of the property to the Fleet Corporation for a nominal sum.

At the same time that these enormous extensions in plant and man-power were being effected, the original yard was loaded to capacity with actual ship production. During 1917 and 1918, the years of our active participation in the war, New York Shipbuilding Corporation delivered twenty merchant vessels totaling 175,965 deadweight tons, this great fleet including seven tankers of 78,231 deadweight tons, ten colliers of 81,227 tons, and three freighters of 16,507 deadweight tons. One of the colliers, S. S. Tuckahoe, of 5500 deadweight tons, was launched twenty-seven days after the keel was laid, delivered ten days later and in active operation with a full cargo of coal on the fortieth day after the keel laying. In addition to ship production and plant expansion, New York Ship's executive and technical staffs played an important consultative role in the planning of Hog Island and the designing of the cargo ships assembled there.

Recent Launching Program

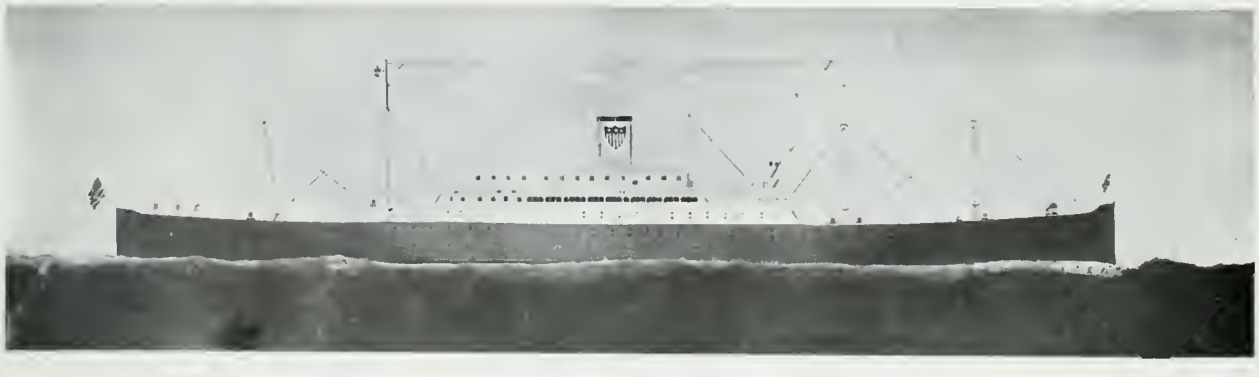
The momentum gained during the actual war period further increased in 1919, when the great plant expansion came fully into play, and made 1920 the banner year in the history of the yard. Comparison of the launching records of the last two years shows:

	1919	1920
Number of ships	20	23
Length of ships in feet	7,435	9,917
Tonnage, gross	88,977	161,118
Tonnage, deadweight	85,608	161,233
Indicated horsepower	430,450	406,950

No less than eleven passenger and cargo liners of 231,000 tons displacement are included in the 1920 launching figures, as well as ten destroyers and two oil tankers. But the outstanding feature of last year's performance was the completion and delivery of the first three Shipping Board liners to get into operation from any shipyard.

The 1920 launching record forecasts for 1921 the greatest passenger liner production in the history of any American shipyard, the probabilities being that no less than twelve of these big Shipping Board vessels will be delivered. Already the first two of these liners to reach the Pacific Coast have been delivered by New York Ship, which earlier won the distinction of putting the first two into the trans-Atlantic trade.

As progress is steadily being made toward cleaning up the great war-time contracts of the Navy Department and Emergency Fleet Corporation, New York Ship has had more of its facilities released for the construction of vessels for private interests. During 1920 the keels of nine tankers for various operators and of one passenger steamship for the Munson Line were laid. One of these tankers was delivered to W. R. Grace & Company last fall, having been constructed in the remarkably short time of seven months and ten days from keel laying to delivery.



INDUSTRIAL WASTE

By HERBERT HOOVER

THE waste in our production is measured by the unemployment, the lost time due to labor conflict, the losses in labor turnover, the failure to secure maximum production of the individual due either to misfit or lack of interest. Beyond this again is a wide area of waste in the poor coordination of great industries, the failures in transportation, coal and power supplies which reecho daily to interrupt the steady operation of industry. There are again such other wastes due to lack of standardization, to speculation, to mismanagement, to inefficient national equipment and a hundred other causes. There is a certain proof of deficient production by comparisons of our intense results in 1918, when, with 20 per cent of our man power withdrawn into the army, we yet produced 20 per cent more commodities than we are doing today. We are probably not producing more than 60 or 70 per cent of our capacity.

No one will ever suppose that it is ever possible to bring national productivity up to the full 100 per cent, but the whole basis of national progress, of an increased standard of living, of better human relations, indeed, of the advancement of civilization, depends upon the continuous improvement in productivity. While we currently assume that great advances in living standards are brought about by new and basic inventions, yet in fact even a greater field of increasing standard lies in the steady elimination of these wastes. The primary duty of organized society is to enlarge the lives and increase the standards of living of all the people—not of any special class whatever.

There is ofttimes a superficial dismissal of this subject of maximum production on the assumption that there are positive limits in production due to oversupply. Such assumption has no proper foundation in the broad view of industry as a whole. Too much economic thought on production has delimited its boundaries by the immediated volume of demand of a given commodity. There is no such thing as the nation overproducing, if it produces the right commodities. The commodities or services produced by the whole nation are capable of absorption by the whole nation if they are of the right character. When ten men or one hundred million men divide their united output, they can by doubling their output have twice the amount to divide. The problem in doubling output is to direct it to commodities or services that they can use. There is no limit to the increase of living standards except the limitations of human strain, scientific discovery, mechanical invention and natural resources.

It is true enough that any particular commodity or service can be overproduced, for each will reach a saturation point in demand when all the members of the community have been supplied. The absorption of increased productivity lies in the conversion of luxuries of today into necessities of tomorrow, and to spread these through the whole population by stimulation of habit and education. Wheat bread, railways, good roads, electricity, telephones, telegraphs, automobiles and movies were once luxuries. They are still luxuries to some parts of the population.

It is but a corollary that certain commodities can better be produced for exchange for commodities from outside our boundaries of more appropriate character to our needs. Today we have capacity for production of some commodities not only in excess of our home need, but even beyond export demand under present financial conditions. As a matter of practical remedy, we must either recognize these financial relations or alternately abandon some part of this kind of production and turn our idle men to making things of which we are not yet fully supplied.

The largest area of waste lies in the large periods of slack production and unemployment, due to the ebb and flow of economic tides between booms and slumps. The ideal would be steadily increasing production—an ideal of no likelihood of exact realization because of inability to ever gage in advance the growth in consumption or the approach of saturation. On the other hand, there are certain possibilities of stabilization worth consideration. Our studies of industries as a whole show that we usually expand our equipment just at the periods of maximum demand for their products instead of doing our plant expansion during periods of slack consumption. We thus make double demands on labor and we doubly increase unemployment in periods of reduced consumption.

Everyone knows that for our normal productivity, our transportation facilities are today inadequate. We know that we are insufficiently housed, insufficiently equipped in our public roads and our public utilities; that we need an entire revision of our power supply, that we need expansion of our water ways; and yet armies of idle men are walking the streets.

The reasons why this occurs are not far to seek, in that it is at times of high productivity that capital is most easily obtained. It is then that the necessity of increased equipment most impress men's minds and it is the high hopes of these periods that lead them into the adventure of expansion. Nor is it possible to expect that all industry can be so stabilized as to do its capital construction in periods of depression in commodity demand. Nevertheless, there are some industries that could, by cooperation of the government and co-operation among themselves, be led in this direction. More particularly does this apply to railways, telephones, telegraphs, power supplies and other public utilities, and to the expenditure upon our state, municipal and national public works.

Another variety of intermittent employment, and thus great waste, lies in certain industries now operating upon an unnecessarily wide seasonal fluctuation, as for instance the bituminous-coal industry. This is today one of our worst-functioning industries. These mines operate seasonally and erratically. They proceed from gluts to famines, from profiteering to bankruptcy. The mining engineers have already pointed out the direction in which the remedy lies, through storage, through railway rate differentials and other remedies. Through constructive action, an army of men could be released from this industry to convert some luxury into a necessity of tomorrow.

The second largest area of waste in productivity is the eternal amount of labor friction, strikes and lockouts. Fundamentally this is not alone a struggle for division of the results of production between capital and labor, but also in the element of purely human friction and loss outside the area of dispute on wages and hours. The growth of industry into large units has destroyed the old mutuality of interest between employee and employer.

Probably the next largest fraction of waste in productivity lies in a too high degree of individualism in certain basic products and tools. In other words, a standardization of certain national utensils makes for economy in distribution, in operation and in repairs.

Another type of waste lies in our failure to advance our industrial equipment. The Super-Power Board will demonstrate the saving of 25,000,000 to 50,000,000 tons of coal annually by the electrification of our Eastern power supply. The St. Lawrence Waterway Commission will demonstrate the saving of five to ten cents a bushel to the farmers of fifteen states by unlocking the lakes to ocean-going vessels.

Pacific Marine Review
The National Magazine of Shipping

576 Sacramento Street
SAN FRANCISCO, CALIFORNIA U. S. A.

Official Organ of the Pacific American Steamship Association

Subscription Price, per year (Domestic) $3 00
(Foreign) $3 50
Single Copies . . . . 35 cts

J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor
J. G. BRAY . . . . Pacific Coast Adv. Mgr.
E. R. HARRIS . . . . . Northwestern Representative

NEW YORK OFFICE
339 at 30 Church Street
M. B. STEWART, Manager

Pacific Marine Review is sold at all leading News Stands
Entered as second class mail matter at Postoffice
San Francisco, California

Published on the First of Each Month. Copyright
1921 in the United States by J. S. HINES

AMERICAN FREIGHT FOR AMERICAN SHIPS

DURING the past six months there has been in the public press of America an insistent call for the American government and American financial interests to help America first. That a great amount of this is due to reaction from the outpouring of American wealth and sympathy into European channels is no doubt true, but it is also true that this demand is backed by good sound financial reasoning.

Probably in no sphere of American activity is this matter of America's helping America first more necessary than in the American merchant marine. At the present time and for a number of months past shipping throughout the world has been facing a condition of too many ships and not enough freight. There are on the seas of the world 10,000,000 gross tons more shipping than there were in 1913, and notwithstanding the fact that the exports and imports of the great majority of countries show a larger money value for 1920 than for 1913, when we compare the volume by weight of foreign trade of the world in those two years, we find that 1913 leads by a very substantial margin. In other words, we have afloat, ready for service on the sea, somewhere between 12,000,000 and 15,000,000 gross tons of shipping in excess of our actual needs at the present time.

For the purposes of this article there is no need to go into the causes of this shortage of freight or this excess of shipping tonnage. The condition is as stated, and there is, therefore, a very keen competition between all freight-carrying ships for any freight that happens to be offering.

In view of this condition, America is in the rather unfortunate condition that her merchant marine has cost, in comparison with the pre-war costs of shipping, a very excessive amount, and the standing charges against the Shipping Board fleet, whether in operation or out of operation, reach a point that would have been undreamed of by the most venturesome shipping operator of pre-war times. These standing charges constitute a bill which must be paid by the American people, whether these ships are operating or not, and of course if the ships can be kept in operation and earning, the standing charges will be cut down by the amount of the earnings. It would, therefore, seem to be only the part of good business for American taxpayers to see to it that, so far as lay in their power, American ships were kept filled with freight.

This can be accomplished in a great variety of ways, if American shipping men, exporters and importers, will co-operate with shipowners and with the United States Shipping Board. A tremendous amount of raw material from various parts of the world is used in America and brought in on ships. It would be entirely feasible for American buyers of this material to influence the shipment of a large part of it in Amercan bottoms by request or instruction in their shipping directions. Likewise a tremendous amount of raw stuffs, foodstuffs and manufactured articles is shipped by American firms to customers abroad, and while in a great many cases these customers specify shipment, there is undoubtedly a large opportunity for the American shipper in this export business to favor American bottoms.

The Department of Commerce is in a position to assist greatly any movement toward diverting cargoes in foreign ports to American bottoms, and government agencies generally can help in this direction. Great Britan, before the war and since, has, along perfectly legitimate business lines, established all sorts of agencies and influence in foreign ports for assisting British trade, as, for instance, it is reported that quite recently a Canadian bank established itself in Haiti and offered the Haitian merchants long-term credit on very good terms with but two instructions—first, that the merchants must buy only British products, either from Canada or the British Isles; second, that these products must be carried in British vessels. There is an American bank in Haiti, but it is a commercial bank and could not possibly give credit for longer than three to six months; consequently, Haitian merchants are turning to Great Britain for the business which during the war had been diverted to the United States. That is but one instance out of many hundred such that could be cited, and it will be necessary, in order to keep our merchant marine running, that American business men co-operate with American shipowners and with all interested departments of the United States government to build up, wherever humanly possible, American trade.

We do not need, if we stick to legitimate business, to fear any international complications or to feel that we will be putting a hardship even on our European competitors because they are, to use a slang phrase, "old birds at the game" and can give us many lessons as to how it is worked. The Foreign Trade Financing Corporation is, if properly managed, going to be a large factor in expanding American foreign business. Our new engineer, Secretary of Commerce Herbert Hoover, will probably chop away a great deal of the red tape that is helping to tie our ships up on the mud banks, and if we can judge by his past record, our new Secretary of State will certainly place no obstacles in the way and will probably be of very material assistance in aiding this good work.

We are just at the time when a long, strong pull all together will put our merchant marine out in the clear, and every American merchant should ship on American ships; every American shipowner should insure in American marine insurance corporations; and in all business transactions where it is at all possible we should all patronize home industry and keep our business money at home.

FOREIGN TRADE BUREAU ORGANIZED

BELIEVING that its service should extend further than mere transportation between ports, the Pacific Mail Steamship Company has extended the organization of its San Francisco general office to include a foreign trade bureau for the purpose of advising and assisting shippers in all matters connected with successful foreign trade.

This bureau will be in charge of a man experienced in foreign trade and will gladly supply reliable information regarding:

Possible foreign markets.

Proper packing and marking.

Foreign import duties and regulations.

How to make exports, proper documents, etc.

Sources of raw materials.

Names of foreign exporters and importers.

Consular requirements of foreign countries.

Regulations governing commercial travelers.

Construction activities abroad which might utilize American manufacturers, statistics, etc.

Other data which might be of value to manufacturers, exporters and importers will be collected, and they are urged to take advantage of the facilities offered by this bureau. No expense or obligation of any kind will be incurred by so doing.

U. S. SALVAGE ASSOCIATION

THE United States Salvage Association, preliminary organization of which is described in the Marine Insurance Department of this issue, has now become an established fact, and Charles R. Page, manager of Marine Insurance Syndicate A, was on the Pacific Coast during March establishing offices of the new association.

One result of this organization has been the abrogation of the Shipping Board's contract with the American Bureau of Survey, already announced, and the winding up of that association's affairs.

The headquarters of the United States Salvage Association are in New York. Offices have been established in Boston, Philadelphia, Baltimore, Norfolk, Savannah, New Orleans and Galveston. On the Pacific Coast there will be two, at San Francisco and Seattle, the former in charge of David Young, formerly of the Hanlon Drydock & Shipbuilding Company, Oakland, and more recently Seattle manager of the United States Bureau of Survey; and the latter in charge of Captain S. B. Gibbs, who is Seattle agent of the Board of Marine Underwriters of San Francisco and who, by the co-operation of that board, has been enabled to become the agent of the Salvage Association for Oregon, Washington and British Columbia. Soon after April 1 Captain Gibbs will assume his additional duties, and Mr. Young will take charge in San Francisco about the same time.

An arrangement has been made with the American Bureau of Shipping to represent the Salvage Association in Cuba, and in the immediate future the association plans to establish an office in the United Kingdom, in charge of an agent under whom would be sub-agents in the principal ports of the British Isles and the Continent. Another agency will be established on the River Plate to have supervision over the East Coast of South America and the lower West Coast; another in Shanghai, under which will be Siberia, China, Japan, the Philippines and the East Indies as far as Singapore. Commission agents probably will be appointed in India. These are the immediate aims of the association, but eventual expansion also would take in Africa and Australia, neither of which is included in the present program.

THE CHIEF ENGINEER

By SEA FLAME

A BETTER understanding should exist between steamship owners and the engineers. Unfortunately such a condition does not exist except in rare instances. The reason probably is because ships have been operated since the time of the Phoenicians, and the engineer is of yesterday.

The modern steamship is an intricate mass of metal for the most part, wrought into a hull and motive power, together with a numberless lot of auxiliaries, all of special design. The several units called for the highest mathematical and mechanical skill to rightly proportion, form and assemble them. They also required constant skilled attention to ensure their proper and economical operation.

Owing to "old custom" the master is assumed to be the absolute head, legally, of the steamship and all that pertains to her. In many instances the owners and masters take this ancient regulation exactly as it stands on the maritime law books, and treat the engineer force accordingly.

Others, again, assume that the engineer is of considerable importance, and in these cases the remarkable increase in efficiency is most noticeable. While it is obvious that there must be a legal head, it would not be very difficult to evolve some scheme whereby the chief engineer would be the legal head of his department. Then he could have absolute control over it and his men without having to ask the master to exercise authority.

The great difference in accommodations furnished engineers in comparison to those provided the masters and mates causes ill-feeling and to a great degree tends towards inefficiency in the engineer's department. Those under the direction of the chief engineer notice that officer has quarters in no way comparing in comfort or finish with those for the master. They also note that the question of fines and punishments and grade of discharge, as well as the reward of a good record for behavior and ability, is entirely in the hands of the master. Consequently that feeling of confidence in the chief engineer is to a great extent nullified, resulting many times in trouble. This trouble in most cases costs the owner money.

In fact, if the owner desires the highest efficiency, instructions must be given the masters that the engineer is also to be taken as a factor in operation. Treating engineers in this way will attract a better class of men to the profession. Too much "one man" power often makes for dissatisfaction, and this spells loss. Unfortunately some masters are arrogant, overbearing and selfish, causing ill-feeling among all hands. This class, too, demand a great deal more than their rightful attention from the stewards, and these in turn care nothing for the comfort of the rest as long as the master has a special service, for they well know that any complaints against a master-serving steward will not be listened to.

These things could be easily remedied and the results would show more economical operation. Make things so that the engineer feels he is on as intimate terms with the office as the master is, and repair bills will decrease, fuel saving will result, and everybody on board will be happier. Where contentment is, exists efficiency.

It is also believed that if engineers were more intimately in touch with the owner, less trouble would be had with labor union questions. If a man is made to feel that he is a part of the organization he serves, he will be more loyal to it. The personal equation is a great factor in everyday life, and if a man is to have responsibility, clothe him with authority. The engineer's duties are equally as onerous as the master's. His knowledge of the forces of nature are equal. He is obliged at all times to exercise his wits and skill equally with the master. Although his work is essentially different, it is equal in production to that of the master, and it is obvious that the engineer should have the confidence and friendship of his employer.

The writer notices that in the plans of a new steamer for the P. & O. Company (British) the engineers have quarters on the upper or boat deck. These quarters are cool and away from passengers. Also they are fitted with some regard to the comfort and contentment of the men who occupy them. Leave it to a British owner to look out for a waste of money. He deems it good business to properly care for the men whose work makes for profits. The steamer mentioned is the Naldera, recently put in service. In contradistinction to her are the plans of the United States Shipping Board 535 type passenger liners, published in the same journal. These plans show the engineer's rooms in a hot, dark, ill-ventilated section of the vessel. No regard to the comfort of the engine room force has been considered. Only a dull market will keep good men in such places. And at that they will not be contented. Then we wonder at the high repair bills on American ships. Treat the engineers as they should be treated, and better work will be done.

COSTS

THESE are certainly peculiar days in the shipping business, and many a steamship operator has during recent months been rudely awakened to the necessity of drastic paring down of expenses in order to make both ends meet. While freights were on a wartime basis the manner in which operating expenses had been increasing by leaps and bounds was evident only to a few "old timers" who had gotten into the habit of keeping track of expenses as well as earnings, but toward the close of 1920 and during the opening months of 1921 the unpalatable news of the expense sheet was forced upon the attention of every shipowner in the world.

The most sensational aspect of the shipping game, however, is that of ship prices, and in this connection we are glad to publish the chart on the opposite page, which was prepared by our draftsman from figures and a similar chart published in Fairplay, London. The line between the points for January, 1920, and January, 1921, descends at a very steep angle, and since January, 1921, it has been descending at practically the same slope, so that if you lay a ruler along this line, you can find the price of a 7500-ton deadweight freighter in Great Britain at the present time or at least with enough approximation to show the general tendency of ship prices.

In order to show just what effect ship prices have on costs of operation, let us take the case of a typical United States Shipping Board steamer of 8800 tons deadweight cargo carrying capacity purchased by a citizen of the United States at the Shipping Board price of $175 a deadweight ton and compare this with a similar ship bought in Great Britain at present prices. According to the curve in Fairplay, the British ship would cost £14 per deadweight ton or, to make the comparison very conservative, let us say $70 per deadweight ton.

	Amer. Ship	For. Ship
Cost price	$1,540,000	$616,000
Capital charges:		
Insurance at 4%	61,600	24,640
Deprec'n at 5%	77,000	30,800
Interest at 6%	92,400	36,960
Total	$231,000	$92,400

Excess of capital charges on the American ship, $138,600 per annum.

This comparison shows conclusively what a tremendous handicap is imposed on the shipowner by heavy capitalization. When, in addition to this handicap, there is superimposed the tremendous increase in wages, in living costs, and in repair, reconditioning, and maintenance supply charges, together with falling freight rates, the shipowner is indeed on the horns of a dilemma.

Coasting and Home Trade.

1913-14 £	1920 £	Increase per cent.
449	845	88.2
446	1,167	161.7
440	1,019	131.6
453	1,307	188.5
473	886	87.3
461	910	97.4
132	500	278.8
221	572	158.8
164	654	298.8
933	2,534	171.6
£4,172	£10,394	149.1

Foreign Trade

1913-14 £	1920 £	Increase per cent.
6,448	30,048	366.0
2,847	10,631	273.4
5,935	15,898	167.9
704	2,562	263.9
5,865	18,449	214.6
4,244	16,406	286.6
3,238	12,250	278.3
7,215	30,421	321.6
901	3,245	260.2
4,489	19,885	343.0
4,279	17,710	313.9
£46,165	£177,505	284.5

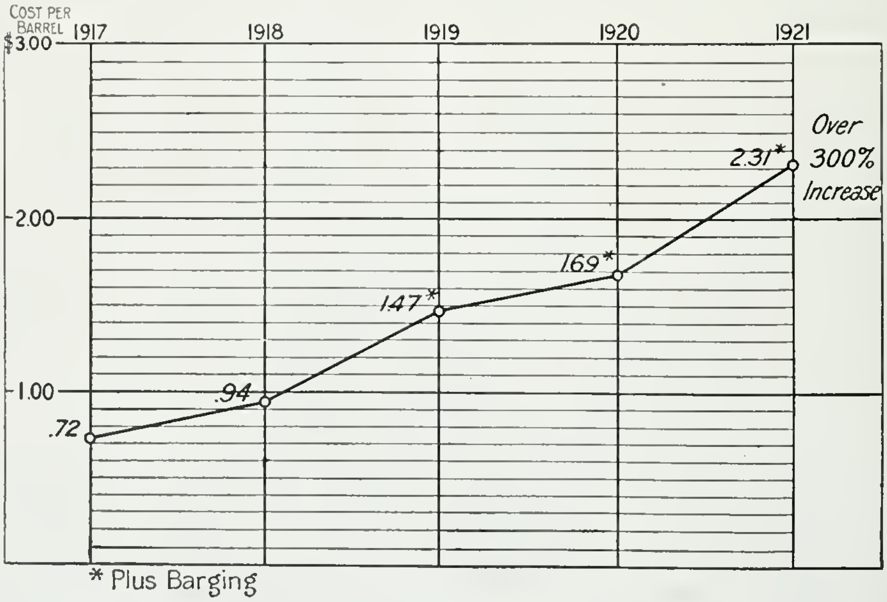
Table of ship operating costs, exclusive of management and depreciation, showing increase in a number of definite British voyages from 1913 to 1920.

It may be considered by many of our readers that the $70 price per deadweight ton given here for British tonnage is excessively low. Many people are willing to admit that ships might have been bought at this price in exceptional cases, but that it is not the general rule. If such reader will take the trouble to examine the books of any of the old established shipping companies, he will find that not only ordinary freight vessels but in some cases palatial first-class passenger liners are carried on the books of these companies at average values below this $70 price. A glance at the curve showing the fluctuations in prices of the freight vessel will show that in 1908 the price of such a vessel, new, ready for service, was in the neighborhood of £5 per deadweight ton, and it is very easy to figure that anyone who bought ships at that price in 1908 and kept books on a 5 per cent depreciation basis would have practically written off the value of such vessels, although in ordinary practice a twelve-year-old steel freighter has from ten to fifteen years' good service ahead of her.

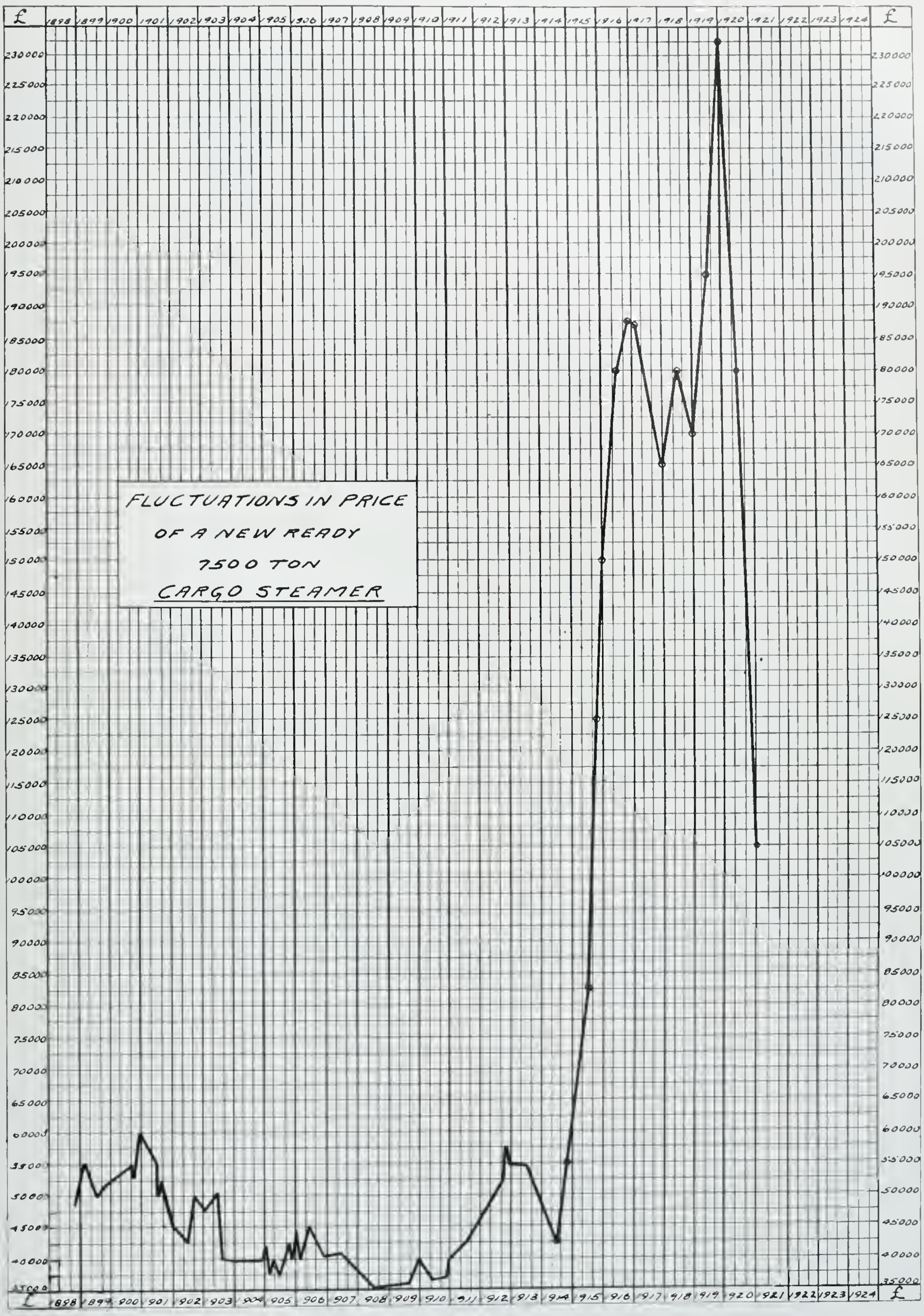
It would, therefore, seem to us that Shipping Board Commissioner Goff was very right in his contention that the Shipping Board tonnage should be marked down, and that his price of $67.50 per deadweight ton as a basis was not at all too low. In fact, the chances are that, if Commissioner Goff or any other clearheaded American business man was willing to face out conditions and figure on market values, he would today set a much lower figure than was set by Commissioner Goff three months ago.

American shipowners will be interested in the figure given in the attached table showing the increased costs of British coasting and foreign voyages, exclusive of standing charges and overhead. This table formed a part of the report for 1920 of the Chamber of Shipping for the United Kingdom and is said to represent a very fair average of increases.

There is some hope of wage readjustment, and at the present time there is a decided tendency toward reduction in prices of supplies and of fuel, although, as shown by the attached chart, which was compiled by Pacific Coast operators, the price of oil had increased over 300 per cent from January 1, 1917, to January 1, 1921.



Graph showing increased cost of fuel oil on the Pacific Coast as based on the average prices of San Francisco, Seattle and Wilmington

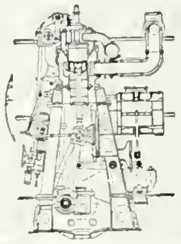


From the standpoint of the operator, the most important development of March in the wage situation of the Pacific Coast was the decision made by the Pacific American Steamship Association, representing steel tonnage interests, and the Shipowners' Association of the Pacific Coast, which is more an organization of steam schooner operators, to confer regarding wage scales to be submitted to the maritime unions.

Another factor making toward common action was the decision of the Shipping Board to await the formation of a concerted program before taking any steps to formulate a new wage scale.

But the general conference on the Atlantic April 15 may make for delay on the Pacific.

Oil Engines and Motorships



MOTOR SHIPBUILDING IN AMERICA

THE attitude of the American shipowner and operator toward the Diesel engine for the last three or four years has been one of "show me," and with an American that expression usually means that he has to be "shown" under American conditions. During the last twelve months there have gradually been accumulating some real figures in the American operation of Diesel engine driven motorships, and as a consequence the American operator is in a fair way to be "shown."

Largest American Motorships

That some at least of our operators are fairly convinced along this line is conclusively proven by the recent action of the United American Lines in ordering two large motor freighters from the Merchant Shipbuilding Corporation. These two vessels, as yet unnamed, are to be sister ships, with a length between perpendiculars of 445 feet, a beam of 59 feet 8 inches, and a carrying capacity of 11,000 deadweight tons on 28 feet 6 inches draft. They are to be powered with two six-cylinders, direct connected, marine Diesel engines of the Burmeister & Wain four-cycle type, developing 4500 I. H. P., which, it is estimated, will drive these hulls at 11½ knots sea speed loaded.

These are the largest motor vessels laid down for private account in any American yard. The keel for the first was laid on the fifth day of February, 1921, and for the second vessel on the tenth of February, 1921. They will be built along lines similar to those which have been found so successful in the Burmeister & Wain freighters of the Danish East Asiatic Company.

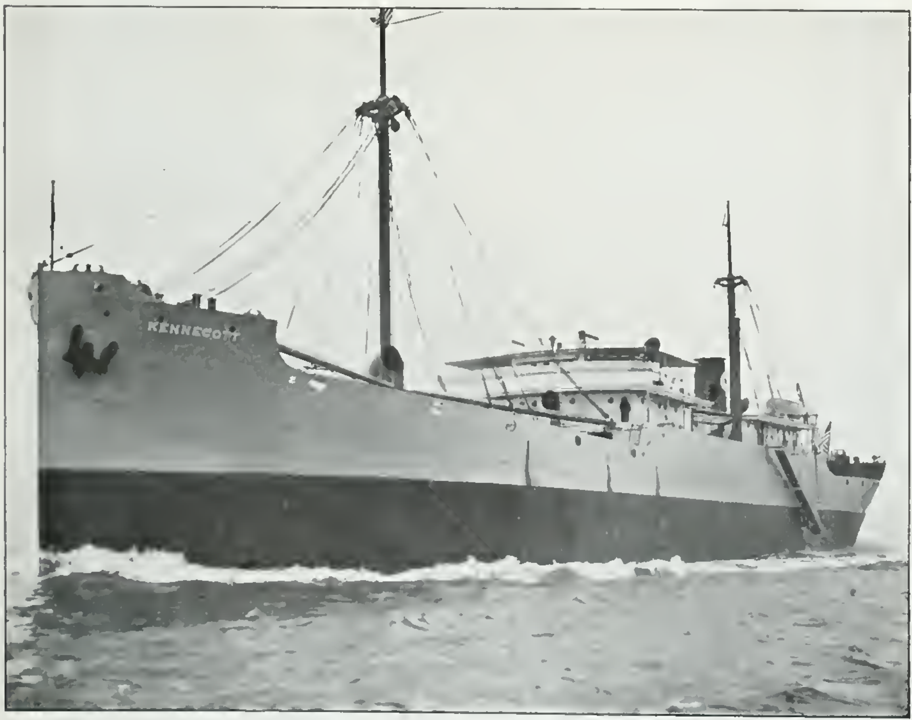
Motor Tankers

The motor tanker H. T. Harper, building for the Standard Oil Company of California at the Moore Shipbuilding Company's yard in Oakland, California, will soon be ready for launching. This vessel of 5010 tons deadweight carrying capacity is 330 feet long between perpendiculars, with a beam of 46 feet and a loaded draft of 27 feet. She is being powered with two Skandia Pacific Werkspoor marine Diesel engines, each developing 850 B. H. P., and is to have a loaded sea speed of 11 knots. The proponents of the motorship on the Pacific Coast are looking forward to the operation of this vessel with a great deal of satisfaction, and if her performance measures up to the standard set by the smaller tanker Charlie Watson, engined with the same type of motor, there is no doubt that many other shipowners will be induced to install Diesel engines in their future tankers.

The Charlie Watson is still plugging along without any incident worthy of mention, her machinery functioning perfectly and proving a great satisfaction to her officers and owners.

We note in all published reports the great regularity with which sea-going motorships perform under all conditions of weather. For instance, take the motor tanker Bayonne of the Gargoyle fleet of the Vacuum Oil Company. This vessel plies between the Delaware River and New York Bay. On March 2, 1921, she had rounded out her one hundredth voyage, having gone into service August 15, 1919. These one hundred voyages covered a distance of 44,000 miles, keeping up an absolutely uninterrupted schedule in all weathers and all conditions of temperature. The latest issue of The Compass, house organ of the Vacuum Oil Company, publishes a photograph of this sturdy coaster buried under a smother of foam bucking the great swells of the Atlantic in an equinoctial gale and narrates how at other times she has forced her way into New York harbor through ice-filled waters. The Bayonne is powered with McIntosh & Seymour direct reversible marine Diesel oil engine of 500 B. H. P. running at 135 R. P. M. "Needless to say, she is correctly lubricated with Gargoyle marine oils."

The records of the wooden motorship Libby Maine, powered with two Dow-Willans direct reversible Diesel oil engines of 320 S. H. P. each, have become almost classic in motorship literature, but she is still "going strong" with a total mileage to her credit of about 70,000 knots. She has a deadweight carrying capacity of 2000 tons, an average sea speed of



Alaska Steamship Company's new motorship Kennecott built by the Todd Dry Dock & Construction Corporation at Tacoma and engined with McIntosh & Seymour direct reversible full Diesel marine engines

6.72 knots, and her fuel consumption works out at 65 nautical miles per ton of fuel or a daily fuel consumption loaded of 2.48 tons. She has been running steadily since June, 1918, and figures for her fuel consumption and performance in every way will bear the closest comparison with the very best steel steamers of similar size and power.

The Kennecott

On March 18 the Todd Dry Dock & Construction Corporation at Tacoma held a very satisfactory trial run of the motorship Kennecott, built by them for the Alaska Steamship Company. On the measured mile the vesel made very easily 12.8 knots, although her contract called for only 11 knots sea speed.

The Kennecott is an all-steel motorship with a 100 A-1 classification in the American Bureau of Shipping and in Lloyd's Register, built for Pacific and West Coast trading. She is powered with two 1400 horsepower McIntosh & Seymour full reversible marine Diesel engines, and her engine room layout and auxiliary machinery are arranged and designed with the idea of giving maximum service with the least possible expense and delay in upkeep. Particular attention has been given to the matter of auxiliary machinery, which is entirely electrically driven. In a future issue we shall publish an article devoted exclusively to the motorship Kennecott, describing in detail her propulsive equipment and auxiliary and cargo handling machinery.

On February 21 the Anchor Shipbuilding Company of Washburn, Wisconsin, laid the keel for a motor ferry boat to be 113 feet long, 33 beam, 7 feet loaded draft, and driven at a speed of 8 knots by a 300 I. H. P. Ingersoll-Rand Diesel engine.

Word comes from the Philippines of the building of a wooden auxiliary motor coaster for the account of Senor M. J. Asorio of Manila. This vessel will have a deadweight tonnage of 500, 145 feet length on the water line, a beam of 32 feet, a molded depth of 14 feet 3 inches. She will be powered with a Bolinder semi-Diesel engine of 160 S. H. P.

An interesting new development among Pacific Coast Diesel engine builders is the new mechanical injection, low-powered Diesel engine which is being built by the Enterprise Engine Company. This engine is designed on a cylinder unit of 25 horsepower, and a three and a four cylinder unit have already been built and shipped. A complete description of these units will be found elsewhere in this issue of Pacific Marine Review.

First American Diesel Electric Freighter

The American freight steamer Fordonian of the American Mediterranean Steamship Company is being converted at the Erie Basin plant of the Todd Shipyards Corporation, New York, to Diesel electric drive, and when finished its performance will be watched with great interest by many engineers who have been advocating this type of marine propulsion. The engines are to be two Ansaldo San Giorgio full Diesels imported from Italy. These engines are four-cylinder, two-cycle and of 500 B. H. P., and i is estimated that they will give the Fordonian a loaded sea speed of about 9 knots with an approximate daily fuel consumption of less than five tons.

These engines are each to drive a 340-kilowatt 250-volt compound wound generator at 200 R. P. M., the energy from these generators being transmitted through suitable controlling apparatus to one 850-horsepower 500-volt motor, the generators being connected in series and the driving unit being made up of two 425-horsepower 250-volt motors mounted on a common shaft.

THE DIESEL ENGINE

Its Development, Design and Construction, Particularly as Applied in Marine Propulsion

V.

THE problems of cooling and heat stresses no doubt are the decisive factors of limitation in working cylinder bores. As the surface of the combustion chamber does not increase in the same ratio as the amount of heat units possible of liberation in the respective cylinder volume and the cylinder and cylinderhead wall thicknesses must be increased to take care of higher stresses, proper cooling becomes a very difficult problem.

To insure satisfactory operation and in order to keep the stresses caused by pressures and temperatures within safe limit, experience has taught the advisability of using lower mean effective pressures with increasing cylinder sizes. This, of course, reduces the output per cylinder unit and the thermal efficiency of the engines.

The above factors are also responsible for practical limitations of cylinder bore. For four-cycle engines this is about 30 inches with an output of from 250 to 300 B. H. P. This same bore can also be considered a maximum for two-cycle engines except in designs with very simple and absolutely symmetrical cylinder-head construction. The largest cylinder ever built was for a two-cycle single cylinder engine of 39.4 inches bore and an output of 2000 B. H. P. This was an experimental unit constructed by Sulzer Bros., Winterthur, Switzerland.

With the multi-cylinder arrangement it is possible to build units large enough to take care of most of the requirements for marine practice, and it also makes a proper balancing of the reciprocating masses possible. In four-cylinder arrangements with cranks at 90 degrees all the moments are balanced, and this cannot be improved upon in the six or eight-cylinder arrangement. In marine practice the four-cylinder two-cycle and the six-cylinder four-cycle are the leading arrangements.

It is the intention in these articles to go into the construction and design of the Diesel engine only insofar as is necessary for the practical engineer aboard ship, and for this reason we will in general deal with those parts of the internal combustion engine which are designed and are working under different conditions from those we are used to in steam engine practice. These must include naturally all the parts peculiar to Diesel oil engines.

Bedplates and Frames

The material used in the construction of these parts is preferably a close-grained cast iron, except where special lightweight engines are demanded such as those used in submarines and chasers. In these cases bronze or steel castings are used.

To carry the working cylinders frames or a crankcase are used. The latter was first used to replace the A-frame type in stationary engines, but today it is becoming quite general even for very large marine engines, especially since it has become common practice to separate circulating pumps, etc., from the main engines. The crankcase arrangement, besides giving the advantage of greater rigidity, insures greater cleanliness of engine and engine room, a very desirable item.

The stresses in the frames and crankcase are in single acting engines tensional and are the result of the pressures acting on the piston.

For small engines in one piece the bedplate or foundation frames are designed along the lines of the type used in steam engine practice; for large engines they are made up of several sections. It is of advantage to construct these in such a way that the lower part forms a closed crankbilge in which the lubricating oil from the bearings can collect. Instead of being cast integral with the bedplate or crank case this crankbilge may be formed by a sheet iron trough bolted to the bedplate.

The stresses in these foundation frames or bedplates are principally bending stresses caused by the piston forces that are transmitted through connecting rods and cranks to the main bearings. To reduce the stresses in bedplate and frames tie rods are often used between the cylinder-head and bedplate, a construction which will be discussed in detail later on.

The construction of the main bearings differs very little, if any, from that used in steam engine practice. In four-cycle engines consideration must be given to the matter of taking care of the forces acting upon the main bearing caps and studs on account of the inertia of the piston and other reciprocating parts.

This reversal in the direction of the forces causes a breathing of the bearings and facilitates lubrication. Nevertheless, the bearings should be lubricated by force feed lubrication. Often it is sufficient if the oil is fed from an overhead tank in liberal quantities through the bearings. It is then collected in the crankbilge, strained and often cooled, and put in circulation again. For large engines the main bearings should be equipped with water cooling.

Piston and Piston Rods.

For piston construction a tough but not too hard cast iron should be used. The pistons of single acting, four and two-cycle engines, are mostly of the plunger type, even in crosshead engines. In two-cycle engines with exhaust and scavenging ports in the lower part of the cylinder a long piston becomes a necessity in order to have these ports covered when the piston is at its upper dead center. In four-cycle engines this is not necessary, and in all modern types of crosshead engines of this design the extension has been omitted and the construction proven successful.

For the sake of reliability the pistons of marine Diesel engines ought to be water cooled, even in sizes below what is customary in stationary engines. Piston cooling, besides increasing the life of a piston, has several other advantages, such as reduced friction against the cylinder walls and reduced lubricating oil consumption. It further prevents to a large extent the forming of oil vapors in the crankcase, reduces crankcase temperatures and is an insurance against crankcase explosions.

Instead of water as a medium for piston cooling, oil is quite often used, especially in high speed trunk piston engines, as in these types it is extremely difficult to design a leakproof arrangement. In this case large oil coolers must be provided, and for this reason and also to effect more efficient cooling water is used wherever possible.

On account of the relatively small quantities of water necessary for piston cooling (about one gallon per horsepower hour), fresh water is often used for this purpose instead of salt, thus avoiding all danger of corrosion of telescopic tubes and salt deposits. This fresh water after discharging from the pistons is collected in a separate bilge tank, pumped through coolers and used over again.

The details of piston construction vary with almost every manufacturer. Each builder is following the rules which experience has taught him in taking care of the head and mechanical stresses, and as yet there is no generally accepted design which will entirely satisfy all the practical requirements.

In order that a piston may withstand the heat and other stresses caused by the high combustion temperatures and pressures, its bottom must be designed to insure great stiffness ,but the thickness of this part must not exceed a certain limit in order to insure sufficient cooling and also because of the weight of the reciprocating masses, which must be kept as low as possible. This result can be obtained by using suitable shape or ribs, but the design of these reinforcing ribs requires greatest care, as, besides the heat stresses which can hardly be judged properly, due consideration must be given to the unavoidable shrinkage stresses. Often the piston bottom is dished; that is, it is lower in the center—a shape which, besides giving greater strength, results also in a more efficient combustion chamber.

Although there is little likelihood of deposits in the cooling water space on account of the strong agitation of the water, the piston should be designed so as to make inspection and eventual cleaning possible, but in the end of the piston facing the combustion chamber core holes and chaplets should be absolutely prohibited.

Piston or cylinder lubrication is effected by means of force feed pumps through one or more lubricator plugs in the cylinder wall. These plugs should be so arranged as to lead into the cylinder at a position which is below the top ring when the piston is at its lower dead center. Piston lubricating pumps must be adjustable for very small quantities without impairing their proper function.

This same arrangement is often used to lubricate the wrist pin in the plunger type piston through a hole in the piston and a pocket, which latter is located in a manner so as to align with the feed plug when the piston is at its lower dead center. Although this system of wristpin lubrication has proven to be fairly satisfactory, it is now being replaced by force feed lubrication through the hollow connecting rod from the crank pin. The latter system is preferable, as it allows for an abundant oil supply with a corresponding cooling effect and reduction in wear.

Cast iron is used exclusively as a material for piston rings. The rings (snap rings) must not be too wide but in sufficient numbers, usually from six to nine.

(To be Continued)

MOTOR SHIPBUILDING IN EUROPE

THE shipping depression continues and is likely to continue for some little time, and while this is the case no orders are being placed for ships either fitted with steam or internal combustion machinery. It is, however, the general belief that this slump will not be protracted and that, as soon as shipbuilding costs have diminished—as they undoubtedly will—shipowners will once more enter the market for new vessels. It can be scarcely questioned that the excessively high wages in the shipbuilding industry will have to be brought down and there is now a proposal afoot to reduce them by 25 per cent. When the shipowners feel that something approaching stability of prices has been reached in the construction of hulls, there is no doubt that a number of contracts will be fixed.

Suggested Cunard Motor Liners

Meanwhile shipowners are examining very closely the question of the types of vessel which they will adopt when the time comes for them to renew their activities, and judging from the opinions which are now freely being expressed, not only will motorships form a larger part of the building programs than has hitherto been the case, but this class of vessel will be constructed in larger numbers than steamers. The Cunard Company are now considering the construction of a motor passenger liner and alternative proposals are being dealt with, one of which embodies the employment of Diesel engines of the Camellaird-Fullager type and the other of Sulzer two-cycle machinery. In each case the project is for a liner equipped with machinery of 12,000 to 15,000 b. h. p., and it is interesting to note that two firms who have in the past built most of the machinery for Cunard liners and were, respectively, responsible for the turbines of the Lusitania and Mauretania, have taken out licenses for the construction of Diesel machinery, the Camellaird principle in one case and Sulzer design in the other case. These two concerns are John Brown & Company, Ltd., the famous Clydebank firm, and the Wallsend Slipway & Engineering Company. It may be remarked that the latter is perhaps one of the most conservative marine engineering firms in Great Britain, but its head, Mr. Andrew Laing, is looked upon as the leading marine engineering expert in the United Kingdom, and in the past the Cunard Company have almost invariably adopted his suggestions.

Plans have also been prepared for a Doxford-engined twin-screw motor liner with machinery of 8700 b. h. p., and it is a noteworthy fact that, from the detailed plans that have already been produced, it is found the motor liner saves no less than 21 per cent in space and that an extraordinary increase in passenger accommodation is possible owing to the absence of boilers and uptakes.

The Doxford Engine's Low Fuel Consumption

In order that there should be no mistake in connection with their engines, Doxfords submitted the first standard 3000-h. p. motor, which was described recently in this journal, to tests lasting approximately three months. They wound up with a seven-day non-stop run entirely without incident, and then the engine was dismantled when the bearings were found to be scarcely touched. It will be remembered that one of the most interesting features in this motor is that a low compression of about 300 pounds per square inch is adopted, this being rendered feasible by the employment of "hot tops" to the piston. These suffered no damage whatever during the three months' operation, so that one feature which might appear somewhat doubtful in the design seems to have proved its value and reliability.

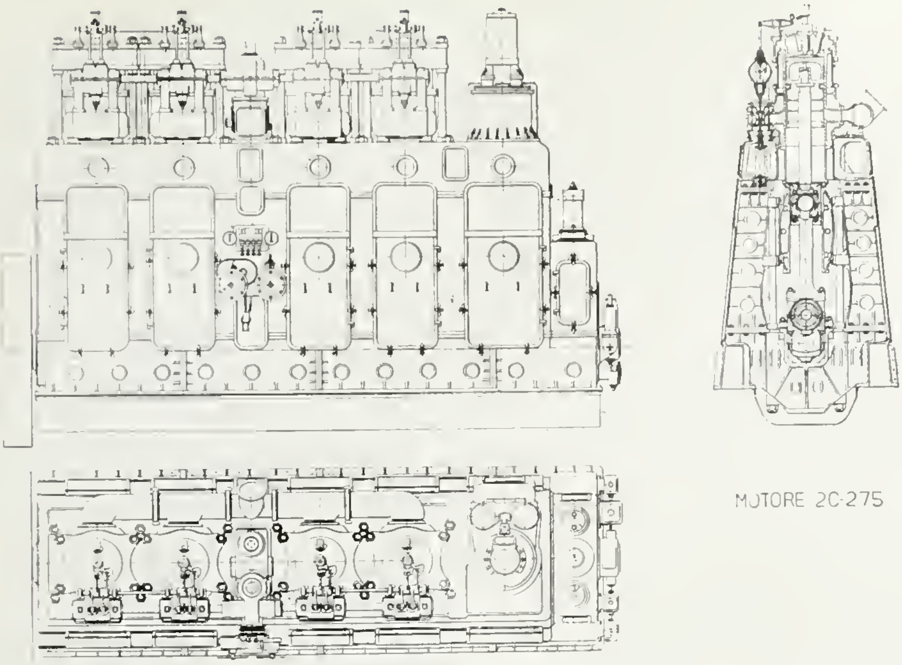
More remarkable than ever is the extremely low fuel consumption that has been attained with these motors. They develop 3000 i. h. p. in four cylinders (with opposed pistons) running at 77 r. p. m., and on the seven-day test using Anglo-American oil with a specific gravity of 0.91, a consumption of approximately 0.41 pounds per b. h. p. hour was attained. On Mexican fuel oil the figure was approximately the same and the engine was run continuously on this oil for a prolonged period. The lubricating oil consumption worked out at about twenty gallons per day of twenty-four hours, which is normal for a high-class Diesel engine.

The first motor is now being installed in one of the Doxford standard motor cargo ships for the Transatlantic Steamship Company of Gothenburg, named the Yngaren, and it is anticipated that she will be put into service some time in May. This type of engine requires an engine - room of exactly the same length as a combined boiler and engine-room on a triple expansion steam engined vessel, but there is a great saving in space owing to the fact that the boilers occupy the whole width of the vessel and the oil engine requires only about one-third of the beam. The actual increase in cargo carrying capacity of the motorship is about 9 per cent. It will thus be seen that one of the Doxford standard engines can be installed in a steamer of the same size and machinery power, practically without any alterations, the speed of rotation being just what is desirable for such a craft. It is no secret that Doxfords are hoping to carry out the conversion of very large numbers of existing steamers as soon as experience at sea has been gained with this motor, proving its complete reliability and economy.

British motorship Glenapp. 14,000-ton deadweight cargo capacity, 6400 horsepower. Speed loaded 12 to 13 knots per hour on approximately 20 tons fuel oil

Three New 12,000-ton Motorships

Standardization in motorship construction is now becoming quite international. During February three motorships of practically the same type and size were launched, two in Denmark and one in the United Kingdom. The



General arrangement drawing of standard 1200 B. H. P. Ansaldo two-cycle Diesel engine

latter was the Somersetshire, the second motorship for the Bibby Line, whose first oil-engined boat, the Dorsetshire, has proved so eminently satisfactory since she was commissioned. The Somersetshire carries between 12,000 and 13,000 tons of cargo at a speed of nearly 12 knots and is 450 feet in length with a beam of 57 feet. She is the second motor vessel to be built in Ireland, most of the previous Harland & Wolff craft having been constructed in their Scottish yards. The machinery was, however, built by the firm at Glasgow, but it is understood that in the near future the huge steam engine works at Belfast will be converted for the construction of oil engines in order to supplement the two existing factories solely engaged upon this work at Glasgow. The machinery of the Somersetshire consists of two six-cylinder engines of 2250 i. h. p. (or about 1650 b. h. p.), the fuel consumption at full speed being about fourteen tons per day.

The other two vessels of the same size which have just been launched in Denmark are both for the East Asiatic Company, who seem determined to maintain their supremacy as motorship owners and have a program of construction consisting of no fewer than sixteen motorships of various sizes, full details of which have not been definitely determined. The two new vessels are the Malaya and the Java, sister ships to the Afrika, which proved eminently successful on her 30,000-mile maiden trip. It is interesting to note that in their anxiety to obtain motorships quickly the East Asiatic Company could no longer rely wholly upon Burmeister & Wain, so that the Java has been built at a new yard which was only started a few years ago at Nakskov, mainly owing to the initiative of the East Asiatic Company, who have a large financial interest in it. No fewer than seven motorships are being built at this yard at the present time.

Motorships for Lamport & Holt

Another important British shipping firm has just entered the ranks of the increasing number of motorship owners. This is Messrs. Lamport & Holt, who have a very large fleet of steamers trading mainly between Liverpool and South America. This is another indication of the enormous influence which Lord Pirrie exerts upon shipping in Great Britain, as he is one of the directors of Lamport & Holt, and it was on his advice that the firm decided to build their first motor vessel. She is being constructed at a Clyde yard, not at Harland & Wolff's, on account of the fact that at the time the order was placed it did not seem likely that any berths would be available for several years to come. The machinery, however, has been constructed by Harland & Wolff, and as their works are now arranged, it is possible for them to turn out far more oil engines than hulls within a given time.

The new motorship, the Leighton, as she will be named, is similar in most respects to many of the Glen Line cargo boats that have been in commission for several years. She is designed to carry 10,000 to 11,000 tons of cargo and is equipped with Harland & Wolff machinery of a standard type, of which probably about twenty sets are now going through the shops. Remembering that these call for the construction of 120 cylinders exactly similar in every respect as well as an enormous amount of valve gear, which involves nothing but repetition work, it will be realized that the cost of construction of Diesel engines is now being brought down to a manufacturing basis. The degree of standardization that has been reached is in fact almost unbelievable, and it amazes a visitor to Harland & Wolff's shops to note the enormous quantities of similar parts available for erection. In fact, the construction of a Diesel engine at these works is largely coming to a state when it is nothing more than erection, the various parts for each engine being taken from a finished store as required, just on the same principle as mass production of motor cars.

Engineers for Motorships

The question of the supply of engineers for motorships is attracting a good deal of attention among shipowners at the present time. On January 1, 1922, new Board of Trade regulations come into force by which no man will be allowed to sit for his chief engineer's certificate for an oil-engined vessel until he has spent two years in the works of a firm manufacturing oil engines and at least two years at sea in a junior capacity on a motorship. It is obvious that the average chief engineer of a steamer (from which class of men most of the chiefs of motorships are recruited), will be by no means willing to go ashore for two years and then spend another two years at sea as third or fourth engineer in order that he may obtain a chief engineer's certificate to enable him to occupy that position on a motor vessel. It must be admitted that shipowners sympathize with their engineers in this respect, and it is probable that the Board of Trade will have to make some modifications or allow existing regulations to continue for another period of two or three years. The present regulations do not call for any special period at sea as a junior engineer and the usual practice is for the shipowner to send engineers from steamers to the works of the oil engine builders for a short period, after which the Board of Trade examination can be passed. If, however, a steam engineer finds that he has to spend four years in a junior capacity before he can take charge of a motorship, it is obvious that there is likely to be a shortage of motorship engineers in the future with Board of Trade certificates, and this would reflect seriously upon the motorship movement. For this reason it is probable that pressure will be brought to bear upon the Board of Trade, for it is obvious that in any case the shipowner takes very special care in appointing engineers to motor vessels.

PANAMA TRAFFIC

THE Panama Canal as a principal artery of world commerce, in which the pulse of trade can be felt, hereafter will receive fitting attention of business diagnosticians. During the war the traffic of the canal was so profoundly affected that statistics virtually were meaningless; but now, since the world has returned to a condition that at least approaches normal, the summary of traffic for the calendar year 1920 is of extraordinary interest.

Larger Intercoastal Trade

For more than one reason, however, the 1920 summary does not indicate what may be expected in normal circumstances. "Normality" must presuppose a large intercoastal traffic; nevertheless the first few months of 1920 were practically barren, the North Atlantic & Western having opened its service in February and other companies having dispatched their first vessels throughout the first three-quarters of the year. Barring an unexpected setback, therefore, the intercoastal trade should be considerably larger in the fiscal year 1921 and in the calendar year 1921 than it was in the calendar year 1920; and doubtless other trades will readjust themselves, some growing and others perhaps declining.

Trade With Far East

Little comment is necessary on the appended summary, reprinted from the Panama Canal Record; the individual reader is best able to make his own deductions and to discover certain unexpected facts. Attention well may be invited to some disclosures, however. One of these is that the combined tonnage movement between the United States and the Far East, both east and westbound, was the second in magnitude, surpassing the American intercoastal traffic by almost 800,000 tons; another fact is that the combined trade between the east coast of the United States and Asutralasia was almost 800,000 tons. In other words, the canal has moved the manufacturing centers of Eastern United States next door to the markets of the Orient and Australasia. The agricultural districts of the West also have been moved closer to the consuming centers of Europe, and we accordingly discover a combined movement of 860,000 tons, which, though large, is exceedingly ill-proportioned, shipments from the west coast of the United States to Europe exceeding those in the contrary direction by 640,000 tons. As world conditions improve and Europe produces more and and at the same time experiences an improvement in exchange, the Pacific-European trade should increase greatly. The next few years probably will make manifest an increasing tendency of commodities to move directly by water from place of origin to foreign markets. This tendency, apart from the effect on the ports of the two coasts of the United States, will react strikingly on American railroads.

Canal Record's Summary

The Panama Canal Record's summary follows:

The traffic through the Canal during the calendar year 1920 exceeded that during any previous period of 12 months.

Prior to this the record period was the fiscal year from July 1, 1919, to June 30, 1920; and prior to that the record was in the calendar year 1919.

Traffic in the calendar year 1920 was made up of 2814 ships in commercial service, paying tolls, and 221 vessels in the service of the United States government, principally the Navy, passing through the canal without the payment of tolls. The total was 3035 ships, exclusive of vessels used in canal work and of launches.

As the ships passing through free are not in commercial use (though the 221 in 1920 carried a total of 364,050 tons of cargo, principally coal, fuel oil, and supplies), they will not be considered in the comparisons. Their passage constitutes a kind of extra service performed by the canal, for which no tolls are paid and which is not a part of its usual commercial service.

32 Per Cent Gain

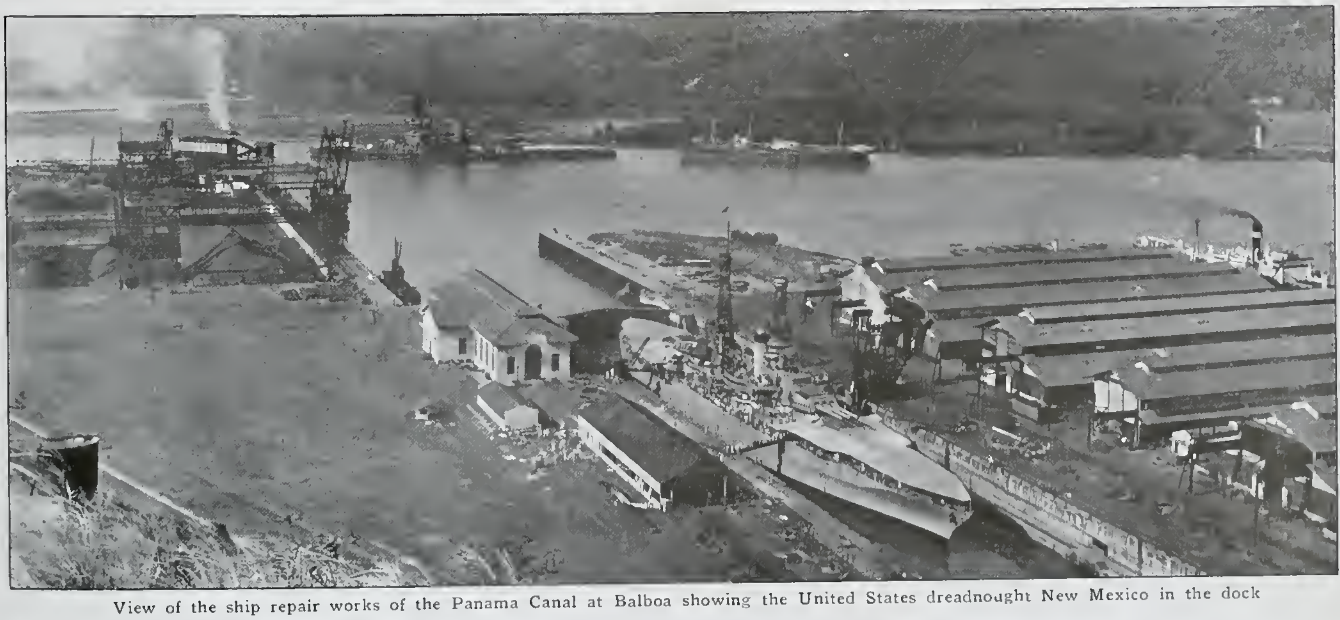
The 2814 commercial ships passing through the canal in 1920 exceeded the number in the fiscal year ending June 30, 1920, by 13.6 per cent, and the number in the calendar year 1919 by 31.9 per cent.

The aggregate net tonnage of the 2814 ships was 10,378,265 tons, Panama Canal measurement. They carried 11,236,119 tons of cargo. The tolls earned on them amounted to $10,295,362.21. In net tonnage, tolls, and cargo they were 21.4, 20.9, and 19.9 per cent greater, respectively, than in the past fiscal year. In comparison with the year 1919, the net tonnage, tolls, and cargo were, respectively, 50, 47.2, and 50.5 per cent greater in 1920 than in the preceding calendar year.

Cargo Handled in Years

Comparison of the cargo carried through the canal in 1920 with that handled in previous calendar years is shown below (years and tons): 1914*—1,745,334; 1915—4,894,134; 1916—4,838,496; 1917—7,427,680; 1918—7,294,502; 1919—7,468,167; 1920—11,236,119.

*In 4½ months, from opening of canal on August 15, 1914, to end of calendar year 1914.



View of the ship repair works of the Panama Canal at Balboa showing the United States dreadnought New Mexico in the dock

Commercial Traffic Through the Panama Canal During Calendar Year 1920, by Trade Routes.

ATLANTIC TO PACIFIC.

Route.	Total number of vessels.	Panama Canal net tonnage.	Tons of cargo.	Percentage of cargo, Atlantic to Pacific.	Percentage of all cargo, both directions.
East coast of United States to west coast of South America	334	1,089,405	893,393	16.95	7.95
Cristobal to west coast of South America	189	290,174	114,445	2 17	1.02
East coast of United States to Far East	188	920,906	1,350,273	25 63	12 02
Europe to west coast of South America	131	483,529	259,921	4 93	2 31
United States coastwise	116	448,734	416,819	7 91	3 71
Mexico to west coast of South America	81	401,590	659,777	12 52	5 87
United States to Australasia	78	404,864	532,297	10 10	4 74
Europe to west coast of United States	65	289,675	110,401	2 09	98
Europe to Australasia	51	339,019	310,876	5 90	2.77
Cristobal to west coast of Central America	24	15,212	15,102	.29	.13
Cristobal to west coast of United States	22	40,871	38,680	.73	.34
West Indies to west coast of South America	13	10,539	12	....	....
Mexico to west coast of United States	13	74,376	129,510	2 46	1.15
East coast of United States to west coast of Canada	13	61,091	92,371	1 75	.82
East coast of United States to Hawaii	13	64,216	99,813	1 89	.89
East coast of United States to Philippine Islands	8	36,826	55,141	1 05	.49
Miscellaneous trade routes	75	202,973	190,516	3 62	1.70
Totals	1,414	5,174,000	5,269,350	100 00	46.896

PACIFIC TO ATLANTIC.

Route.	Total number of vessels.	Panama Canal net tonnage.	Tons of cargo.	Percentage of cargo, Pacific to Atlantic.	Percentage of all cargo, both directions.
West coast of South America to east coast of United States	292	948,342	1,447,849	24 27	12 89
West coast of South America to Cristobal	198	317,070	251,451	4 21	2.24
West coast of South America to Europe	197	818,678	1,062,702	17 81	9 46
United States coastwise	122	528,004	644,833	10 81	5 74
West coast of United States to Europe	115	515,609	749,417	12 56	6 67
Australasia to Europe	75	529,338	459,527	7 70	4 09
West coast of South America to Mexico	73	368,994	3,186	05	.03
Far East to east coast of United States	71	327,887	477,640	8 00	4.25
West coast of Canada to Europe	30	92.411	129,909	2.18	1.16
West coast of Central America to Cristobal	29	18,907	16,054	0 27	0.14
Australasia to United States	25	150,150	156,015	2 61	1.39
West coast of United States to Cristobal	22	40,020	21,435	.36	.19
West coast of United States to Mexico	22	114,193	6,000	.10	.05
West coast of South America to West Indies	15	28,495	46,542	.78	.41
Philippines to east coast of United States	10	45,439	72,359	1.21	.64
West coast of United States to Africa	9	41,934	60,476	1.01	.54
Hawaii to east coast of United States	4	15,439	24,262	.41	.22
Miscellaneous trade routes	91	303,355	337,091	5.65	3.09
Totals	1,403	5,204,265	5,965,769	103.03	53.103

Of the commercial ships, 1414 went from Atlantic to Pacific and 1400 from Pacific to Atlantic.

The cargo handled by commercial ships from Atlantic to Pacific through the canal amounted to 5,269,350 tons; and that from Pacific to Atlantic to 5,966,769 tons. The total was 11,236,119 tons.

Largest with South America

As among areas between which cargo was shipped, the greatest traffic was from the west coast of South America to the east coast of the United States. It amounted to 1,447,849 tons, and was one-fourth of all the cargo passing through the Canal from Pacific to Atlantic and one-eighth of all the cargo handled through the Canal during the year.

The routing next in order in quantity of cargo was from the Atlantic Coast of the United States to the Far East (Japan, China, Philippines, Straits Settlements, etc.) It aggregated 1,350,273 tons, or 6.7 per cent less than the cargo from the west coast of South America to the United States. It was slightly over one-fourth of the total cargo from Atlantic to Pacific and slightly less than one-eighth of all the cargo passing through the Canal in both directions.

Third in order was the route from the west coast of South America to Europe. Over this there passed 1,062,702 tons. This was over one-sixth of all cargo from Pacific to Atlantic and over one-eleventh of all cargo handled through the Canal in the year.

Over each of these three routings there were handled more than 1,000,000 tons of cargo, in the one direction.

On Principal Routes

The fourth routing, in amount of cargo, was from the east coast of the United States to the west coast of South America, 893,393 tons. The fifth was from the west coast of the United States to Europe, 749,447 tons; and the sixth was from the Atlantic Coast of Mexico to the west coast of South America, 659,777 tons, principally fuel oil.

Of the 11,236,119 tons of cargo shipped through the Canal in the year 1920, 6,124,403 tons, or over one-half the total, were shipped in whole cargoes, the respective vessels containing only the one commodity at time of transit. Of the whole cargoes, 2,236,745 tons were from Atlantic to Pacific and 3,887,658 tons from Pacific to Atlantic. The shipments of commodities aggregating over 100,000 tons in shipload lots were as follows:

Atlantic to Pacific (commodity and tons): Fuel oil, 828,223; coal and coke, 651,844; refined oils, 355,494; steel and iron, 157,405.

Pacific to Atlantic (commodity and tons): Nitrate, 1,995,906; flour, 487,614; cold storage products, 347,479; wheat, 318,944; lumber, 205,172; sugar, 127, 995.

Vessels in Nationalities

Of the 2814 commercial vessels using the Canal during 1920, the leading nationalities were as follows: the United States ships numbered 1281 or 45.5 per cent of the total; the British ships numbered 867, or 30.8 per cent of the total; the Japanese, 122, or 5 per cent; Norwegian, 111, or 3.9 per cent. The numbers and tonnage of the ships, by nationalities, are summarized in this table:

Commercial Traffic Through the Panama Canal for the Calendar Year 1920, by Nationality of Vessels.

Registry.	No. of ships.	Tonnage.				Tolls.	Tons of cargo.[1]
		U. S. equivalent.	Panama Canal net.	Registered gross.	Registered net.		
Belgian	2	6,309	8,032	10,144	6,188	$7,886 25	42,700
Brazilian	1	5,436	6,204	6,692	4,126	6,795 00	8,916
British	867	2,707,826	3,333,676	4,242,357	2,649,963	3,357,357.55	3,305,681
Chilean	78	139,038	212,202	271,927	157,861	170,518.99	88,464
Chinese	4	10,561	12,008	16,645	10,624	13,187.10	14,409
Colombian	1	84	95	96	57	105.00	27
Costa Rican	13	2,055	2,201	2,381	1,621	2,392.65	1,641
Cuban	1	578	702	1,059	577	722 50	1,200
Danish	30	92,255	110,432	131,297	84,662	114,035.15	158,110
Dutch	33	121,433	164,331	181,276	115,547	150,715.18	139,258
French	53	139,219	152,600	203,642	135,623	161,527.04	132,149
German	32	87,344	114,727	137,814	84,855	107,004 83	125,455
Italian	31	97,031	120,544	170,370	102,235	121,304.65	89,835
Japanese	122	480,197	545,655	723,476	466,303	583,643.93	764,206
Jugo-Slav	2	3,902	4,503	6,370	4,068	4,877.50	8,325
Mexican	2	2,169	2,638	2,559	1,659	1,899.36	....
Norwegian	111	366,719	433,339	573,805	356,998	411,422.03	486,889
Panaman	8	1,382	1,370	1,558	1,349	1,489.90	872
Peruvian	72	115,693	187,621	288,515	153,110	143,129.05	119,462
Portuguese	2	8,838	9,002	11,210	7,056	10,802.40	10,775
Russian	1	4,749	5,144	7,434	4,779	5,925.00	12,147
Swedish	18	61,743	75,454	78,668	57,918	63,511.25	92,893
Spanish	49	112,103	128,324	171,953	111,783	139,615.33	153,467
United States	1,281	3,985,755	4,747,036	6,056,518	3,939,415	4,724,494.66	6,503,247
Totals	2,814	8,543,438	10,378,235	13,300,837	8,458,431	$10,295,362.21	11,236,119

[1] 2,240 pounds to ton.

ISLAND WRECKS X

By ANDREW FARRELL

SIXTEEN days in a crazy, leaking boat; drenched with salt water; devoured by thirst; three men raving lunatics, whose madness was hushed by death: that in brief is the story of the crew of the American ship Eclipse, C. B. Larsen master. And before the three men died the castaways sighted a full-rigged ship, which passed so close that men could be seen on her decks and yet she continued on her course, while the boat's crew whistled; shouted; waved tarpaulins and all manner of distress signals. Once it appeared that she was about to stand toward them, but she sailed on, and the three lunatics died.

The Eclipse departed from Newcastle October 16, 1907, with a cargo of coal for San Francisco. Good weather was met, although the winds were light, until December 4. On that day, during a fall of rain but by no means a heavy storm, a bolt of lightning struck the vessel and tore away her foretopmast and main topgallantmast, no one being injured. To repair the damage required three weeks. From the day of the storm the vessel leaked, although she remained seaworthy nonetheless, and Captain Larsen saw no reason for changing his course.

Bulwarks Carried Away

Small though the leak was when it started, it increased steadily, and pumping was necessary at all times. No especially bad weather was met; but on January 6, apparently through the fault of the man at the wheel, the vessel shipped a heavy sea that carried away her bulwarks. Being heavily laden with coal, she had little freeboard, and every sea that struck her decks swept her clean; broke the doors of the forward deckhouse and windows and skylights; and poured tons of water into her hold. And all the time the leaks increased.

Captain Larsen ordered fires under the boiler of the donkey engine, so that power pumps might be used; and after much effort, for to keep the fires going was difficult, steam was raised and two pumps were started. Although they were kept going day and night, they failed to hold down the enormous, slowly-rising volume of water; they continually clogged with coal and were unsatisfactory in general; and the hand pumps also had to be manned. Hour by hour they lost, until on the fourth day after the bulwarks went there was eleven feet six inches of water in the hold.

Rats Quit Sinking Ship

"When we opened the hatches one morning," said a seaman, "the water was over the coal, and rats as long as your arm were jumping out." Never was an ancient proverb exemplified more grimly.

During the night the water gained eighteen inches. The vessel was waterlogged and was shipping more with every sea. Two hours after the first measurement a second was taken, which disclosed another gain by the water of eighteen inches. It was then that Captain Larsen gave the order to abandon ship. At that time the Eclipse was in latitude 36 north and longitude 155 west, about 950 miles due north of Hana, Maui.

Mate's Boat Capsizes

Two boats were lowered and provisioned carefully. Into the lifeboat, of which Captain Larsen took charge, were placed sixty gallons of water, four cases of canned salmon, 150 pounds of ship's bread and two cases of canned tomatoes. Into the ship's boat, commanded by First Mate Cameron, were put the same quantity of water and a supply of provisions, including beef, that was even larger. With rare foresight, Captain Larsen, although an inveterate smoker, left all his cigars and cigarettes on the ship and directed the men to do likewise; but they refused to obey.

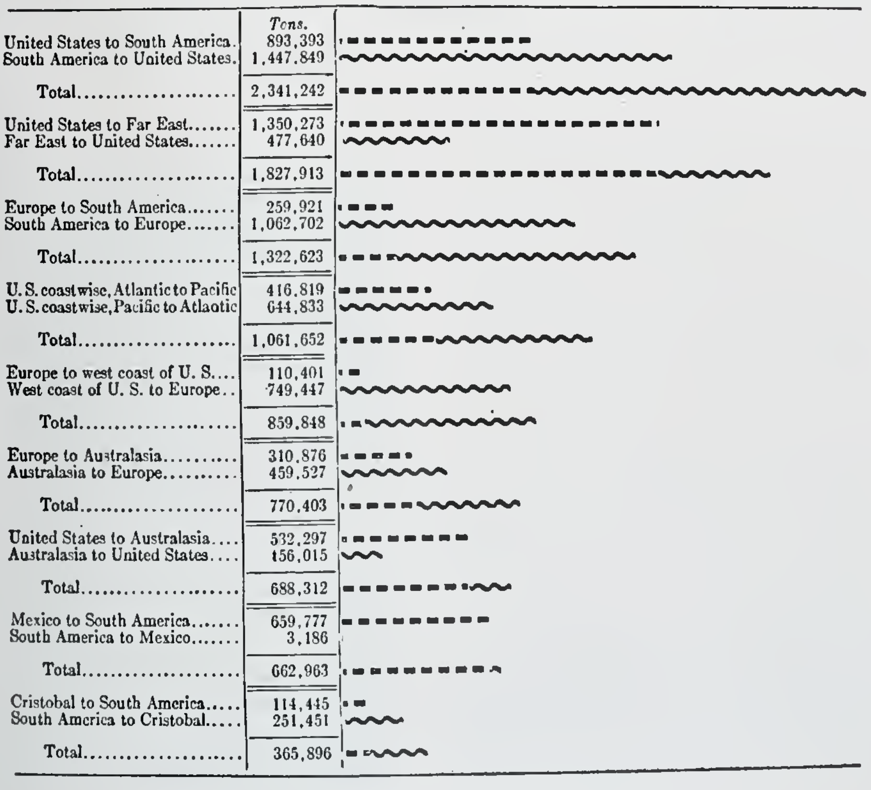
At noon Saturday, January 11, the Eclipse was abandoned. All was well that day and the next, although a heavy sea was running. At 5 o'clock Sunday afternoon a stiff gale set in, and Captain Larsen, ordering the boats to heave to, got out a sea-anchor from his craft and passed a line to the other. But just before midnight Cameron's boat broached to before a great sea and capsized. There was no hope of righting her; indeed, only through desperate struggles were the men saved and dragged into Larsen's boat. Sixteen men now were in the one craft—Larsen and his crew of eight, Cameron and his six. All of Cameron's supplies had been lost.

Boat Falling to Pieces

If the lifeboat had been in perfect order the seven newcomers would have made no great odds; but the boat was far from being in good condition: the nails fastening the plans to the knees were rusted through, permitting water to flow in, and ropes were lashed about the bottom, literally to hold the boards together. When one seam after another opened it was stuffed with whatever could be found. Two and three men bailed continuously; and all sat with their feet and legs in salt water. They became discouraged; sometimes they sat back and refused to pull at the oars. yet on the whole they behaved well.

From the time of the capsizing the crew was on short rations. As for food, there was little lack: the men had small appetites; they were not hungry: what they desired was water—water and rescue. They received daily one-half tin

Combined Cargo Movement in Both Directions over Nine Principal Trade Routes.



Graphical representation of the combined cargo movement from nine principal trade routes through the Panama Canal in both directions. See article on opposite page of salmon, two biscuits, one-fourth of a tin of tomatoes and one-half pint of water. Three times a day was the water doled out; and at night one man was detailed to sleep on the keg to guard it while the others kept an eye on him to see that he played fair.

They Drink Salt Water

Captain Larsen, that inveterate smoker, had no more water than any other man, yet he did not suffer greatly; but those who used tobacco most, he said, earliest succumbed to thirst. For four or five days they drank their stingy half-pints and remained parched and sane; then, one by one, they gave in to the maddening lapping of the sea about them, to the sparkle of the sun on mile after mile of water; gave in to the sight and sound and drank deeply.

"Why, I drank bucketsful of salt water," said one man. "I couldn't help it. I must have something; and that was all I could get." And drink the crew did, from the fourth or fifth day, all of the sixteen men except two.

Insane Frenchman Dances

But oars and sails were taking the men nearer safety with each sunset. About five days before the boat made land, a French sailor, who had been drinking salt water continuously, went mad; then followed a young American, of New Bedford, Massachusetts, and a Norwegian. All were violent though happy in their frenzy. Happiest of all was the Frenchman: in that crowded, leaking boat, almost falling to pieces, peopled by three madmen and thirteen semi-lunatics who left scarcely room to turn around, he insisted on dancing.

He had become quiet, however, when the ship was sighted, at 8 o'clock in the morning of Saturday, January 25. He was lying between the thwarts as his companions cried out that a sail was in sight. Raising himself on his knees, he stared as the men signaled hopefully and hysterically; and when the ship had passed on and the boat's crew dropped back, frenzied and exhausted, the mad, dancing Frenchman was dead. Soon after that the American boy became unconscious, and he also died that afternoon. Daybreak saw the Norwegian lying in a strained, distorted position; and his body followed the others overboard.

Coast of Hawaii Sighted

On the evening before, Friday, January 24, land had arisen from the sea, very dim and distant; probably it was the coast of Hawaii. After the ship had passed a light breeze sprang up, carrying the boat at a speed of three knots. Soon Hana was sighted; and Larsen then gave his men all the remaining water, a gallon and one-half, sufficient, even at the rate of one-half pint to the man, for about two days more. Perhaps the castaways could have indured another day thereafter without more water, and then—

In the early morning of Monday, January 27, the crew landed at Hana, after a voyage of sixteen days.

Three Marooned on Islet

Of one island wreck there is nothing whatever except the suffering of three men marooned on Pearl and Hermes Reefs. All that pertains to the loss of the vessel herself is utterly unknown, but beyond the three human ants, crawling about a sand island, is the greater catastrophe of a lost ship, guessed at, if unseen, in the darkness.

The Japanese schooner Keioho Maru sailed from Yokohama June 7, 1908, for the leeward reefs and shoals of Hawaii on a fishing voyage, so the survivors said, and a bird-poaching expedition. One month out of Yokohama, four men were sent ashore on Pearl and Hermes Reefs "to gather bird-skins. (Gathering bird-skins is merely a euphemism for that ghastly slaughter of sea-fowl on the leeward islands of Hawaii of which the Japanese have been guilty time and time again.)

Ship Vanishes After Storm

That aside, the four men went ashore with provisions for a month. Soon after the schooner had departed, to set men ashore on other islands to "gather bird-skins," a great storm arose and lasted for several days. The surmise of the four, formed when the vessel did not return, was that she had been lost in the gale; and there is no other plausible hypothesis to account for her complete disappearance.*

During the storm the men's tent was torn so badly that it was of no further use, and a hut was built of the long grass that grew abundantly on the island and of the sail of the boat in which they had gone ashore. When the weather was fair they were comfortable; they had sufficient food; the boat carried them to nearby sand-spits; but the month's provisions ran out, and no schooner appeared. Then their situation was desperate. They had fish-hooks, which assured them of a food supply fairly constant; sea-birds were to be had in abundance, and turtles crawled up on the beach to lay their eggs; water, however, they did not have.

In this emergency they hit on the scheme of evaporating salt water and condensing the steam on plates. Slow as this was, it nevertheless met their needs; until their last match was gone. Without matches they could light no fire; and without fire they could have no water.

Magnifying Glass Saves Lives

Then, by a small fortunate chance, one of the men recalled that he had a small magnifying glass, carried, doubtless, in the inquisitive, playful spirit of a boy. When the sun shone this was used to ignite grass, from which a fire of driftwood was built. When the sun did not shine, there was raw food and no water; and fishing, moreover, usually was impossible at such times.

One day the birds suddenly took flight, their mating season over, and did not return, so thus was cut off a principal food supply. The boat was capsized in a storm and broken by giant rollers, which was no great disaster, because the men were ignorant of navigation and dared not attempt to make Midway. When they had been on the island three months, one died of scurvy; the others, ill and suffering, clung to life in the desert, on that sand island three-fourths of a mile in circumference.

Sighted by Cable Schooner

Signal fires they made continuously, using for fuel timbers with which the beach was strewn, the fragments, it was evident, of vessels that had gone to pieces on neighboring reefs. No ship sighted their signals by day or fires by night; there was no white sail or trail of smoke on the horizon; until five months and eight days had passed. But at length, on December 5, 1908, the Pacific Commercial Cable Company's schooner Flaurence Ward, bound from Midway to Honolulu, appeared in the distance. Frantic signals with smoke and a piece of sailcloth brought her in.

(To be continued)

---

* In August, 1908, the Pacific Mail liner Asia, bound from Yokohama to Honolulu, sighted in latitude 33:56 north and longitude 163:25 east, about mid-distance between Yokohama and Midway, a derelict schooner, her decks awash, her masts gone, part of her bulwarks torn away; and her name, as well as it could be made out, was Kino Moto Maru. There is enough resemblance between the names of the two vessels to give rise to the belief that the derelict might have been the missing schooner. But nothing is definite.

PACIFIC COAST FOREIGN TRADE

By EDWARD N. HURLEY

The Bureau of Economics, an organization developed for the study of California's public service industries, with offices in San Francisco, Sacramento, Los Angeles, Washington and New York, is studying not only the industrial development of California but the outlet for that development through foreign trade. Under their auspices Edward N. Hurley, former chairman of the United States Shipping Board, prepared this article as a general report covering the lines along which Pacific Coast foreign trade development should take place. It will be noted that the free port idea is very prominently brought out in Mr. Hurley's analysis, and we understand that this phase of the foreign trade policy is to be thoroughly thrashed out in the present session of Congress. Pacific Coast ports should, therefore, be alive to the matter of presenting their respective claims as locations for free zones.

FOR centuries the pressure of peoples and the extension of trade relations have worked westward. First, across Asia and Europe; then across the Atlantic; and finally across the American continents. Today the peoples of the world in their westward march have circled the globe and now face their beginnings across the Pacific.

The potentialities for foreign trade for our America of the future are greater here than upon any other ocean, because in the lands bordering the Pacific lie two-thirds of the world's population.

What, then, must be done to take full advantage of the opportunities with which the people of the West are faced?

Commerce Is Barter

In the end, all commerce is barter, and goods exported must be paid for in service rendered or by goods and raw materials imported in return. In other words, there must be some balance between imports and exports, for, in the end, you cannot sell where you do not buy, and this basic fact must be remembered by every one who attempts the solution of our foreign trade problems.

Ships alone will not solve the question, nor can we expect in the beginning to flood Oriental markets with American goods simply by sending our goods across the seas. The development of foreign trade is a gradual growth and is built up shipload by shipload, and almost package by package.

The problem which the Pacific Coast faces is not a problem of putting a large number of ships into service between Pacific Ports and the Orient, but it is the problem of extending our relations with Oriental peoples little by little, a ship at a time; and then, as our goods are absorbed and as markets are found for returned cargoes, other ships can be added and our commerce will grow on a sane foundation.

Co-operation Needed

There must be co-operation between the five great ports of the Pacific. Seattle, Portland, San Francisco, Los Angeles and San Diego must all be equally interested in the success of their sister cities. They cannot progress on any other basis. The old-day bitter competition between cities has passed, and any other policy will tend to retard rather than to develop growth. Seattle must be interested in Portland's success; Los Angeles and San Francisco must work hand in hand, and traffic must develop along the lines of least resistance. Any other program will develop unnecessary dangers, while co-operation spells success for all.

Another thing. It is axiomatic that you cannot sell abroad what you do not produce, and the Pacific Coast will not benefit greatly simply as a transhipment point for Eastern products. What is required here is the building up in the Western states of a great workshop which will be for Pacific trade what the factories of New England and the North Central states are for our trade in the Atlantic; and into these western workshops, as into the workshops of New England, will flow the raw materials developed in the Mississippi Valley and the great inter-mountain territory.

Problem of Production

Comes, then, the problem of production and the forces which will turn the wheels for that production. Without coal, the Pacific Coast can turn to but two things for the development of its overseas' trade—petroleum and hydroelectric power—and until these forces are fully developed and they in turn develop products for overseas' business, the growth of trade in the Pacific will be retarded.

I am a protectionist for those American industries which require protection, and yet I realize thoroughly that ships must be loaded both ways in order to make shipping profitable and to make a balanced foreign commerce possible.

The imports and the exports of this coast must be kept on a comparatively even basis. From 1912 until America entered the war our exports exceeded our imports. During 1917 and 1918 our imports were greater than our exports, but since the signing of the armistice the trade balance has swung back to a balance of more than $100,000,000 each year in favor of export business. During the last ten years, therefore, the balance has been comparatively healthy, and it must be maintained somewhat upon the same basis.

With protection of our industries, however, we build up automatically a wall against our imports and develop a one-sided tendency in our ship operation. During the next four years, if our protective tariffs are increased materially, it will become the more difficult to build up the import business which is required to balance the export trade which we desire.

Comes, then, the need for developing in the United States a means by which we can hope to 'eat our cake and have it too," and the best method known throughout the world is the development of free port and free zone areas.

Free Zone Idea

The aim of free zoning, of course, is to create conditions permitting American manufacturers to import new raw materials from foreign countries, and within specified zones to permit the manufacture and fabrication of such materials, either for re-export or for sale in domestic markets—import duty to be paid only on that portion of such materials imported as are finally sold in domestic markets, while goods to be re-exported are manufactured within the prescribed zone duty free.

A free zone is described as a district in, or adjacent to, an existing port where activity in commerce and industry, including sorting, refining, grading, mixing, assembling, manufacturing and selling may be carried on without customs charges or needless formalities. Such territory set aside for a free port is intended to be a great market center for the transhipment trade of the region.

In a free port merchandise may be unloaded from an inbound ship, placed in a warehouse, and re-shipped at a future date without any customs formalities whatsoever, thus eliminating the cost, annoyances and red tape connected with the storage of goods in bonded warehouses.

Not only does a free port and a free zone tend to develop transhipment trade but develops direct import trade. Under the present conditions, if an importer has been delayed in obtaining necessary paper through the Customs, merchandise is sent to a bonded warehouse. This necessitates the formalities and costs of getting the goods out again before they can be shipped into the interior.

Another thing—as cheap ocean transportation is dependent upon cheap terminal costs, the turn-around of vessels in a free port would be facilitated and the consequent costs of shipment greatly reduced—this not alone to the advantage of our own business men, but also to that of our entire merchant marine.

Before the war Hamburg was the greatest free port in the world, and, as Germany was a protective tariff nation, consideration of Hamburg's growth will give some idea of what a free port and free zone would mean to the ports of the Pacific Coast. That other nations are becoming more and more interested in the development of such ports is shown by the fact that Copenhagen, Stockholm and Christiania have all been set aside as free ports by their governments.

England, a Free Port

All England is a free port, but the physical operations in the districts surrounding Tilbury Docks at London and the development of the huge manufacturing districts adjacent thereto give some idea of the development which would follow the creation of a free zone on the Pacific Coast.

Our manufacturers are all looking towards foreign markets, and, therefore, such of them as use imported raw materials, either exclusively or in part, would be able to locate the export branch factories within free zones.

This country is an importer of foreign made products which could well be assembled in free port territory, both for sale in customs territory and for reshipment to other countries. The development of such industries would create not only an addition to the industry itself, but would tend to transfer to our own ports manufacturing and assembling which otherwise would continue to take place abroad to the benefit of foreign labor and foreign capital.

In the coming years of sharper commercial competition among the nations, it is inevitable that the United States government must place American business upon the same competitive footing as that enjoyed by those protective tariff nations which have free port and free zone advantages.

But the first problem is to develop the forces which will make production possible, the conservation of your oil and the immediate development of your hydro-electric power resources. With these forces will come the ability to produce the necessary materials for foreign trade.

Then comes the problem of the free zone and the development of your merchant marine and the export and import by quantity.

In the meantime all that can really be expected on the coast is a steady growth in the marine development, and that growth should be carried on along sane, conservative lines. Develop your production and find markets for that production as the production increases. In that way the Pacific Coast will develop its own business and be not alone a transhipment point for Eastern manufacturers.

WATERSPOUTS

THE following interesting account of waterspouts encountered in the English Channel was furnished by Second Officer E. S. Davies, of the British steamer British Marquis:

"On the afternoon of December 12, 1920, during passage up the English Channel, when between Start Point and the Bill of Portland, we had the pleasure of witnessing at close quarters an atmospheric disturbance, common enough perhaps in some latitudes, but something of a rarity in that locality.

"From noon that day the wind had been blowing from northeast, accompanied by heavy snowstorms and fog, but about 3 o'clock the weather took a decided turn for the better, clearing rapidly, the snow recurring at only long intervals and the fog dispersing.

"Contrary to what might have been expected, the dense nimbus clouds were not immediately driven to leeward, but seemed to be forcibly rolled back from the southeast, the sky clearing from that direction first, the line of demarcation between clouds and blue sky eventually resolving itself above our heads in an east and west direction.

"We were then (about half past 3) in a position with the sky above the northern semicircle of our horizon densely packed with nimbus clouds, the southern one sparsely dotted with fracto-cumulus, wind continuing approximately northeast, but very erratic, and the edge of the cloud bank above our heads low and violently distorted.

"The water surface along our track became agitated in several places, and in a few minutes a number of waterspouts were forming, dispersing and reforming under the edge of the cloud bank, moving the while rapidly to the west. We took pains to avoid them, but a new one, springing into existence directly ahead of the vessel, caught us before we were able to make a detour, fortunately without harmful result—a momentary descent of wet, screaming winds and it was past. Thus learning their light and fragile character, we were encouraged in examining them at close quarters, and were struck by their many remarkable features. At first the sea appeared to be in a state of violent ebullition, then from the low-lying clouds descended rapidly swirling inverted cones of vapor, which united with the disturbance below to form what can only be regarded as miniature cyclones, the water surface being continuously lashed into a foam which ascended to the clouds in trunks of the usual spiral form, the motion of the spiral being noticeably contraclockwise in each case. The trunks were of considerable beauty, and could well be compared with the stem of an old wineglass with its delicate tracery, the most noticeable feature, however, being their cores or axes. These latter were in diameter about one-sixth that of the spouts themselves and were entirely devoid of vapor, thus forming inner tubes bounded by continuous spirals of vapor of varying shades, dark about the periphery of the cores and gradually becoming lighter forward the outer boundaries. Although normally they rose vertically from the surface of the sea, yet in their lateral progress the vagaries of the wind caused them to assume many and curious positions, sometimes inclining them to angles of large dimensions, sometimes contorting them into snake-like forms, and sometimes so violent as to destroy the continuity of the forces controlling them, causing them to break and disperse.

"By 6 o'clock the wind had shifted to the southeast and the sky quite clear.

"At a conservative estimate, we saw twenty waterspouts that afternoon, all lying in our track, and it is a remarkable fact that a companion vessel proceeding in the same direction, but distant about two miles north of our vessel, and consequently well under the cloud bank, did not encounter a single one."—U. S. Hydrographic Bulletin.

EUROPEAN MARINE NOTES

Exclusive Correspondence of Pacific Marine Review

In the publication of statistics with regard to shipbuilding we have lately had almost a surfeit. Hardly were Lloyds' December quarterly returns published in the middle of January, when there came out soon after the annual summary of shipbuilding, which forms a complement to the quarterly returns. This annual summary gives the only complete calculation, including tonnage launched abroad. It shows, by the way, that the world's production of new shipping has fallen sharply from 7,144,500 tons in 1919 to 5,861,600 tons last year, a decrease for the year of 1,282,900 tons, but yet an increase of more than 2,500,000 tons on the output of 1913, which was the largest of any pre-war year. In spite of this decrease for the world, the production of the United Kingdom last year was greater by 435,000 tons than in 1919, and amounted to 2,055,600 tons. The total exceeded that for 1913 by 142,300 tons, or more than 26 per cent. The bulk of the decrease in the world's production—92 per cent—was accounted for by the decline in the United States, just as the greater part of the increase in the world's production for 1919 was attributable to the increased construction in the United States.

American and British Conditions

Although the decline in construction in the United States was large, the production there was also large. The output amounted to 2,746,200 tons, according to the above summary, and so exceeds that of the United Kingdom by as much as 420,600 tons. Further, the United States figures last year represented 42 per cent of the world's combined output for 1920. There may at the present time be a falling off in construction in the United States, but it is not fully reflected in last year's returns. Similarly, hesitation in this country to place orders and the cancellation of contracts are not expressed in the British figures for last year. The quieter state of the industry in the United Kingdom was indicated in the decline in the tonnage under construction at the end of December as compared with the previous quarter, and the health of the industry cannot be gauged fully without consideration of the rate at which new contracts are being placed. Taking this latter factor into account, there can be no question that, as the Register suggests, the immediate shipbuilding outlook in this country is far from being as favorable as the present high figures would at first appear to suggest.

Freights

The freight market continues to be a source of severe trouble to our shipowners. There is nothing to suggest any immediate stiffening of rates. The supply of tonnage is much in excess of the demand, a situation which has been emphasized by the policy of governments in recent years in building so much shipping. The managers of shipping now afloat are endeavoring as long as possible to keep their vessels in service, but the effect of unprofitable business is becoming cumulative and there may be some sensations in sight.

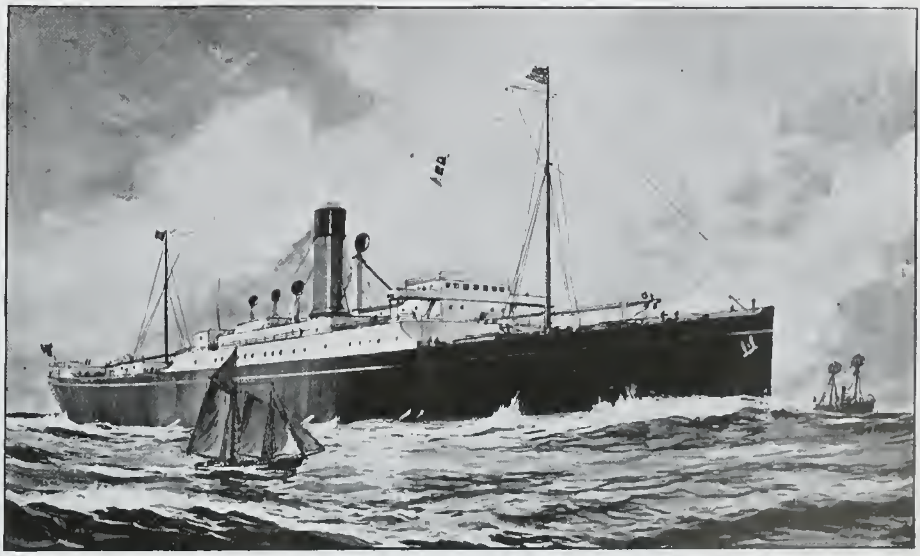
There was much closely-reasoned argument in the voluminous annual report of the Liverpool Steamship Owners' Association submitted at the annual meeting at Liverpool. It described factors which have contributed to the present unsatisfactory conditions of oversea commerce, the description seeming to lead up to the remarkable statement that:

> By the end of the year the point had been reached when the shipowner had to contemplate a loss on almost every voyage he undertook.

In a sentence immediately preceding this declaration the statements were made that during the first half of last year freights remained high, "but that they have since fallen and are still falling," so bearing in mind the conditions indicated as existing at the end of last year, it follows that the present shipping situation is serious indeed. The report points out that already, as is well known, ships have been laid up, and it adds that "this movement must increase, unless the cost of running the ships is reduced." In helping to bring about an improvement the association, in its report, looks for assistance from the sweeping away of state control, and concludes that "it is the ability of the buyer to pay that imposes limits on prices, wages and freights," and that "it is upon our success in finding willing buyers overseas for our manufactures and coal that not only our prosperity but even our food supplies depend."

Shipowners and the Pilferage Problem

Shipowners appear to be dissatisfied with the attitude taken up by the Home Secretary on the subject of the pilferage of goods in transit, and especially with the official insinuation that losses are due to looser business methods rather than to any increase in pilfering since the war. According to the head of a big steamship line, while they have, on the contrary, done a great deal towards tightening up their methods, their evidence is still that the evil is much more prevalent than formerly. Complete elimination of loss is not believed to be practicable, but a reduction to pre-war proportions is considered to be a possibility. To that end a committee which has been appointed by the Chamber of Shipping is marshaling and unifying the preventive measures that individual shipowners have taken with a view to formulating a definite policy which the chamber can recommend for general adoption. At the same time the shipping community of the port of London holds a fairly unanimous view that more police protection should be provided by the Home Office. The estimated expenditures of $200,000 necessary for this purpose is not regarded as an excessive insurance premium on the basis that $3,200,000 represents the losses by pilferage on the Thames alone, apart from losses by theft in railway or road transport or from warehouses, from claims passed by Lloyd's Claims Bureau, and from large amounts paid by insurance companies.



Artist's drawing showing one of ten freighters now building in Scotch yards for the Leyland Line. The first of these vessels, the Norwegian, has recently been delivered. They are 400 feet long and of 7300 tons gross register. Seven are due for delivery in 1921, three in 1922.

British shipbuilders have been talking a good deal since the new year opened about the impossibility of carrying on under the present circumstances. They hold that they have either got to reorganize work in some way so as to obtain better value for the money spent as wages or reduce wages. At present a forty-seven-hour week is being worked in our shipbuilding yards as against the old fifty-four, and the reduction was made on the understanding that practically as much work would be done in the forty-seven hours as in the old fifty-four. Later the fight came for a forty-four-hour week, again without any reduction in earnings. On this occasion the shipbuilding employers pointed out that the important proviso regarding the maintenance of output had not been observed. Many meetings took place between the employers and the unions and a joint sub-committee was appointed to travel and collect information. These travels were to extend to the continent and the United States, but before this part of the program was carried out a section of the trade unionists withdrew from the enquiry and so the whole matter is in abeyance.

The Shipbuilding Employers' Federation refused the demand of the unions for an extra advance of 10 cents per hour and also declined to consider favorably the question of stabilizing wages for six months ahead. The unionists who had broken away from the above-mentioned sub-committee's inquiry then advocated that the Ministry of Labor should set up a public court of inquiry into shipbuilding profits to see whether the extra money could be paid. The employers are not at all likely to agree willingly to such an official inquiry, but if they must do so they will stipulate that the inquiry should also cover questions of costs as well as profits. Shipbuilders everywhere are agreed that cheaper ships must be built if trade is to be reorganized and reconstituted.

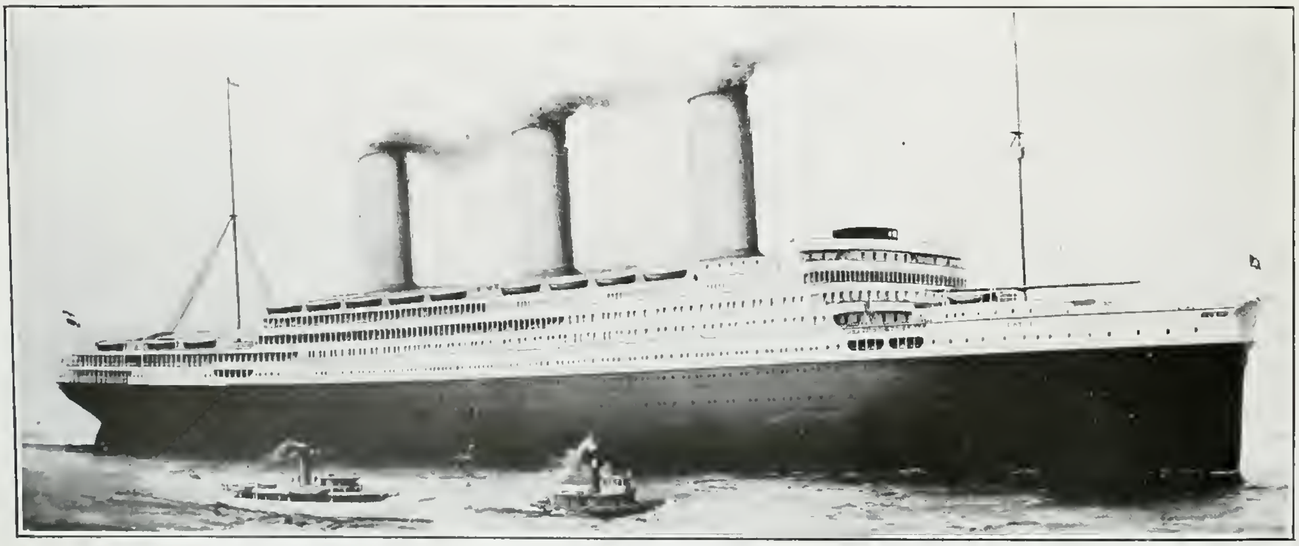
Costs of Materials

There have been so many reductions in the prices of shipbuilding materials within recent weeks that it is difficult to summarize them. Repeated "cuts" in the prices of ship plates, boiler plates, angles and bars have been intimated on the Clyde (Scotland), the northeast coast and elsewhere, while behind these there have been reductions in the prices of pig iron, Scotch hematite and other raw materials of steelmaking. Quoting a writer in the Times' engineering supplement, this adds force to the contention of the shipbuilding employers that the present is not a time when labor costs should be put upon a fixed basis. The reductions in the prices of steel have a very direct effect on wages, as in most of the districts wage rates are regulated by sliding scales which are based on the selling prices of steel, and in some areas the corresponding reductions in wages have already been intimated. The price of iron ore remains high, but the falling off in freights has reduced the actual cost, delivered at the iron works, and this has helped to bring about the decreases in the price of pig iron. With reduced wages in the steel and iron works it is impracticable for shipbuilding operatives to argue in favor of higher wages in their industry, or even to argue that they, too, should not be subject to a reduction, especially as there has been a marked decrease in the cost of living. But any proposals for a reduction will, as a matter of course, be resisted very strenuously.

With regard to prices of materials, the matter of greatest interest is how far these will have to fall before they enable shipbuilders to secure additional orders for new vessels. It is no secret that, so far, the reductions have been brought about mainly by the seriousness of foreign competition in steelmaking, rather than by the desire to improve the condition of shipbuilding trade. Steel plates have been imported in large quantities from the continent and from the United States, and delivered at the shipyards at prices lower than those quoted by home makers, while since the beginning of February there have been reports of the delivery in the United Kingdom from Germany of steel castings for boiler parts at prices lower by $20 per ton than those of British makers, and of qualities with which no fault could be found.

Norwegian Merchant Fleet

According to figures issued by the Norwegian Veritas' Register, the Norwegian fleets on December 31, 1920, excluding vessels of under 100 tons, consisted of 1850 ships, of 2,370,000 tons, or a net augmentation of 150 ships and 402,000 tons over the same date in 1919, which in turn exhibited an advance of 106 vessels of 152,000 tons over 1918. The net addition in 1920 comprised steamers for 375,000 tons and motorships for 44,000 tons, whereas the sailing tonnage diminished by 19,000 tons. New construction represented 370,000 tons of the net addition of 375,000 tons, and 325,000 tons of the new vessels were built abroad, leaving 45,000 tons which were turned out at Norwegian yards. It is estimated that the vessels still under contract for Norwegian account in other countries are for approximately 500,000 tons.



The Imperator, former Hamburg American liner, now operating under the house flag of the Cunard Line

WHITE STAR BUYS BISMARCK

THE world's largest ship, built by the Germans as the Bismarck and sold to the White Star Line by the Reparations Commission a few weeks ago, is expected to begin plying out of New York to English channel ports early in 1922, says a statement issued by the International Mercantile Marine. She will be operated under the name Majestic as a teammate of the Olympic, which for years has headed the White Star fleet.

Stripped During War

Since her launching in June, 1914, the Bismarck has laid at the docks of her builders, Blohm & Voss, at Hamburg, waiting completion. In the early months of the war her engines were installed and work was rushed toward fitting her out for service at the earliest moment following peace, which the Germans expected would come quickly. It was their purpose to make this ship the head of the augmented German merchant marine, which they expected to put on the seas as the result of a German victory in the field. As the war dragged on, work stopped on the Bismarck. Then, as the pinch came for copper and brass for use in their torpedoes and shells, the Germans stripped the great ship of every kind of fixture that would yield either metal.

Afire Last October

Early last October the Bismarck came into public notice through reports of a fire on board, which was stated by cable news dispatches to have caused considerable damage. No information was given out by the Germans as to the origin or extent of this fire. So much mystery was thrown about the incident that after a time reports began to come from Hamburg that the fire was not on board the big liner, but on another vessel of the same name. Many persons believed, however, that there had been a serious fire on the ship, and that it was started by the Germans to destroy the vessel and thus avoid delivering her in accordance with the terms of the treaty.

Since the purchase of the Bismarck for the White Star Line, certain accurate information of an official character regarding the fire has become available. This does not contain any evidence that the fire was of incendiary origin. It shows, however, that considerable damage was done. Starting below the fourth deck, in a coal bunker temporarily used as a storeroom, the blaze damaged several plates in a bulkhead between the bunker and the boiler room, and working up the side of the ship to the decks above, destroyed three staterooms on the third deck and fourteen on the second deck, the latter in the first cabin quarters. Fireproof flooring on the first deck arrested its progress.

3500 Passengers

The engines of the Bismarck are in place, with the boilers and much of the auxiliary machinery. The work of completing the installation of staterooms, and of fittings in the ship's public rooms, is also well in hand. The ship's decorations and furnishings will be installed in the White Star Line style.

When completed the Bismarck will have capacity for about 3500 passengers and a crew of approximately 1250, or if fitted to burn oil as fuel, about 1000, the difference being in the number of fireroom attendants required. Her probable passenger capacity will not be far from the following First class, 990; second class, 544; third class, 934; fourth class, 1068. This was the former passenger capacity of the Leviathan, and although rated slightly larger, the Bismarck is a sister ship, having been built from the same plans. The breadth and depth of the ships is the same, namely, 100 feet breadth and 57 feet depth, with a draft of water of 38 to 40 feet. The Bismarck is stated to be 12 feet longer than the Leviathan, or 912 feet. Her engines are turbines, like the Leviathan's, and her speed will be about the same, 22 knots. Her registered tonnage, being based on the cubic contents of her hull and deck structures, cannot be determined until the ship is completed. It should be about 56,000 tons. That of the Leviathan is 54,282 tons, and of the Olympic 46,439 tons.

The Bismarck will be the second Majestic of the White Star Line fleet, the original vessel of that name, launched in 1889, having been one of the most popular ships in trans-Atlantic service for a generation. She was broken up in 1914, the year the Bismarck was launched, and the metal of her hull and machinery was recast in guns and shells.

Thirty years ago the old Majestic crossed the Atlantic in 5 days, 18 hours and 8 minutes, which is not so much slower than the Mauratania's 1920 record of 4 days, 10 hours and 41 minutes, in view of the great advances in propelling machinery made since 1891.

Another large liner, the Imperator, also has been disposed of, to the Cunard Line, which had operated her for the British government, having taken her over. She is the largest vessel under the British flag and the largest in the world in active service. She is of 52,200 tons gross, with a length of 883 feet, beam of 98 feet and depth of 63 feet. She has always received special attention because of her large proportions and luxurious accommodations. The name of the Imperator has been changed to Berengaria.

A. P. ALLEN

MR. A. P. ALLEN, who is now superintendent of the repair and dry dock department of the Federal Shipbuilding Company, was formerly chief engineer of the West Coast plants of the Bethlehem Shipbuilding Corporation and was commandeered in the fall of 1917 by the United States Shipping Board and sent to Washington as assistant manager to Robert L. Hague of the Department of Construction and Repairs, Division of Operations, where he was also chief engineer.

Mr. Allen was stationed in Washington until his resignation in October, 1918.

Mr. Allen started out in the shipbuilding business in the machine shops of the old Neafie & Levy Ship and Engine Building Company, Philadelphia, and from that organization went to Newport News when the plant there began operation and remained in the shops and drawing office during a period of eight years. In 1889 Mr. Allen went to the west coast and was connected with the Union Iron Works. Later he went to Seattle with Moran Brothers Company, where he had charge of the designing of the engineering work of the battleship Nebraska. Subsequently he was engaged in general contracting and engineering business, at which time he was also superintendent of a local shipbuilding plant.

At the beginning of the shipbuilding boom of 1914, Mr. Allen became connected with the Bethlehem Shipbuilding Company, San Francisco.

LINERS FOR "THIRD CLASS"

TWO interesting steamers, the Mount Carroll and the Mount Clinton, were successfully launched recently at the Chester yard of the Merchant Shipbuilding Corporation. Both of these vessels are for the United American Line's New York-Hamburg service and they are the first vessels to be built in the United States exclusively for third class, trans-Atlantic, passenger traffic.

The original design of these vessels covered the construction of a three-decked cargo vessel of the following dimensions:

Length, O. A.	457′ 0″
Length between perpendiculars	440′ 0″
Beam Molded	57′ ″
Depth to Shelter Deck	57′ 0″
Draft	28′ 9″
Deadweight	10,500 tons

Passenger Accommodation

As completed for emigrant service vessel will have accommodations for 1294 passengers and a crew of 141. The space between upper and shelter decks contains 20 two berth rooms, 94 four berth rooms, 12 six berth rooms, 2 eight berth rooms and one open compartment with 28 berths. Men's and women's general hospitals and infections wards, dispensary and room for hospital attendant are located in this deck space. Main dining saloon, galley, bakery, butcher shop, pantries and a dietary kitchen are on the upper deck.

Quarters for 762 passengers are provided in the five compartments on the lower deck. All of this space is made available for carrying cargo by the removal of berths and stanchions.

An auxiliary dining saloon and a small bar room were provided on shelter deck by extending the deck house.

Access to passengers' accommodations is provided by means of stairway from auxiliary dining saloon and booby hatches placed in the corners of cargo hatches.

Accommodations for officers are provided in deck houses amidships. Crew's quarters are situated aft on upper deck and stewards and other members of commissary force are berthed amidships on lower deck.

Refrigerator, linen rooms and store rooms located in No. 3 hold and on flat built here especially for this purpose.

All parts of the accommodations are heated by steam and, in addition, a forced system of ventilation is provided.

The sanitary arrangements, washrooms, etc., are in accordance with the latest practice and of ample size.

The refrigerating system consists of two 8-ton ammonia refrigerating machines located in a gas-proof compartment off the engine room, and arranged to operate on the brine circulation system, thus eliminating the danger of ammonia fumes getting about the ship. Either one of these machines has sufficient capacity to maintain the desired temperatures in the refrigerating rooms, which eliminates the risk of provisions spoiling, due to a breakdown. The refrigerator rooms are large enough to carry sufficient provisions for a round voyage without replenishing.

Machinery

Propelling machinery consists of geared turbines of 4200 shaft horse power in conjunction with four oil fired Scotch boilers, with which a speed of 14 knots is expected.

The vessel has oil bunker capacity for 9500 miles, which will permit her to make a round trip without re-fueling and with ample reserve.

For cargo handling there are eight 8¼x10 steam winches for handling general cargo and two 10x12″ compound geared winches at the forward hatch for handling heavy loads in conjunction with a 30-ton boom.

For lighting, and furnishing power to various small motors and fans, there are three 20 K. W. electric generators in the dynamo room, each direct connected to a steam engine. One of these generators is a spare. There is an 18-inch searchlight mounted on top of pilot house, and ample lighting fixtures distributed throughout the passengers' and crew's accommodations and also on deck for handling cargo at night. In addition to the steam generators there is a 15 K. W. emergency generator located on the bridge deck, connected to a gasoline engine, and arranged for lighting the accommodations and decks for operating the wireless in case of accident in the engine room.

For fire extinguishing, a system of steam smothering is provided for the cargo holds, and hose lines are provided for reaching all parts of the decks and quarters, connected to a large steam fire pump in the engine room. In addition to this there is provided an automatic fire detecting system for giving the alarm and location of a fire in any part of the vessel.

The United American Line's S. S. Mount Clinton just after launching

Shipping Briefs

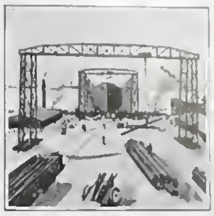
An office has been opened at 42 Broadway, New York, by the Atlantic-Gulf & Pacific. Vessels of the line will berth at Pier 25, North River.

The O. S. K., through McCormick & McPherson, Pacific Coast agents, has announced the resumption of calls at Havana, suspended because of congestion at that port. The first vessel will be the Hamburg Maru. The O. S. K. has announced a new around-the-world service between Calcutta, the Suez, New Orleans, San Francisco, Yokohama, Kobe, Dairen, Shanghai and Singapore. Heretofore the Calcutta-New Orleans service was over the same route as the Japan-Pacific-Panama-New Orleans line. No calls will be made at South African and South American ports.

Representatives of the Australian government have sued the Pacific Motorship Company and the Pacific Freighters Company, applying for receivers for both companies. The Commonwealth recently sold its eight wooden motorships to Pacific Motorship, which were to be paid for in bonds had not the creditors of the company stopped the issue.

Fred L. Waldron, Ltd., Honolulu, has been appointed agent of the China Mail, succeeding Castle & Cooke.

Material Handling



NEW MACHINERY DEVELOPMENTS

IN last month's article on developments in the installation and application of material handling machinery we occupied the greater part of the space given to us in Pacific Marine Review for this subject in a trip around various ports in the world and on the eastern seaboard of the United States. Apparently many of our Pacific Coast readers thought that we were neglecting our home waters, for there has come into this office during the past thirty days quite a number of stories in connection with specific installations of machinery at various Pacific Coast ports. We will, therefore, start this article with accounts of port developments along the Pacific slope, and if there is any space left, tell some of the doings of our neighbors across the water.

Large Lumber Crane

From Tacoma there comes the news of a contract placed on January 13 with the Colby Steel & Engineering Company for a large gantry crane especially designed for the loading, unloading and assembling of lumber on the port of Tacoma open pier No. 1. This installation is said to be one of the largest commercial cranes of its kind in the United States, if not in the world, and it will load ships at the rate of 300,000 board feet per eight-hour day and will enable the port of Tacoma to make very attractive rates for this class of service. The crane can also be used to very good advantage for handling cargo to and from ships, barges and lighters and for handling structural steel plates, rails, etc. The dimensions of this crane are shown in the illustration. The entire structure is being designed and built at the plant of the Colby Steel & Engineering Company, who have specialized for many years in handling equipment for lumber mills and industrial plants.

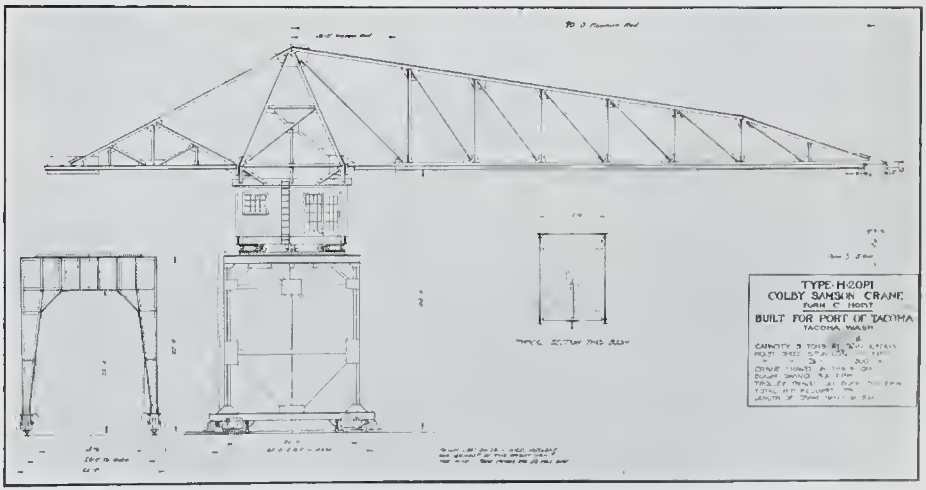
Car Unloader

The port of Portland reports the installation at their new No. 4 terminal, Pier No. 5, of a box car unloader and loader which was supplied by the Ottumwa Box Car Loader Company of Ottumwa, Ohio.

This unloader is of the rocking cradle gravity type and is used in connection with the very complete conveyor and storage bin system which had been installed on this pier, the entire system making it possible to handle bulk material to and from cars and boats without the necessity of any manual labor. The machine handles either open or box cars, and this flexibility makes it possible to transfer bulk materials from box cars to open cars, from open cars to box cars, or from either type of car to and from the bins or to and from vessels alongside the pier.

The unloader is mounted on a foundation set in a pit approximately 19 feet deep from the top of the rail, 72 feet long, and 17 feet between the walls. The main part of the machine consists of a steel cradle approximately 70 feet long and 15 feet wide constructed of plates, angles and beams and having circular side wings or rockers which act as a track, permitting the cradle to be tipped on end. The cradle is carried on eight large steel rollers. The rails onto which the car runs are mounted on a deck which is hinged on one side and can be tipped by lifting on the opposite side through pin racks operated by power driven sprockets. In operation the car is mechanically centered on the tracks on this deck and held in position by "grabbers," these grabbers when not in use disappearing in small pits at each end of the cradle. When the car is run onto the tracks on the deck the grabbers are raised and travel simultaneously toward each other until they center the car on the cradle and hold it centered by means of steel pawls working on a ratchet bar. The grabbers are constructed with a head that fits over the car coupling and acts as a safety device to prevent the car from overbalancing.

A 75-horsepower motor supplies the power for tipping the cradle endwise. A 50-horsepower motor operates the side tipping mechanism, and a 20-horsepower motor is used to work the grabbers. As the car is tilted to the side, a car door opener operated by compressed air is moved against the door and the same is held up outside until the unloading is completed. A telescopic chute worked by a small air cylinder is pushed against the side of the car at the doorway and below the floor, and as the car tips sideways this chute, forced back against the air pressure into the stationary chute, is held firmly against the car and the material is prevented from spilling. In operating this machine the car is tipped to the side first at an angle of from 15 to 24 degrees. As the grain or other material begins to run out freely, the operator starts the motor which tips the cradle endwise, and when the material in the high end of the car has pretty well run out, the cradle is tipped in the opposite direction and the car is cleaned except for a small portion of the material which may have



Colby Samson crane built by the Colby Steel & Engineering Company for the port of Tacoma run past the door on the second tipping. Another reverse tip cleans the car completely. Box cars are unloaded in from five to nine minutes. The installation of this mechanism is the finishing touch to what is said to be one of the finest piers on the Pacific Coast.

Greatest Ferry System

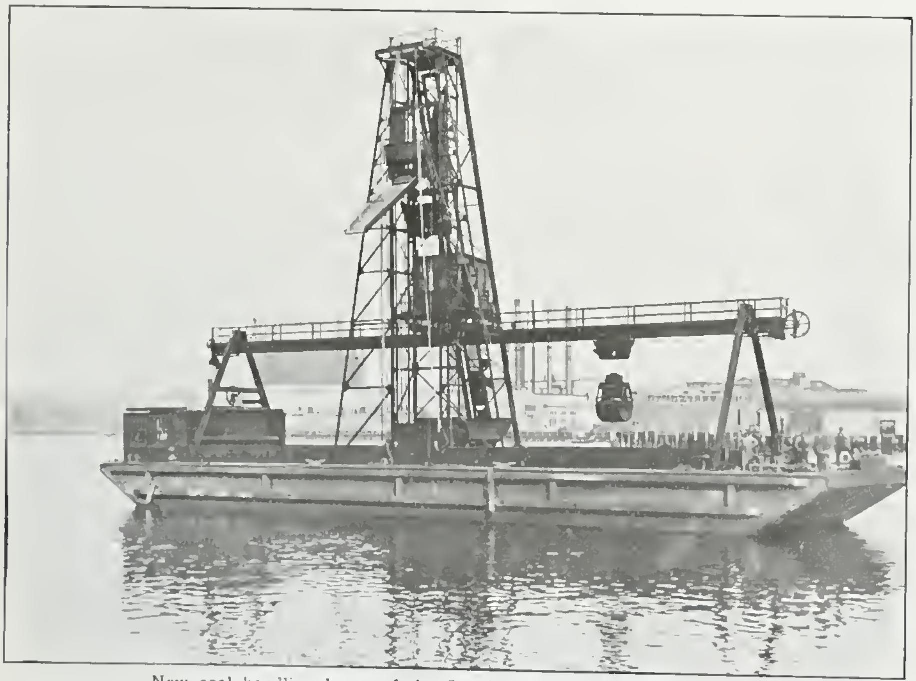
The Southern Pacific Company has recently issued the annual report of its ferry system across San Francisco Bay which was used during 1920 by 27,000,000 persons. To quote the report, "The only cause of mishap that has evaded the Safety First measures installed on this ferry system is the high heel worn today, which occasionally causes feminine passengers to stumble on the stairs." Not a single casualty of any kind has occurred in the transportation of these millions. The Southern Pacific ferry system as now operating on San Francisco Bay is the largest system of its kind in the world, and more people pass through the ferry station in twenty-four hours than pass through any other station in the United States, the figure being exceeded only by the Charing Cross Station, London.

But we are getting off our subject, passenger traffic not belonging to material handling. The ferry report, however, does mention one piece of material handling apparatus characteristic of San Francisco Bay which has often been noted by ferry passengers for its ease of operation and general efficiency. The company notes in its report that the seagulls of San Francisco Bay have such a broad catholicity of taste and are so efficient in the handling of materials that it has been found necessary to fasten the glass in the windows of the Ferry Building with strips of metal instead of putty, the seagulls removing the putty about as fast as it can be applied. An investigation is now being carried on to discover whether the putty is used by the seagulls as food or as a building material.

San Francisco Harbor

In a recent issue of Pacific Marine Review we described at some length the new freight transfer warehouse which the Board of State Harbor Commissioners of the port of San Francisco proposed to build on the north side of Channel Street. A rather interesting angle has developed in connection with this proposal through the action of the warehousemen of San Francisco who have endeavored to pass through the state legislature a bill preventing the Board of State Harbor Commissioners from going into the warehousing business. This seems to us very short-sighted policy on the part of the warehousemen and undoubtedly will be so adjudged by the state legislature. Any action on the part of the harbor commissioners which will expedite matters on the waterfront will be of benefit not only to the warehousemen's business, but to all business in San Francisco, and the erection of this warehouse on Channel Street should prove in the long run of tremendous benefit to every warehouse along the waterfront. It is to be hoped that our friends the warehousemen will see this matter in the proper light and withdraw their opposition. Cooperation on their part would be far more effective.

We are glad to be able to illustrate the completed new coal handling barge of the Standard Coal Company, whose plant on the Oakland estuary and contemplated barges were described in a former issue. These barges are built of steel throughout, the framing and plates having been sheared to specifications and punched at the mills of the American Bridge Company, Ambridge, Pennsylvania, and assembled by the J. G. Williams Construction Company of San Francisco at the Standard Coal Company's plant on the Oakland estuary. They are 138 feet in length, 35 feet in width, and 12 feet molded depth, with a coal capacity of 900 tons.


New coal handling barge of the Standard Coal Company of California

As will be seen in the illustration, the superstructure carries a longitudinal beam from which an electric trolley operating a grab bucket is suspended. The coal bins in the barges are so constructed as to be self-trimming so that the grab bucket can clean the bin practically without manual labor. The grab bucket carried by the trolley is discharged into a central hopper which in turn discharges onto the elevator buckets in the tower. The tower has a height of 66 feet above the deck of the barge, and its elevator mechanism will have a capacity to handle 100 tons of coal per hour. The height of the tower is such that its adjustable chute can be raised sufficiently to feed the bunker openings of any vessel that comes into San Francisco harbor. Power for operating these barges is supplied by crude oil engines driving electric generators.

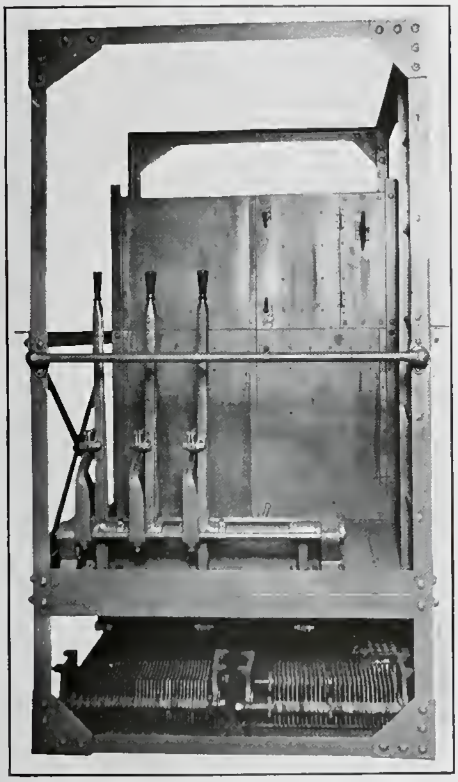
Equipped with two of these barges and with the large gantry crane at their coal storage yard, the Standard Coal Company of California offer excellent service to steamers bunkering at San Francisco.

We have described three rather large and unusual material handling installations. One feature—the electric drive—is common to all, and it is rather a peculiar situation in American material handling engineering that while in practically all material handling on shore or on docks electric power is used, practically all machinery used for this purpose on shipboard is steam driven. A generation ago American material handling engineers were laughing at their British and European cousins, who were at that time using hydraulic power for the greater part of their crane and dock machinery. We were going all to electric, and we have during the last generation converted all of the Europeans to the same idea, so much so that they have gone farther than we in that they are now putting on all of their ships electric power for winches, windlasses and capstans, while we are still using what might be termed hot or warm hydraulic engines for the great bulk of our merchant marine deck power.

Navy Deck Machinery

The United States Navy, however, has led the way in the matter of the application of electricity to all auxiliary machinery on seagoing vessels, and Californians will be interested in a few particulars of the material handling machinery being installed on the new battleship California.

The S. Flory Manufacturing Company of Bangor, Pennsylvania, are supplying four electric deck winches for this ship. These are compound geared, the winch heads being 18 inches in diameter on the barrel, 24 inches outside diameter, and 20 inches long and they are driven by a 45 H. P. General Electric fully enclosed motor which is equipped with solenoid brake and full magnetic control, the master controller being mounted on the winch. The machine is designed for a rope pull of 20,000 pounds at a speed of 50 feet per minute on the low gear or 5000 pounds at 200 feet per minute on the high gear. A safety device is fitted, which locks each gear into position in such a way that it is impossible to shift when the motor is running. All of the gears are fully enclosed. All wiring is installed under the deck and brought through cored holes in the bedplate at various terminals. The design of the winch is such that it is slightly under 40 inches in over-all height and, being mounted on a single massive bedplate, it is very well adapted for fastening to ship structural work.

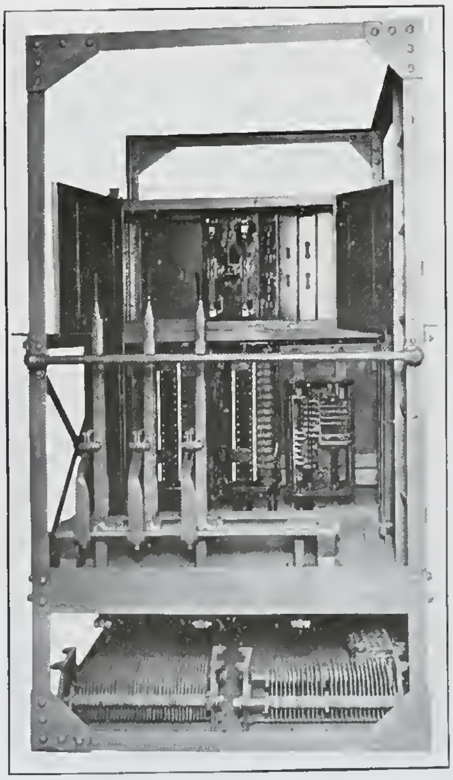


New crane cab with all electrical connections enclosed

It is now possible to obtain from American manufacturers standard electric apparatus to meet all the requirements of merchant marine deck machinery, and in view of the economies that may be effected by its installation, all steamship operators who are contemplating new tonnage should look carefully into this matter, especially those who are working in northern latitudes where for long periods of the year steam cargo winches, windlasses and capstans run inefficiently as hot water rams.

A new refinement in the design of cranes has come to us from Pawling and Harnischfeger Company of Milwaukee in their new crane cab, which is illustrated in the two views herewith. As will be noted, all of the electric control parts are enclosed in a cabinet, and the levers are arranged to operate radially in a line parallel with the length of the crane and are placed at the front of the cab, allowing the operator to have an entirely unobstructed view so that he can see the position and movement of the crane hook, the signals of the floor men, and the entire floor of the shop as the crane travels along the runway. As shown in the illustration, while thoroughly enclosed, all magnetic control parts and resistors are readily accessible.

Mr. Letson Balliet, chairman of the Inner Harbor Committee of the city of Oakland, has recently proposed some very common sense plans for the improvement of Oakland's inner harbor. In a letter addressed to the Harbor Development Committee of the Oakland Chamber of Commerce, of which the Inner Harbor Committee is a subsidiary, Mr. Balliet points out the objections to the ordinary pier construction in Oakland's inner harbor.



New crane cab with cabinet open

The pier head line in the Oakland estuary is approximately 400 feet out into the channel from the quay wall, which is already built along the shore line of the estuary for 1950 feet. The letter points out the absurdity of blocking up the channel with projecting piers at which no large freighter could dock without having an end projecting into the channel beyond the end of the pier, and proposes that a skeleton wharf of concrete piling be built extending along the quay wall and of sufficient strength to support large warehouses for its full length; that these warehouses be built of skeleton construction for the first story to a height of from 26 to 28 feet so that railroad trackage could be operated to all parts of the wharf surface.

The wharf in the outlined plans would be 300 feet wide, leaving a berthing space 100 feet wide for steamers, from which it would be much easier to maneuver into the fairway of the channel than from projecting piers.

The warehouse would extend to within 30 feet of the water's edge, leaving room for two or three standard gauge railroad tracks which would be spanned by gantry cranes so that freight could be handled from vessels lying at the wharf either directly to open or box cars on these tracks, to loading platforms on the wharf's surface, or to any floor of the warehouse above, the warehouse to be built as many stories as desired with suitable elevators and with gantry crane on the roof of sufficient capacity to deliver general cargo to all floors or to and across the roof of warehouse.

We are in receipt this month from the northeast coast of England of some very interesting records made there in the unloading of United States Shipping Board vessels. These are sent by Hobbs, Linsley & Co., Ltd., of Grimsby, agents at Immingham, England, for the steamer Eastern Sailor.

This vessel arrived at Immingham with a cargo of railway ties and crossings. Hobbs, Linsley & Co. put on her the stevedoring firm of Jacob Pickwell & Co., Ltd., and in 60½ hours' working time unloaded 4,207,200 feet, board measure, an average per hour worked of 69,540 feet, board measure, or 116½ loads. This is said to be a record for this class of work in Great Britain and is all the more meritorious considering the fact that there was a compulsory stoppage on one hatch for three and one-half hours owing to a breakdown of cranes, this time being included in the 60½ hours mentioned above.

APPRAISAL OF TERMINAL PROPERTIES

By H. McL. HARDING
Consulting Engineer of the State of New York on Barge Canal Terminals

THE seaboard, the Great Lakes and river cities in their designing for port terminals often find it necessary to appropriate or condemn privately owned upland or underwater land, so as to be able to complete correct plans for terminal construction. A broad, comprehensive design may include in its unification small obsolete wharves, piers or unimproved waterfronts.

The question immediately arises, what value shall be placed on such properties, as evidently due to their location and the number of available waterfronts being limited, the ordinary rules of real estate valuations, as the Hoffman or other rules, will not here apply. Also it is not alone the number of feet of waterfront which affects the value, but the depth of the property and its topography. The value of such properties depends upon their income-producing power, which for a terminal is in general more than for any other utilization.

It may be ascertained that the property, due to its location, is not suitable for a terminal or that the cost of making it a commercial terminal would be so much as to greatly reduce its earning power. For instance, there may be too strong a current, as at the Gainor Park Terminal, East River, New York, or there may be rock of such hardness as to cost enormous sums for dredging, as at "Black Tom," New York harbor.

From the above, as well as from many other reasons, it is evident that there are many engineering problems connected with the appraisal of waterfront property. Furthermore, comparisons of properties or recent sales along the same waterfront may not be criterions of value, due to differences of physical characteristics, or possibilities of terminal development. An economical improvement of land under water clearly depends upon terminal engineering.

There is now arising a demand for terminal facilities for waterborne freight and this demand is not confined to any one section of the United States, but in front of nearly every ocean or inland city where there are inquiries for terminal locations by the Federal government, the states, municipalities, corporations and private individuals. The state of New York has condemned many properties for barge canal terminals.

Taking into consideration the conditions during the past ten or twenty years, it is self-evident that waterfront properties must not be appraised or valued according to the usual practice of referring to former waterfront sales. There should be adopted the other method of basing values upon its evident utility—that is, upon its earning power. Also, the value should be based upon the number of square feet to be used for the terminal and not upon the number of so-called city lots.

This change at the present time of valuing is largely on account of the great variations in the sales prices or in bona fide offers occurring daily, so that it is exceedingly difficult to ascertain with exactness correct values, especially under condemnation proceedings. While records of sales of properties having nearly equivalent locations may serve as a partial guide, yet there are many considerations affecting values so that such sales should be used for comparison with great caution.

The following are some of the features which have or should have influence on appraisals:

1. The size of the area as an undivided whole.

2. The length of the waterfront and its width in proportion to its frontage length. Certain relative proportions of the above lengths and width give the greatest value.

3. The position of the Federal government pierhead and bulkhead line in relation to the whole property and the possibility of modification.

4. The possibility of projecting suitable piers into the waterway and the number of piers and slips of commercial width that can be constructed.

5. The present depth of water along the present or proposed quay line or piers and the depth required.

6. The number of cubic yards of dredging and the character of the bottom to be dredged.

7. The character of the subsoil and its pile sustaining power.

8. Is the construction of a marginal way of sufficient width for railway tracks and drayways feasible? The present drayage requires wider marginal ways.

9. Is there sufficient room for transit or transshipment sheds of proper dimensions parallel to the frontage of the quay or the pier?

10. Can warehouses or manufacturing lofts be constructed in correct relation to the waterfront or the transit sheds?

11. Are there good roads affording easy rail or dray approaches to the terminal?

12. Can there be railway tracks or drayways along the waterfront so as to secure the all-important direct co-ordination between vessel and shore?

13. How many ship or barge units can be laid out along the available waterfrontage?

14. What is the possible space for bulk or coarse freight?

15. Annual tonnage transferring capacity per linear foot.

16. Character of the soil to the rear of the bulkhead in respect to securing stable foundations for superstructures.

17. Determination of the best type of superstructure, whether of the crib, concrete wall or relieving platform type.

18. Distance from the civic centers for the origin or consumption of freight.

19. Specifications and cost estimates for initial improvements.

20. Possible gross and net income and percentage return from the total investment.

21. In relation to underwater lands unfilled. Water area from the bulkhead line to the pierhead line is a public highway and no right to ownership exists for determining values. Slip areas have a value even though no ownership exists.

22. Sewers, slaughterhouses and other nuisances may have an influence on terminal values.

23. For comparison with adjacent waterfront sales, such properties must be similarly situated with like physical characteristics.

24. The nearness of the terminal to elevated, subway or trolley lines and the proximity of a labor market have an important influence on its value.

25. The value is also increased if the property is practically necessary to the municipality or to some company or individual other than the owner for a contemplated improvement.

26. Its value is also dependent upon its nearness to barge, lighter or harbor craft traffic.

27. The size of the population, of its hinterland and their consuming capacity, and the volume of tonnage and value of the traffic passing by its waterfront, should affect its appraised value.

28. The elevation of the land terminal area, whether level or on grade, whether it should be excavated or filled, and what expenditures would be necessary to make the land area suitable for terminal purposes should be considered in the appraisal.

THE THERMOS BOX

A REPRESENTATIVE of Pacific Marine Review has just had a very interesting and instructive interview with Captain A. P. Lundin of the American Balsa Corporation, who is at the present time in San Francisco looking after the numerous contracts which his company has for installing its system of insulation in the refrigerator cargo spaces and for other uses on board ships now building in Pacific Coast shipyards.

Many years ago while cruising in the tropics the captain noticed the wonderful buoyancy of the rafts used by the natives of Ecuador, and found on inquiry that these rafts were built from the logs of a tree popularly known as "balsa" (Spanish for raft) and that this tree was one of the commonest second growth trees in the equatorial jungles of Central and South America. The captain made mental note of this remarkable wood and also of the fact that it was in its natural state very subject to quick decay and could not be protected by ordinary painting or any of the methods then in use.

In 1906 Captain Lundin, having given up his seafaring life, formed a connection with Mr. Axel Welin and organized the Welin Marine Equipment Company handling the Welin quadrant davit and other life-saving devices. Remembering his experience on the Ecuador coast, he obtained a quantity of balsa wood, and after long experiments finally discovered the proper method for permanently waterproofing this material. Balsa wood, so treated, was approved after exhaustive tests by the United States Board of Steamboat Inspectors, and after complete demonstration of the feasibility of the use of this material for many life-saving purposes at sea, the American Balsa Corporation was formed and built up an immense business in A-B-C rafts.

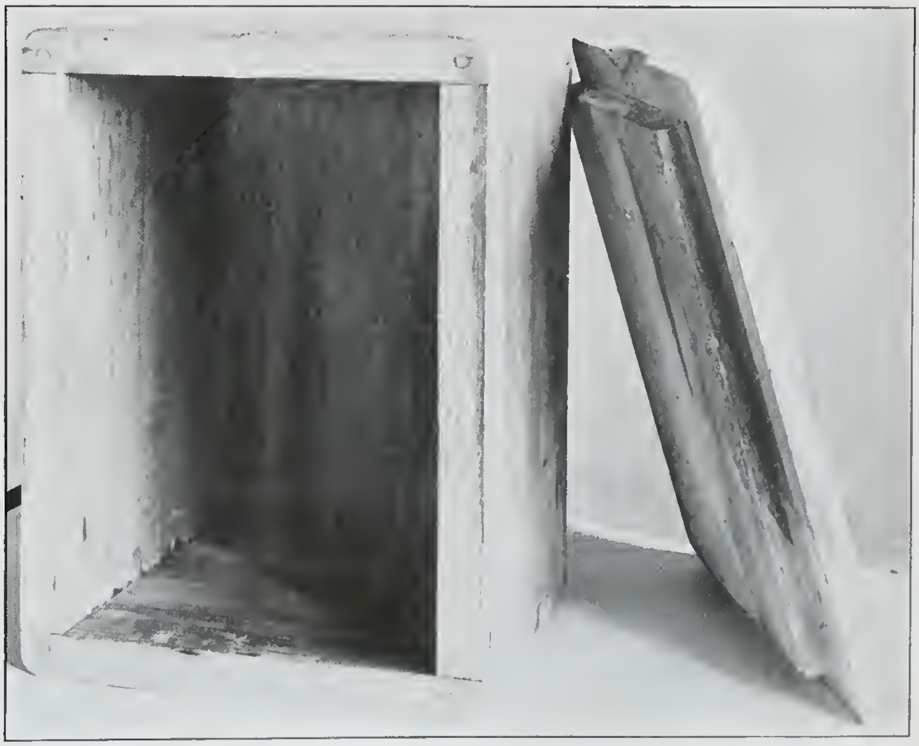
The commercial application of balsa was interrupted by the war and the requisitioning of practically all balsa supplies for various lines of government work. Prior to the outbreak of the war, however, it had been found that balsa wood, due to its peculiar structure, had great value as an insulating medium in refrigerative engineering; in fact, tests had shown that its power of thermo insulation was higher than that of the best materials then in commercial use. This quality, combined with its very low specific gravity and comparatively high structural strength, indicated to the engineers of the American Balsa Corporation a great field of practical application in many lines of industry. The corporation, therefore, carried out extensive research work and investigation for the purpose of insuring its supply of the material, and great tracts of land suitable for the culture of balsa trees were obtained and planted.

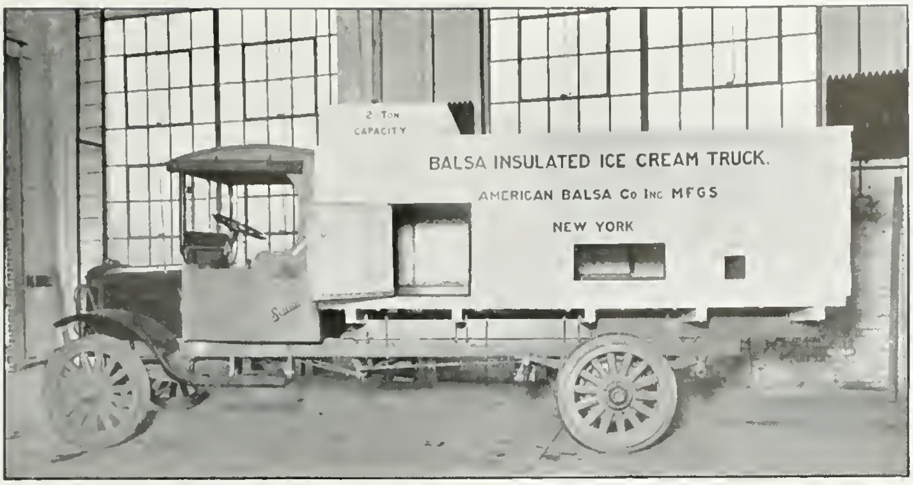
Photograph taken at the plant of the American Balsa Corporation, showing the ease with which large balsa timbers are handled.

To the botanist balsa is known as ochroma lagopus and bears a decided resemblance to our ordinary cottonwood. It is remarkable for its quick growth, the United Fruit Company having records showing a growth from the seed to a tree thirty-six feet high in one year, and Professor Rowlee having made many measurements showing an average increase in diameter of five inches a year.

Balsa logs show no annular markings, the growth being continuous. When dry, balsa wood weighs from six to ten pounds per cubic foot, while cork weighs dry thirteen to fifteen pounds per cubic foot, and spruce, when properly seasoned, weighs twenty-six to thirty pounds per cubic foot. Exhaustive tests have shown the strength of balsa to be fully one-half that of spruce.

While in connection with its use during the war balsa wood furnished by the American Balsa Corporation was undoubtedly the means of saving a very great many lives at sea, both of civilians and in both branches of the military service, undoubtedly the doughboys will remember longest and most gratefully its use as the "thermos box." A tremendous amount of difficulty was experienced early in the war in providing supplies of cracked and shaved ice for surgical and other purposes at the front. The American Balsa Corporation fitted up balsa bodies on trucks of the various sizes fitted to contain nicely a number of small balsa containers filled with cracked ice. It was found that these small containers, when properly constructed and with tightly fitting covers, would keep the cracked ice in very reasonable condition for eighteen hours or more, and the trucks so equipped would run up to the nearest distributing point and the small containers would be carried by hand to places of use. This use of balsa originated as a wartime measure is now being followed up in com-


New balsa shipping box and cover. This box has shown very unusual thermo insulating qualities and will keep perishable foods in a chilled condition for thirty-six hours



A two and one-half ton ice cream truck insulated with balsa

mercial work, especially in connection with the shipping of perishable foods by parcel post or express.

The illustration herewith shows the construction of what we are pleased to call "the thermos box". It is made of thick sections of balsa wood dovetailed at all corners and with corners rounded off and hardwood dowels or treenails set through the dovetailing at each corner. The cover, as will be seen in the illustration, is made to fit very tightly into the box with a flange covering the box edge. The boxes are shipped with the cover secured by a wide strap of canvas on which the shipping directions are pasted, and the package is returnable in the same way as egg crates. Food is packed into these boxes in cold storage rooms, the box having been thoroughly chilled, and under these conditions the box will keep the food at the same temperature for thirty-six hours, irrespective of external conditions. The weight of this box, notwithstanding its bulky appearance, is much less than that of the ordinary wooden box of the same capacity.

The new Shipping Board liner Golden State, which is now in service under the management of the Pacific Mail Steamship Company running from San Francisco to the Orient, has several of its cargo holds equipped for refrigerated freight carriage. These holds are insulated with balsa, which is of especial value for this purpose on account of its light weight and great strength as compared with other known insulating mediums. Because of its strength balsa can be used for this purpose without wood or other lagging, and consequently in the installation of refrigerating holds in cargo vessels balsa saves about 50 per cent of the weight, as compared with other insulation, and saves also a considerable amount of valuable cargo space. As balsa can be installed with a minimum of joints, it eliminates practically all leakage. This material is held in such high estimation by the United States Shipping Board that its use has been specified in insulating the refrigerated cargo space in all of the 15 vessels of the Golden State or "535" class.

At the present time on the Pacific Coast there is a number of installations under way of refrigerating cargo space in merchant vessels, among which may be mentioned the two freighters, Manulani and Manukai, building for the Matson Navigation Company at the Moore Shipbuilding Company's yard.

Practically every tanker building on the Pacific Coast at the present time is using this material in the insulation of its refrigerating spaces for stores, and on several tankers it has been decided to use a new application of balsa wood in insulating the crew's quarters.

Ford truck fitted with ice box of balsa and small balsa containers for carrying cracked ice

The steamer Avalon showing equipment of Lundin balsa-protected lifeboats. This steamer, which is used in tourist excursion traffic between the port of Los Angeles and Catalina Island, has an unusually large supply of balsa A-B-C rafts

TWO "SOUTHWESTERN" TANKERS

THE Southwestern Shipbuilding Company, East San Pedro, California, has recently delivered to the Union Oil Company the 12,000-ton tanker Montebello after very successful trials. The Montebello is the first of two duplicate tankers building at this yard. The second ship, the La Placentia, will be delivered in April.

These vessels have an over-all length of 457 feet, a length between perpendiculars of 440 feet, and beam molded of 58 feet. They are of the shelter deck type with a depth molded to shelter deck of 41 feet and a deadweight capacity of 12,000 tons, with 29 feet 2 inches draft. The gross tonnage measures 8800 tons and the net tonnage 5300 tons. The ships are built on the Isherwood longitudinal system to the highest class of the American Bureau of Shipping for carrying petroleum in bulk. The cargo space is divided into 18 main cargo tanks, 10 summer tanks, 2 fuel oil tanks, and 2 deep ballast tanks forward.

Very commodious quarters have been provided for both crew and officers, rooms being comfortable, well lighted and ventilated, and the commissary and sanitary arrangement perfect in every detail.

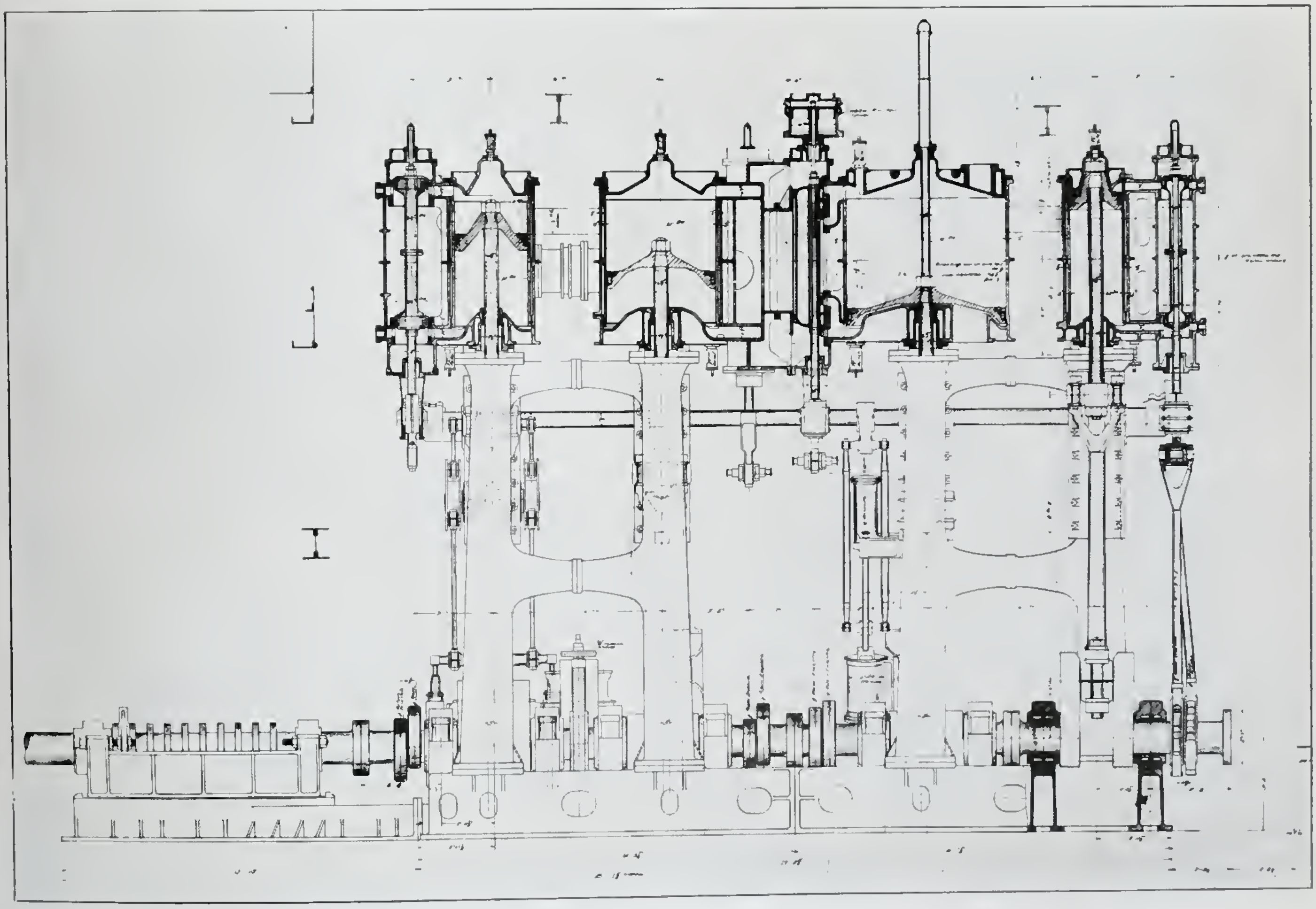
Through the courtesy of the Southwestern Shipbuilding Company, we are reproducing herewith the piping plans for steam, oil and water on these ships and a general arrangement drawing of the main engines.

The power plant is composed of three Scotch type marine boilers built by the Willamette Iron & Steel Works of Portland. These boilers are 15 feet 6 inches diameter by 12 feet long with a combined heating surface of 10,000 square feet and are fitted with Howden forced draft system and designed to give a working pressure of 220 pounds gauge. Fuel oil is burned under these boilers by the Bethlehem-Dahl system, two No. 8 heaters being used and two 6 by 4 by 6 Dean horizontal duplex fuel pumps.

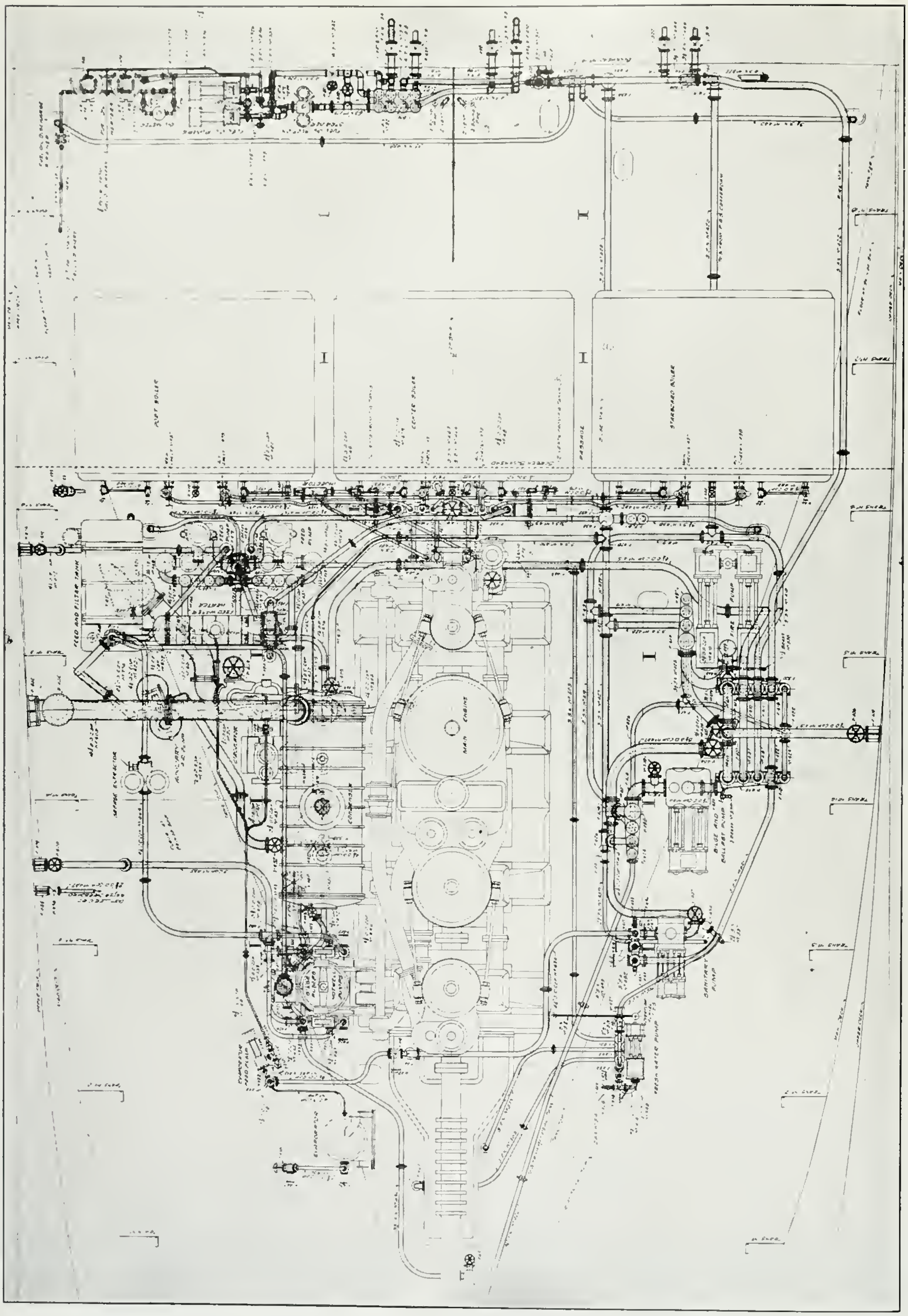
The main propelling engine was designed by the Southwestern Shipbuilding Company and built by the Llewellyn Iron Works, Los Angeles. It is of the four-cylinder quadruple expansion vertical reciprocating type with cylinder diameter of 24 - 34 - 51 - 74 inches and stroke of 54 inches. This engine is completely balanced on the Yarrow-Schlick-Tweedy system and develops 3300 horsepower at 80 r. p. m.

The following auxiliaries are installed in the engine room: Two 14 by 10 by 24 vertical simplex Dean feed pumps; one 7 by 6 by 10 horizontal duplex Dean sanitary pump; one 6 by 3¾ by 6 horizontal duplex Dean fresh water pump; one 16 by 10 by 14 horizontal duplex Dean fire pump; one 10 by 10 by 12 horizontal duplex Dean ballast and bilge pump; one 3 by 3 by 4 horizontal duplex Dean evaporator feed pump; one 10 by 18 by 12 vertical twin beam Dow auxiliary air pump; one 16-inch centrifugal circulating pump with 10 by 10 engine, built by the Taylor Foundry and Engineering Company; one 25-ton Braun evaporator; one 2000-gallon Braun distiller; one Braun feed water heater; one Braun grease extractor; one 2½-ton Audiffren-Singrun refrigerating machine; two 15 kilowatt General Electric generators.

The main cargo pumps, which were described in detail in the March issue of Pacific Marine Review, were designed by the Southwestern Shipbuilding Company and built by the Joshua



Sectional general arrangement of quadruple expansion engine designed by the Southwestern Shipbuilding Company and built by the Llewellyn Iron Works for the Union Oil tankers Montebello and La Placentia

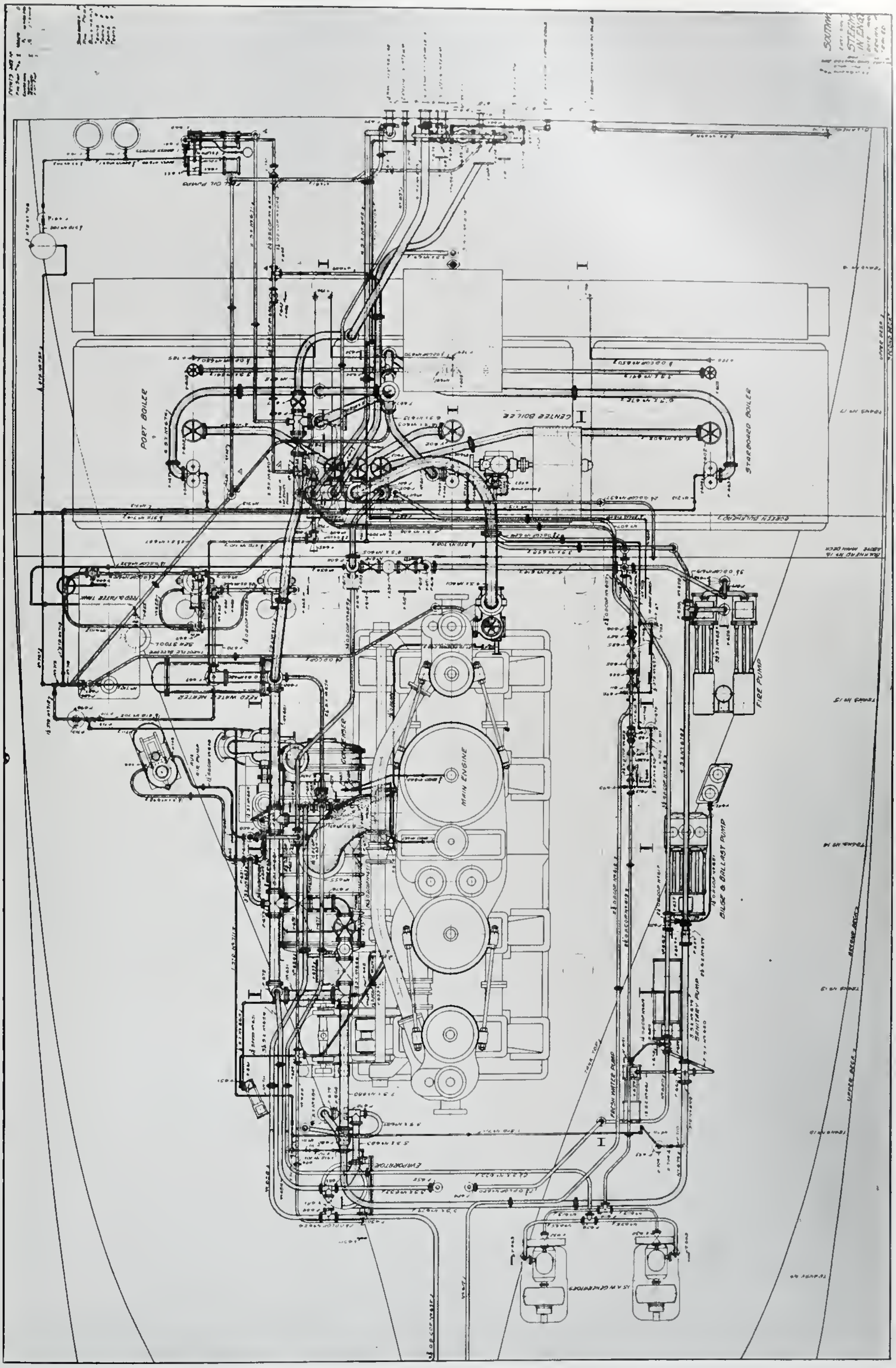


Oil and water piping arrangement of the tank steamships Montebello and La Placentia building at the Southwestern Shipbuilding Company for the Union Oil Company of California

Hendy Iron Works of Sunnyvale, California. These pumps have sufficient capacity to discharge the entire cargo of 80,000 barrels in twenty hours.

The Joshua Hendy Iron Works also built for these ships a 10 by 16 inch windlass designed and placed on the vessels by the Southwestern Shipbuilding Company with a special reference to the handling of lines on deck when anchored in open roadsteads.

The balance of the deck machinery



Steam piping arrangement plans for the tank steamships Montebello and La Placentia

was designed by the Southwestern Shipbuilding Company and built by the Helser Machine Works of Portland, Oregon. This machinery includes four 8 by 10 inch heavy duty steam capstans, two fitted on the forecastle and two on the poop; two heavy duty double friction drum warping winches with extension shafts and large gypsies, one fitted forward of the bridge and one between the bridge and the poop; eight 9 by 9 inch Helser throttle reversing steam winches for handling cargo to and from shelter deck spaces.

BOOK REVIEWS

Jane's Fighting Ships, 1920—An encyclopedia of the navies of the world. Edited by Maurice Prendergast and Oscar Parkes. Published by Sampson Low, Marston & Company, Ltd., 100 Southwark Street, London. Price 2/2/- net.

This is the twenty-third year of issue of this book, which has become a standard work of reference for those interested in the progress of naval construction, and this particular issue will be especially interesting on account of the tables, notes and addenda giving the official particulars of the partition of the warships of the Central European powers among the allied navies.

The new projected construction of all of the naval powers of the world is covered with great completeness and also the projected work in connection with naval bases. The work of the United States, particularly in regard to naval bases on the Pacific, is covered both by graphical and textual matter, giving estimated costs and practically all of the engineering features of the new work at Bremerton, San Diego, San Pedro and San Francisco.

The whole book has been corrected and newly illustrated from information officially furnished by the naval departments of the various countries or from information compiled from the latest editions of official year books or collected directly by correspondents of Jane's Fighting Ships. Between five and six hundred new halftone illustrations appear in this book, which lists and describes between six and seven thousand warships.

The Welding Encyclopedia—A complete reference and instruction book on the subject of autogenous welding by every method.

One-third of the subject matter is an illustrated dictionary section, which gives full definitions of all words, terms and trade names used in the welding trade; in this section are a number of short treaties on important welding topics. The oxy-acetylene, electric arc, electric resistance and thermit processes are then treated in separate chapters which give instructions for the welding of all weldable metals by each of these processes, and these chapters are followed by a chapter on the use and care of equipment. Another chapter is a compilation of the rules and regulations of the various states, the Department of Commerce, the Interstate Commerce Commission, the A. S. M. E. Boiler Code Committee, the Master Car Builders, Lloyd's Register of Shipping, the Underwriters' Laboratories and the National Board of Fire Underwriters on the application of welding processes and the installation and operation of equipment. A special chapter is devoted to boiler welding, and another to the heat treatment of steels. A group of charts and tables shows graphically the right and wrong methods of preparing welds, comparisons of Centigrade and Fahrenheit temperature scales, the development of iron ore into iron and steel products, and colors corresponding to different temperatures. A very important feature of the book is the catalog section, which contains announcements of the leading manufacturers of welding equipment and supplies. The Buyers' Index in this section enables the reader to locate at once the makers of all kinds of welding apparatus. This section is, in fact, a complete set of condensed catalogs, arranged for convenient reference. The book contains 326 pages and 375 illustrations. It answers every important question that can arise in the welding shop and covers every phase of the art of autogenous welding. Published by the Welding Engineer Publishing Company, 608 S. Dearborn Street, Chicago, Illinois. Price, bound in cloth, $5 postpaid.

A Naval History of the War, 1914-1918. By Henry Newbolt; 350 pages; 8 maps and plans. Published by Hodder & Stoughton, Ltd., London, and George H. Doran Company, New York.

This volume is more general and nonprofessional than many recent publications dealing with the war at sea, and accordingly it is better reading for the layman. The author covers the subject in eight chapters, three of which are general: Modern War and Psychology, British and German Policy, and the Course of the War at Sea, and five of which cover important actions or phases in more detail: Coronel, the Falklands, German Submarine War, British Submarine War, and the Battle of Jutland.

The author throughout is moderate, even when he discusses German submarine warfare, but his moderation lends weight that is denied to intemperate writers who forget that the war has become history and as such demands dispassionate criticism. The conclusions of the volume are well-matured and in some noteworthy respects cast new light (new to the casual reader, at least) on some little understood events, such as the reasons that may have impelled Admiral Cradock to accept battle at Coronel against a greatly superior fleet.

In the chapter on the Battle of Jutland the author serves his readers by clearing away irrelevant or minor considerations and by making clear what are the issues involved in the long discussion that has ensued. After outlining the views of Admiral Jellicoe's friends, the author continues: "Against this may be set a narrower but more natural instinct, which has told some of our great admirals, and at least one at Jutland, that the defensive method is out of place when you have an inferior enemy flying before you." One might retort that Nelson thought the defensive method out of place even against a superior enemy and that Nelson's fame as the "greatest sailor" appears, somewhat singularly, to be as secure today as it was prior to August 1, 1914.

A History of the Transport Service. By Vice-Admiral Albert Gleaves, U. S. Navy, Commander of Convoy Operations in the Atlantic, 1917-1918. 285 pages; 127 photographs, diagrams and charts, and numerous tables. Published by George H. Doran Company, 244 Madison Avenue, New York. Price $6 net.

This book tells with very straightforward simplicity the story of the transporting and supplying overseas of the American army of two million men, "an achievement which undoubtedly will be ranked as one of the greatest in the annals of history." The book is very replete with stories of heroism, both in the naval and in the merchant marine service, and makes splendid reading for anyone interested in life at sea.

Vice-Admiral Gleaves was in command of all of the convoy operations in the Atlantic during the most active period of the German submarine campaign, and he therefore writes of the subject matter of this volume with complete authority. Having had ready access to all of the official reports, he quotes fully from these reports, substantiating all of the individual stories, thus making a volume which is not only interesting reading but an accurate reference book as a history of this phase of our participation in the war.

The Crisis of the Naval War. By Viscount Jellicoe of Scapa, Admiral of the British Fleet. 330 pages, 8 plates and 6 charts. Published by George H. Doran Company, New York. Price $7.50 net.

This volume carries on the history of the British Navy in the world war as begun in the companion volume by the same author, entitled "The Grand Fleet, 1914-1916." This present volume has particularly to do with the means used and the results accomplished by the

(Continued on page 62)

Marine Insurance

DEVELOPMENTS IN MARINE INSURANCE

By C. F. HOWELL

IN view of the sensation created last year by the amending of Section 45 of the Insurance Law of the State of New York so as to require admitted foreign marine insurance companies to report in their United States branch statement the premiums received on all United States risks, regardless of the place where they were written, it was to have been expected that more than usual interest would be taken in this year's recommendations of New York's superintendent of insurance. The preliminary report of this official for 1921 made satisfactory reading for those who have looked forward to some modification of his attitude of a twelvemonth ago. The difficulty experienced by American marine insurance companies in securing ample reinsurance facilities without treaties direct with foreign home offices had been brought to his attention, and with the purpose of relieving the situation he made the following to the legislature: "An amendment to Section 22 of the Insurance Law, which is known as the 'reinsurance section,' providing, in substance, that an authorized insurer may reinsure marine risks with a foreign country insurance corporation, authorized to transact business in this state, through the home office of such company, under a contract specifically providing that losses thereunder shall not be collectible out of any of the assets of said corporation in the United States, and that the ceding insurer as to the portion of such marine risks so ceded shall be charged with unearned premium liability, and shall report and pay the taxes thereon, in which event the foreign country company need not include the business so ceded in its United States branch statement, nor be required to report same notwithstanding the provisions of Section 45." It will be observed that such an amendment will require the ceding company to maintain the unearned premium liability and also pay the taxes, and the United States branch assets of the foreign country company will not be subject to any liability because of reinsurance placed in that manner.

Referring to the Model Bill for the organization of marine insurance companies in the District of Columbia, which was submitted by the United States Shipping Board to the National Convention of Insurance Commissioners, Insurance Superintendent Phillips cordially endorsed the qualified approval given the bill by the latter organization, so that a marine insurance company may give a more complete coverage, that is, indemnity, not only against all the perils of the sea, but indemnifying the ship owner against all hazards and liabilities, including personal injury liability and property damage, or against loss or damage arising out of the construction, operation or use of ships or vessels. To this end he recommended an amendment to Section 150, enlarging the powers of marine insurance companies.

A third recommendation was of interest. It reads as follows: "I also suggest for your consideration an amendment to Section 16, permitting our domestic insurance companies, other than life, to invest in the stock of any company organized in the United States and engaged solely in the insurance business in foreign countries. I think, however, that an investment of that character should not be in excess of 20 per cent of the capital stock and surplus of the investing company."

Salvage Association Planned

Very naturally, there is great interest taken in the proposal for the organization of a salvage association in this country similar in scope to the famous and effective Salvage Association of London. It is planned to be owned and operated by Syndicate A, of the American Marine Insurance Syndicates, and is to be styled the United States Salvage Association. The proposition came up at a recent meeting of the subscribers of the Syndicates, when some sixty-five companies were represented; which is more than three-quarters of the entire subscription membership. A tentative draft of the proposed certificate of incorporation was submitted, but was laid on the table for the time being and until it could be thoroughly examined by the members prior to final action. It is certain to be adopted in the near future. The proposed organization is to be a corporation. It will give the service of Syndicate A a much more expressive trade name than that of a mystifying initial, as at present, and will also extend its powers. The directors of the salvage association will act as voting trustees to hold the entire capital stock in trust for the subscribers of Syndicate A. It will furnish the American shipping trade with the same kind of facilities as are now supplied the British trade by the salvage Association of London. Its agents will be located throughout the world. As is known, Syndicate A exercises a supervisory and advisory jurisdiction over damage repairs and the salvage requirements of marine underwriters; the proposed association will very likely develop in time considerably beyond the present scope of Syndicate A, even to actually engaging in ship repairs and ship salvage. Once the agreement has been formally adopted it will have the approval of a modified contract with the United States Shipping Board, as the association will be an operating company of Syndicate A.

Three Companies Collapse

As if the standing of marine insurance had not had enough hard knocks of late, along comes a triple collapse that places three underwriting contenders out of the race. As a result of the failure of the banking house of Hannevig & Company, receivers have been appointed for the North Atlantic Insurance Company, the Liberty Marine Insurance Company, and the Jefferson Insurance Company. The first two have been writing but little, since September last, but the Jefferson is an old and active factor in the business. The New York Insurance Department took over the first two, and the Pennsylvania Department the last. This was done in order to secure as much as possible of the assets for the benefit of the policyholders—the first two companies having at the time of the failure of the Han-

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

nevig Bank upwards of $1,250,000 on deposit in that institution.

Transportation Rates Reduced

Evidently the violent protest made by shippers on account of the 100 per cent increase in automobile marine rates, announced a short time ago by the underwriters, has not been without its effect, as a substantial cut in the new schedule has already been made. The reduction is 25 cents per $100, and includes automobile floaters. When the recent large advance became effective, automobile manufacturers promptly registered vigorous complaints through the National Automobile Chamber of Commerce. They argued that there was no longer any necessity for such an advance in rates, because the congestion in freight yards had been largely cleared away and the railroad service was approaching normalcy; furthermore, they claimed that boxing of autos was substantially improved. To these objection the underwriters replied that the congestion still continued at the railroad yards, with attendant damage to autos from exposure to the weather, and that the so-called improvement in packing is imaginary, being frequently limited to merely a thin covering of paper. But competition began to exert the usual pressure on underwriting judgment, and one by one the insurers withdrew from the rate-increase agreement, until at present the minimum cut in rates is as given above. It might easily be said that the marine auto rates are off, as more than one underwriter is disgusted with the withdrawals from the agreement and proposes exercising his individual judgment as to what he will charge. The rate-cut has astonished many, as it is known that heavy losses have been had by the majority of the companies for some time in covering auto transportation risks.

Carriers' Responsibility

Perhaps no subject is being so carefully considered at this time as that of the adoption of improved bills of lading in which the carrier may be made to assume his former and proper legal liability. Only recently the determination of the carriers to dodge their share of the burden has been evidenced in a joint statement of several steamship companies, filed with the Interstate Commerce Commission, in which the argument is advanced that the commission has no power to compel the ocean carrier to adopt any particular bill of lading. The statement goes on to declare that the ocean bill of lading should be very liberal as regards the liability of the carrier, and asks that the shipper recognize that the risks of which the ocean carrier relieves itself in the bill of lading are not borne by the shipper himself. The meaning is obvious. Pass the load along to the underwriter. The question now is, will the underwriters permit this piece of cool nerve to go by unchallenged? The point made by the latter is that a lack of legal responsibility entails a lessening of care in the handling of property, and that, in turn, must inevitably mean largely increased premiums, with a consequent increase in expense to the public. The result of a continuance of the carrier's shirking their former responsibility would very likely be a discontinuance of such coverage as theft, pilferage, short delivery, hook-hole damage, oil stain damage, poor stowage, etc.

Experience of the Syndicates

Everyone at all identified with marine insurance in the United States learned the first reports of the responsible heads of the American Marine Insurance Syndicates with the greatest interest. It is satisfactory to know, from those reports, that the history-making experiment of the Syndicates has met with success far beyond anticipations. Manager Charles R. Page told of the completion of the organization of Syndicate "A" along the Atlantic and Gulf Coasts; of the number and high character of the surveyors; of the beneficial policy of calling for competitive bids, as reflected in the securing of advantageous prices: of the surveying work as regards maintenance and repair, and especially of loading, with particular attention paid to tankers; of the establishment of representatives in the United Kingdom and Scandinavia, with the West Indies and several of the South American countries likewise prepared; of the co-operation of American consuls everywhere in locating foreign representatives for the Syndicate; and of the development of salvage and ship repair work.

Lawrence J. Brengle, chief underwriter for the Syndicates, reported on the amount of premiums which had been written in Syndicate "B" from the beginning of operations — in August, 1920 — to approximately the close of the year, as follows: Net premium, $1,123,026.35; estimated losses, $125,000; of which the earned premium, as of December 10, 1920, is $188,239.63; and the estimated losses, as of the same date, have been $95,000. For Syndicate "C" Mr. Brengle reported: Net premium, $3,321,596.21; estimated losses, $500,000; of which the earned premium, as of December 10, 1920, is $617,216.17; and the estimated losses as of the same date were $400,000. "We are now considering the question of a loss department," said Mr. Brengle, "and hope to have that organized within a short time; and when that is accomplished we will be in the position of having our force practically complete."

The report of Syndicate "C" committee was particularly encouraging. This important document was signed by Messrs. W. W. Parsons, Wm. H. McGee and Hendon Chubb—three of the ablest underwriters in America. They told of how rates are made for Syndicate "C," and described the policies which have governed the managers in making those rates. Every Wednesday the rate committee meets at the Syndicate rooms, New York, at 11 o'clock, when it considers all fleets or vessels which have been submitted to the underwriters prior to noon of the Tuesday preceding it. In each case it is the endeavor to name rates and terms at that meeting for all the fleets coming before

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING

F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

the committee. There is a rule that two constitute a quorum, and this was done in order to secure prompt quotations to those applying to the Syndicates. Practically all fleets or vessels submitted have been rated within one week after being put before the Syndicate, and often within twenty-four hours. It has been the custom to have the broker personally present his ideas to the committee, and in many instances the owner or his representatives have also appeared before the committee. In arriving at rates for a fleet the committee have felt that careful consideration should be given to the record of the owners of the fleet or vessel, where the owner has had a managing experience of three years or more. This is an entirely different proposition from the rate-making of Syndicate "B." In the latter, most of the vessels are in the hands of new owners, and until their efficiency or inefficiency has been demonstrated it is necessary to arrive at an average rate to apply to all these vessels; but in the case of Syndicate "C" most of the vessels belong to owners who have had a long experience, and where the results of such experience is available to underwriters this has been taken as an important factor in arriving at the rates asked for. In all cases the rate committee have also given their careful consideration to the value per ton, as it is recognized that in most cases the cost of repairs depends more upon the tonnage of the vessel than it does upon the insured value, and that any low per ton insured value must be compensated for by a corresponding advance in rates.

Ship Moisture Damage

In view of the constant run of losses on account of the susceptibility of cargo to damage, the helpful suggestions of Mr. T. R. Taylor have been received by the underwriters with close attention. He urges, as an elementary precaution, that dry goods and wet goods be separated. Every care must be taken with anything that is wet when loaded; that may become wet by breakage; any apparently dry article that may contain moisture within, such as bales of cotton or hay; or any article that will run when heated, as candles or beeswax. If it is impossible to put these wet goods in a separate hold, or even in a separate part of the same hold, efforts should be made to stow the wet goods under the dry, or to protect them from one another by tarpaulins or dunnage. Certain commodities, like cereals, may be ruined by being placed near goods that contain but a small amount of moisture; others are so dry as to be able to draw water through near-by casks, or even through the ship's wooden side. Of this class are bones, oilcake, camwood, sumac, madder, pepper and salt. Arrowroot will absorb moisture through the sides of the vessel, and should be packed in the middle of holds. Wines may not be stowed near oils, nor turpentine near molasses. Oils are menaces, both on account of their odor and their inflammability; and if placed near fibers or other goods liable to heat, spontaneous combustion may result.

A Record Repair on the SS. Liebre

TWO large repair jobs were obtained in March by the Union plant, Bethlehem Shipbuilding Corporation, San Francisco, one of which, that of the General Petroleum tanker Liebre, was completed with record dispatch in the face of unusually difficult circumstances.

The Liebre, which was completed by the Union Construction Company of Oakland in February, went aground on Anacapa Island while en route from Los Angeles Harbor to Puget Sound on her maiden voyage with a cargo of oil. She was raised by the new drydock of the Los Angeles Shipbuilding and Drydock Company for inspection, after which some vigorous competition ensued.

The bid of the Bethlehem Shipbuilding Corporation was $40,890 and 14 days, as compared with other bids of $42,370 and 16 days and $54,400 and 18 days. The time of 14 days included the voyage to San Francisco for repairs and delivery at Los Angeles, where the vessel then was lying.

On Tuesday, March 7, the Liebre was placed on dock No. 4, Union plant, and on Thursday, March 17, in the record time of eight working days, she was floated and sailed for Los Angeles, arriving March 19, two days ahead of the contract time. Although the vessel was on the dock only eight days, one and one-half days' working time was lost in cleaning tanks, so that the actual working time was reduced to six and one-half days.

The repairs to the Liebre will be interesting to other shipbuilders, who may understand from the itemized list what dispatch was necessary. Fifteen shell plates were renewed; eight plates were faired and returned; all floors of the forepeak were faired and returned; bottom plates of the forepeak bulkhead, swash bulkhead and centerline bulkhead, as well as four shell longitudinals, were renewed.

The American-Hawaiian steamship Alaskan also was sent to the Union plant in March. She grounded on Asuncion Island February 21 in a heavy fog. The bid of the Bethlehem Shipbuilding Corporation was approximately $144,000 and 25 days. This job consisted of making a new forefoot casting; renewing twenty-seven shell plates; fairing and returning seven plates; removing and renewing or fairing and replacing all floors in Nos. 1 and 2 double-bottom tanks; calking and testing Nos. 3 and 4 tanks, renewing or fairing and returning all floors, frames, intercostals and brackets in the forepeak; renewing ceiling in holds over the tank top.

In addition to repairing the hull damage, the Bethlehem Corporation installed a new funnel and breeching and uptakes and overhauled all main and auxiliary machinery.

FULL SPEED AHEAD

Eastern Shipbuilding

National Shipbuilding

With this issue Pacific Marine Review begins the publication of a list of vessels under construction or contract in yards of the Great Lakes and Atlantic, both Canadian and American, and of the American Gulf. The list is incomplete because time was not sufficient for returns to be received from all yards; within a few months, however, Pacific Marine Review expects to make the listing one on which all interested may rely as on the report of Pacific Coast shipyards. Due to the incompleteness of the returns, no attempt has been made to prepare a summary of the work on hand as of March 1 in the Lake, Atlantic and Gulf districts, although the usual tabulation of Pacific Coast work is given.

In general, the aim has been to confine the listings to self-propelled metal (or concrete) vessels designed for ocean or Lake trade; that is, deep-water steamships and motorships. Incidental to reporting this class of construction, however, some companies have listed other work—principally barges—which have been incorporated in the return. But no attempt has been made to cover the vast amount of miscellaneous building, the primary aim being, as stated, the listing of large self-propelled steel vessels.

A vessel will be carried only until delivery has been made and recorded; thereafter it will be dropped; so that the tables will be kept up-to-date. The detailed description of each vessel will be found valuable, inasmuch as standardized ships for the Shipping Board have given way so largely to specially-designed craft for private account.

American Building

On February 1, 1921, private American shipyards were building or under contract to build from private shipowners 252 steel vessels of 977,903 gross tons, compared with 275 steel vessels of 1,067,293 gross tons on January 1, 1921. These figures do not include government ships or ships building or contracted for by the United States Shipping Board.

Atlantic and Gulf

ALABAMA DRYDOCK & SHIPBUILDING CO., MOBILE, ALA.

Purchasing Agent: E. L. Markel.

No construction; drydocking and repairs only.

AMERICAN BRIDGE COMPANY, AMBRIDGE, PENN.

Twenty-five coal barges Carnegie Steel Co; 175 LBP; 26 beam; 8 loaded draft: keel March and April 21 est; launch and deliver March, April, May/21 est.

Six coal barges US War Dept; 145 LBP; 24 beam; 9 loaded draft; keel March 21; launch May/21 est; deliver May '21 est.

Three car floats undisclosed interests; 285 LBP; 38 beam; 8 loaded draft; keel June/21 est; launch Aug/21 est; deliver Sept 21 est.

ATLANTIC CORPORATION, PORTSMOUTH, N. H.

No construction on hand.

CONSOLIDATED SHIPBUILDING CORPORATION, MORRIS HEIGHTS, N. Y.

Purchasing Agent: William Rayner.

Oak, hull 251, US lighthouse tender; 160 LOA; 30 beam; 9-6 loaded draft; 875 DWT; TE eng 700 IHP; 1 Scotch boiler 14 diam; keel Nov22/20; deliver July/21 est.

Hawthorn, hull 252, US lighthouse tender; sister to above; keel Nov22 '20; deliver July/21 est.

No name, hull 246, US lightship; 146-3 LOA; 30 beam; 12-7 loaded draft; 825 DWT; comp eng 400 IHP; 2 Scotch boilers 10-6 diam; **keel Mar4 21**; deliver Aug/21 est.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING COMPANY, PHILADELPHIA

Hull 448, scout cruiser USN; keel Feb16/'20.

Hull 449, scout cruiser USN; keel Mar29/20.

Hull 501, scout cruiser USN; keel Aug18/20.

Hull 502, scout cruiser USN; keel Aug4/20.

Hull 503, scout cruiser USN; keel Oct14/20.

Cuba, hull 505, passenger P&OSS Co; 325 LBP; 47 beam; 16 loaded draft; 16 loaded speed; 1100 DWT; 2-cyl TE eng 1800 IHP each; 4 SE Scotch boilers 12x14-6; keel May3/20; launch Dec11/'20; deliver Apr15/21 est.

OSCAR DANIELS COMPANY, TAMPA, FLORIDA

Brunswick, hull 10, Isherwood cargo USSB; 416 LBP; 54 beam; 26-11 loaded draft; 11 loaded speed; 9600 DWT; TE eng 2800 IHP; 3 WT boilers; keel Oct 27 / 19; launch Feb 17 / 21; deliver May2/21 est.

B. D. Benson, hull 11, Isherwood tanker Standard Oil; 466 LBP; 60 beam; 26-7 loaded draft; 10½ loaded speed; 11,900 DWT; QE eng 2800 IHP; 3 Scotch boilers 15x11-6; keel June29/20; launch Apr15/21; deliver June15/21 estimated.

T. J. Williams, hull 12, Isherwood tanker Standard Oil; sister to above: keel Aug11/20; launch June5/'21 est; deliver Aug15/'21 est.

DOLLUTT & WILLIAMS SHIPBUILDING CO., NEW ORLEANS

City of Elwood, hull 1910, Isherwood SS for USSB; 395-6 LBP; 55 beam; 27 loaded draft; 11 loaded speed; 9600 DWT; turbine eng 2800 IHP; 3 WT boilers 9150 sq ft; keel Feb 27 19; launch Apr10/20.

Jeff Davis, hull 1911, sister to above; keel Jan26/20; launch Oct30/20.

Galveston, hull 1912, sister to above; keel Feb20/20; launch Dec18/20.

Ward, hull 1913, sister to above; keel Mar25/20; launch Jan22/21.

Oldham, hull 1914, sister to above; keel Apr17/20.

FEDERAL SHIPBUILDING COMPANY KEARNY, N. J.

Purchasing Agent: J. L. Hastings.

Vancolite, hull 46, tanker Standard Oil of NJ; 500 LBP; 68 beam; 27-6 loaded draft; 11 loaded speed; 15,000 DWT; rec engs 3500 IHP; 3 Scotch boilers; keel May5/'20; launch Mar24/21; deliver Apr/21 est.

Walter Jennings, hull 47, tanker Standard Oil of NJ; sister to above; keel May5/20; launch Feb9/21; **deliver Mar 21.**

E. T. Bedford, hull 48, tanker Standard Oil of NJ; sister to above; keel July 25 20; launch Apr/'21 est.

Victolite, hull 49, tanker Standard Oil of NJ; sister to above; keel July22/20; launch May/21 est.

J. A. Moffett, Jr., tanker Standard Oil of NJ; sister to above; keel July23 20; launch June/21 est.

Steel Seafarer, hull 43, freighter US Steel Products Co; 425 LBP; 56 beam; 25-10 loaded draft; 12 loaded speed; 9400 DWT; turb engs 3100 IHP; 3 Scotch boilers; keel Apr/21 est.

Steel Pathfinder, hull 44, freighter US Steel Products Co; sister to above; keel Apr/21 est

Steel Pioneer, hull 45, freighter US Steel Products Co; sister to above; keel Apr/21 est.

GLOBE SHIPBUILDING & DRYDOCK COMPANY OF MARYLAND, BALTIMORE

San Leopoldo, hull 101, oil-carrier Eagle Oil Transport Co; 401 LBP; 54 beam; 25-1 loaded draft; 10½ loaded speed; 8600 DWT; TE engs 2800 IHP; 3 Scotch boilers 15-3x11-6; keel Sept/20; launch Apr/21 est; deliver June/21 estimated.

San Leonardo, hull 102, oil-carrier Eagle Oil Transport Co: sister to above; keel Sept/20; launch Apr/21 est; deliver June/21 est.

GROTON IRON WORKS, GROTON, CONN.

Purchasing Agent: J. S. MacDougall.

No name, hull 13, ferry boat City of Boston; 174 LOA; 57 beam over guards; 900 gross; 2 vert comp engs 750 IHP each; 2 Scotch boilers 11x11; keel Nov/20; deliver Apr25/21 est.

LAKE TORPEDO BOAT COMPANY, BRIDGEPORT, CONN.

Purchasing Agent: H. C. Stevens.

S-48, hull 48, submarine USN.
S-49, hull 49, submarine USN.
S-50, hull 50, submarine USN.
S-51, hull 51, submarine USN.

MERCHANT SHIPBUILDING CORP., CHESTER, PENN.

Purchasing Officer: G. Coit.

Mount Carroll, hull 379, combination United American Lines; 440 LBP; 57 beam; 28-8¾ loaded draft; 13 loaded speed; geared turb engs 4200 IHP; 4 Scotch boilers 15-10x12-1; keel Apr6/20; launch Jan10/21; deliver Mar/21 est.

Mount Clinton, hull 380, combination United American Lines; sister to above; keel May27/20; launch Feb8/21; deliver May/21 est.

No name, hull 381, tanker Union Oil Co; 424 LBP; 58 beam; 25-5 loaded draft; 10½ loaded speed; 10,000 DWT; TE engs; 3 Scotch boilers 15-3x11-7; keel July3/20; launch Mar/21 est; deliver Mar/21 est.

No name, hull 382, tanker Union Oil Co; sister to above; keel July22/20; launch Apr/21 est; deliver June/21 est.

Robert E. Hopkins, hull 383, tanker Tidewater Oil Co; sister to above; keel Aug30/20; launch May/21 est; deliver July/21 est.

Samuel Q. Brown, hull 384, tanker Tidewater Oil Co; sister to above, keel Oct1/20; launch May/21 est; deliver July/21 est.

No name, hull 385, freighter United American Lines; 445 LBP; 59-8 beam; 28-6 loaded draft; 11½ speed; 11,000 DWT; 2 6-cyl, 4-cycle Diesel engs, 4500 metric; 1 vertical donkey 400 sq ft HS; keel Feb5/21; launch June/21 est.

No name, hull 386, freighter United American Lines; sister to above; keel Feb10/21; launch July/21 est.

MERRILL-STEVENS SHIPBUILDING CORP., JACKSONVILLE, FLA.

Purchasing Agent: W. W. Merrill.

No construction work contemplated for 1921.

MORSE DRYDOCK & REPAIR CO., BROOKLYN

No construction; repair work only.

NAVY YARD, BOSTON

Pecos, hull 18, oil-fuel ship USN; 455 LBP; 56-2 beam; 26-8 loaded draft; 14 loaded speed; 14,800 disp; rec eng 5200 IHP; 4 Ward WT boilers; keel June2/20; launch Apr23/21 est; deliver Oct/21 estimated.

Whitney, hull 4, destroyer tender US N; 460 LBP; 60-11 beam; 21 loaded draft; 16 loaded speed; 10,600 disp; geared Parsons turbs 7000 IHP; 2 WT exp. small tube boilers; keel Apr/21 est; launch Apr/22 est; deliver Oct/22 est.

NAVY YARD, PHILADELPHIA

Dobbin, hull 7, destroyer tender USN; 460 LBP; 60-10 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp; Parsons geared turb single screw engs 7000 SHP; 2 WT boilers; keel Dec23/19; launch May1/21 est; deliver date not determined.

Constitution, hull 8, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive 180,000 SHP; 16 WT boilers; keel Sept25/20; launch and deliver dates not determined.

United States, hull 9, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive 180,000 SHP; 16 WT boilers; keel Sept25/20; launch and deliver dates not determined.

NEW YORK SHIPBUILDING CORP., CAMDEN, N. J.

Purchasing Agent: L. G. Buckwalter.

Wenatchee, hull 240, combination US SB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs 12,000 SHP; 8 WT boilers; keel June 15/18; launch May21/19; **deliver March 21.**

Sea Girt, hull 241, combination US SB; sister to above; keel Aug/18; launch July20/19; deliver fall/21 est.

American Legion, hull 242, combination USSB; sister to above; keel Jan 21/19; launch Oct11/21; deliver fall/21.

Granite State, hull 246, combination USSB; 520-8 LBP; 62 beam; 32-3 loaded draft; 14 loaded speed; 13,050 DWT; 4 cyl. TE engs 7000 SHP; 6 SE Scotch boilers 13-3x11-6; keel May22/19; launch July31/20; deliver Mar/21 est.

Centennial State, hull 249, combination USSB; sister to above; keel Oct/19; launch Nov/20; deliver fall/21 est.

Blue Hen State, hull 250, combination USSB; sister to above; keel Mar4/20; launch Feb23/21; deliver fall/21 est.

Bay State, hull 251, combination US SB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs 12,000 SHP; 8 WT boilers; keel Oct15/19; launch July17/20; deliver winter/21 est.

Peninsula State, hull 252, combination USSB; sister to above; keel July 20/20; launch April/21 est; deliver spring/22 est.

Keystone State, hull 253, combination USSB; sister to above; keel May13/19; launch May15/20; deliver Apr/21.

Empire State, hull 254, combination USSB; sister to above; keel May 13/19; launch Aug4/20; deliver summer/21 est.

Lone Star State, hull 255, combination USSB; sister to above; keel May 13/19; launch Oct23/20; deliver summer/21 est.

Hoosier State, hull 256, combination USSB; sister to above; keel May20/19; launch Oct23/20; deliver fall/21 est.

Solana, hull 259, bulk oil Pacific Mail Steamship Co; 419-3 LBP; 56-3 beam; 25-9¼ loaded draft; 19¾ loaded speed; 9870 DWT; 3 cyl TE engs 3000 SHP; 3 SE Scotch boilers 15-10x11-4; keel Aug23/20; launch Jan22/21; deliver Mar/21 est.

Yankee Arrow, hull 260, bulk oil Standard Trans Co, NY; 468 LBP; 62-6 beam; 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs 3200 SHP; 3 SE Scotch boilers 15-3x11-6; keel Aug17/20; launch spring/21 est; deliver summer/21 est.

Empire Arrow, hull 261, bulk oil Standard Trans Co, NY; sister to above; keel Sept14/20; launch spring/21; deliver summer/21.

Levant Arrow, hull 262, bulk oil Standard Trans Co, NY; sister to above; keel Nov4/20; launch fall/21 est; delivery winter/21 est.

No name, hull 263, combination Munson S S Co; 414 LBP; 57-6 beam; 23 loaded draft; 15½ loaded speed; 4950 DWT; geared turbs 5800 SHP; 5 SE Scotch boilers 16-4x12-3; keel Sept30/20; launch summer/21 est; deliver winter/21 est.

No name, hull 264, bulk oil, stock; 419-3 LBP; 56-3 beam; 25-9¼ loaded draft; 10¾ loaded speed; 9870 DWT; 3 cyl TE engs 3000 SHP; 3 SE Scotch boilers 15-10x11-4; keel spring/21 est; launch fall/21 est; deliver winter/21 est.

No name, hull 265, bulk oil, stock; sister to above; keel spring/21 est; launch fall/21 est; deliver winter/21 est.

No name, hull 266, bulk oil Standard Trans Co, NY; 468 LBP; 62-6 beam; 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs 3200 SHP; 3 SE Scotch boilers 15-3x11-6; keel Aug11/20; launch fall/21 est; deliver winter/21 est.

NORFOLK SHIPBUILDING & DRYDOCK CORP., NORFOLK

Repair work only.

PUSEY & JONES COMPANY, GLOUCESTER, N. J.

Operations discontinued for present.

STANDARD SHIPBUILDING CORP., SHOOTERS ISLAND, MARINERS HARBOR, NEW YORK

Purchasing Agent: Jamie Cortada.

San Tiburcio, hull 29, Isherwood tanker Eagle Oil Transport Co, London; 412 LBP; 53-1 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; TE engs 2850 IHP; 3 Scotch boilers 15-6x11-7; keel Apr19/20; launch Jan29/21.

San Ubaldo, hull 30, Isherwood tanker Eagle Transport Co, London; sister to above; keel May26/20.

San Ugon, hull 31, Isherwood tanker Eagle Transport Co, London; sister to above; keel May26/20.

SUBMARINE BOAT CORPORATION PORT NEWARK, N. J.

Purchasing Agent: W. C. Lawrence.

Sunugentco, hull 145, ocean freight Submarine Boat Corpn; 324 LBP; 46.2 beam; 23 loaded draft; 11 loaded speed; 5350 DWT; turbine engs 1860 IHP; 2 B&W boilers 2000 HP; keel Mar25/20; launch Jan15/21; deliver Apr/21 est.

Suspearco, hull 148, ocean freight Submarine Boat Corpn; sister to above; keel May19/20; launch Jan27/21; deliver Apr/21.

Sucubaco, hull 149, ocean freight Submarine Boat Corpn; sister to above; keel May24/20; launch Feb24/21; deliver Apr/21 est.

No name, hull 150, ocean freight Submarine Boat Corpn; sister to above; keel May29/20; launch Apr/21 est; deliver June1/21 est.

The following canal barges Submarine Boat Corpn, Transmarine Line, for towing only; **launching of all March and April/21 est, delivery of all April/21 est:**

Transmarine No. 108, hull 182; 100.4 LBP; 21.6 beam; 9 loaded draft; 206 DWT; keel Dec10/20.

Transmarine No. 109, hull 183; sister to above; keel Dec10/20.

Transmarine No. 110, hull 184; sister to above; keel Dec.18/20.

Transmarine No. 111, hull 185; sister to above; keel Dec18/20.

Transmarine No. 112, hull 186; sister to above; keel Jan3/21.

Transmarine No. 113, hull 187; sister to above; keel Jan3/21.

Transmarine No. 114, hull 188; sister to above; keel Jan7/21.

Transmarine No. 115, hull 189; sister to above; keel Jan10/21.

Transmarine No. 116, hull 190; sister to above; keel Jan13/21.

Transmarine No. 117, hull 191; sister to above; keel Jan18/21.

Transmarine No. 118, hull 192; sister to above; keel Jan21/21.

Transmarine No. 119, hull 193; sister to above; keel Jan24/21.

SUN SHIPBUILDING COMPANY, CHESTER, PENN.

Cerro Ebano, hull 37, tanker Pan-American Petr & Trans Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 12 loaded speed; 12,500 DWT; single screw QE engs 4300 IHP; 4 SE Scotch boilers 15-10x11-11¼; keel Aug26/20; launch Feb 19/21; **deliver Mar19/21.**

Cerro Azul, hull 38, tanker Pan-American Petr & Trans Co; sister to above; keel Oct13/20; launch Feb26/21; **deliver Mar26/21.**

No name, hull 39, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs 4300 IHP; 3 SE Scotch boilers 15-10x11-11¼; keel Nov 5/20; launch Apr 20/21 est; deliver May20/21 est.

Agwiharve, hull 40, tanker A. G. W. I. S. Co.; 480 LBP; 65-9 beam; 26-7 loaded draft; 12 loaded speed; 12,500 DWT; single screw QE engs 4300 IHP; 4 SE Scotch boilers 15-10x11-11¼; keel Nov26/20; launch Apr2/21 est; deliver May2/21 est.

Agwimex, hull 41, tanker A. G. W. I. S. Co; sister to above; keel Dec8/20; launch Apr25/21 est; deliver May25/21 estimated.

Agwiscot, hull 42, tanker A. G. W. I. S. Co; sister to above; keel Dec23/20; launch May13/21 est; deliver June13/21 estimated.

Agwistates, hull 43, tanker A. G. W. I. S. Co; sister to above; keel Jan3/21; launch May23/21 est; deliver June23-21.

No name, hull 44, tanker Benham & Boyesen, Inc; 430 LBP; 59 beam; 25-7 loaded draft; 11 loaded speed; 10,600 DWT; TE engs 2600 IHP est; 3 SE Scotch boilers 15-10x11-11¼; keel Jan 12/21; launch May21/21 est; deliver June21/21 est.

No name, hull 45, tanker Tidewater Oil Co; sister to above, except loaded speed is 10½; keel Feb23/21; launch June 28/21 est; deliver July28/21 est.

No name, hull 46, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs 4300 IHP; 3 SE Scotch boilers 15x11-11¼; keel Apr1/21 est; launch Aug30/21 est; deliver Sept30/21 estimated.

No name, hull 47, tanker Sun Oil Co; sister to above; keel Apr5/21 est; launch Sept3/21 est; deliver Oct3/21.

TAMPA SHIPBUILDING & ENGINEERING CO., TAMPA, FLA.

Yard leased to Oscar Daniels Co.

TANK SHIPBUILDING CORPORATION, NEWBURGH, N. Y.

Building non-propelled oil barges.

TERRY SHIPBUILDING CORP'N, SAVANNAH

Purchasing Agent: H. A. Bittner.

Hull 69, oil-barge builder's account; 285 LBP: 44 beam; 21 loaded draft; 3500 DWT.

Hulls 70, 71, 72; sisters to above.

TEXAS STEAMSHIP COMPANY, BATH, MAINE

Purchasing Agent: A. R. Weber.

No name, hull 31, tanker Texas S S Co; 415-10 LBP; 56 beam; 25-7¾ loaded draft; 11½ loaded speed; 9600 DWT; TE engs 3000 IHP; 3 Scotch boilers 15-3x11; keel Oct19/20.

No name, hull 32, tanker Texas S S Co; sister to above; keel Nov10/20.

American Lakes

ANCHOR SHIPBUILDING COMPANY, WASHBURN, WIS.

Purchasing Agent: George F. Morgan.

Double ended ferry, no name, Hudson & Athens Ferry Co; 113 LBP; 33 beam; 7 loaded draft; 8 loaded speed; Ingersoll-Rand Diesel engs 300 IHP; keel Feb/21.

DEFOE SHIPBUILDING COMPANY, BAY CITY, MICH.

Lt. Col. Robert C. Gildart, hull 51, mine-planter US; 100 LBP; 22 beam; 11 loaded draft; 12 loaded speed; comp engs 350 IHP; 1 WT boiler; deliver Apr25/21 est.

Lt. Col. Herman C. Schumm, mine-planter US; sister to above; deliver Apr 30/21 est.

Major Carl A. Lohr, hull 53, mine-planter US; sister to above; deliver May5/21 est.

Major Lester E. Moreton, hull 54, mine planter US Govt; sister to above; deliver May10/21 est.

Major Albert G. Jenkins, hull 55, mine-planter US; sister to above; deliver Mar15/21 est.

Major Wm. P. Pence, hull 56, mine-planter US; sister to above; deliver May 20/21 est.

Captain Clarence M. Condon, hull 57, mine planter US; sister to above; deliver May25/21 est.

Captain John W. McKie, hull 58, mine-planter US; sister to above; deliver May30/21 est.

FERGUSON STEEL & IRON CO., BUFFALO

Shipbuilding discontinued.

GREAT LAKES ENGINEERING WKS. RIVER ROUGE, MICH.

Purchasing Agent: A. E. Kretlow.

Delphine, hull 239, yacht Horace E. Dodge estate; 250 LBP; 35-5 beam; 14-8 loaded draft; 16 loaded speed; 4-cyl QE engs 3000 IHP; 3 WT boilers; keel June17/20; launch Apr2/21 est; deliver May15/21 est.

KRAFT SHIPYARD & DRYDOCK CO., CHICAGO

Purchasing Agent: C. W. Kraft, pres.

No new construction in prospect for 1921.

SAGINAW SHIPBUILDING CO., SAGINAW, MICH.

Lake Miraflores, hull 147, 2-deck ocean vessel USSB; 253-6 LBP; 43-8 beam; 24-3 loaded draft; 9½ loaded speed; 4245 DWT; inv TE eng 1500 IHP; 2 Wickes WT boilers 13-2x15; launch Feb 13/21; deliver Apr/21 est.

TOLEDO SHIPBUILDING COMPANY, TOLEDO, OHIO

Purchasing Agent: H. M. Ives.

No construction work.

Canadian

CANADIAN ALLIS-CHALMERS, SHIPYARD, ONTARIO

Plant closed indefinitely.

CANADIAN CAR & FOUNDRY CO., LTD., FORT WILLIAM, ONTARIO

Yard permanently closed.

CANADIAN VICKERS, LTD., MONTREAL

Purchasing Agent: H. Graham.

Canadian Commander, hull 79, single-screw steel 2-deck cargo for Canadian government merchant marine; 400 LBP; 31 loaded draft; 11 loaded speed; 8400 DWT; TE engs 3000 IHP; 3 Scotch boilers 15-6; keel June2/20; launch Oct 30/20; deliver May/21 est.

Canadian Leader, hull 80, single-screw steel 2-deck cargo Canadian government merchant marine; sister to above; keel June29/20; launch Nov27/20; deliver May/21 est.

No name, hull 81, single-screw steel 2-deck cargo Norwegian interests; 365 LBP; 49½ beam; 29 loaded draft; 11½ loaded speed; 6400 DWT; TE engs 2600 IHP; 3 Scotch boilers 14-9 with superheaters; keel May8/20; launch Apr20/21 est; deliver May/21 est.

No name, hull 82, Norwegian interests; sister to above; keel July29/20; launch May/21 est; deliver June/21 est.

COLLINGWOOD SHIPBUILDING CO., COLLINGWOOD, ONTARIO

Purchasing Agent: E. Podmore.

No new tonnage; plant operating on repair work only.

DAVIE SHIPBUILDING & REPAIRING CO., LTD., LANYON LEVIS, P. Q., CANADA

Purchasing Agent: N. W. Van Wyck.

Canadian Challenger, hull 476, single-screw cargo Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE surface cond engs 3000 IHP; 3 Scotch marine boilers 15-6x11-6; keel May14/20; launch June/21 est.

PORT ARTHUR SHIPBUILDING CO., PORT ARTHUR, ONTARIO

Purchasing Agent: N. S. Thrasher, Cleveland, Ohio.

Canadian Harvester, hull 45, double-deck ocean freighter Canadian government merchant marine; 251 LBP; 43-6 beam; 22-3 loaded draft; 10 loaded speed; 3950 DWT est; 3 cyl TE 18-30-50x36 engs 1250 IHP; 2 Scotch boilers 16x10-9; keel Mar30/20; launch Nov 20/20; deliver May1/21 est.

Glenafton, hull 46, single-deck Lake freighter Glen Transportation Co; 251-11½ LBP; 42-6 beam; 16-6 loaded draft; 10 loaded speed; 3000 DWT est; 3 cyl TE 20-33-54x60 engs 1300 IHP; 2 Scotch boilers 14-6x11; keel Oct20/20; launch Apr/21 est; deliver June 1/21 est.

SINCENNES-McNAUGHTON LINE, SOREL, QUEBEC

No work on hand.

TIDEWATER SHIPBUILDERS, LTD., THREE RIVERS, QUEBEC

No contracts for new construction.

Progress of Construction

Many of the notes in this section, which is devoted to yards of the Atlantic and Gulf, are from the Bulletin of the Atlantic Coast Shipbuilders' Association.

Baltimore

The new 10,250-ton tanker District of Columbia has been delivered by the Baltimore Dry Docks and Shipbuilding Company to the Shipping Board. The new tanker was allocated to Walter & Daley. The District of Columbia is 450 feet long, 59 feet beam and 33 feet 6 inches molded depth.

Canadian Vickers

Three vessels, Canadian Commander and Canadian Leader and an unnamed freighter for Norwegian interests, are scheduled to be delivered by Canadian Vickers, Montreal, in May. A second Norwegian freighter will be launched in May and delivered in June.

Consolidated

The Consolidated Shipbuilding Corporation, Morris Heights, New York city, has laid the keel for lightship 105 for the Bureau of Lighthouses. This vessel has an overall length of 146 feet 3 inches, 30 feet beam and 12 feet 7 inches draft. Lighthouse tenders Oak and Hawthorn, two steel vessels of 160 feet in length, are under construction at the Consolidated yards. A 98-foot ocean-going motor cruiser, building for a prominent Western yachtsman, will be launched by the builders some time in April.

Cramp

William Cramp & Sons Ship and Engine Building Company, Philadelphia, expects to deliver the passenger steamship Cuba to the P. & O. April 15. This is a vessel 325 feet between perpendiculars, of a deadweight capacity of 1100 and a loaded speed of 16 knots. All the other work of the Cramp yard is naval, five scout cruisers being under construction for the United States.

Daniels

The Oscar Daniels Company, Tampa, Florida, schedules the launching of the B. D. Benson, an 11,900-ton tanker for the Standard Oil, April 15, with delivery in June, and the launching of a sister, T. J. Williams, in June, with delivery in August. The 9600-ton cargo vessel Brunswick, U. S. S. B., will be delivered in May.

Defoe

The Defoe Shipbuilding Company, Bay City, Mich., which is constructing eight mine planters for the United States Army, expects to deliver all within approximately a month, the first being scheduled for delivery April 25 and the last May 30. Each of the vessels is 100 feet between perpendiculars, 22 in beam, 11 in loaded draft and will have a speed of about 12 knots.

Doullut & Williams

The Doullut & Williams Shipbuilding Company, New Orleans, La., launched three 750-ton steel oil-carrying barges and delivered its fourth vessel, the steamship City of Elwood, to the U. S. Shipping Board. This ship left the plant at 6 a. m. on the morning of February 22, following the route through Lake Pontchartrain, and docked February 25, thus making record time, as it formerly took some thirty days for the large composite ships to go through this route.

The steamer Ward, 9600 tons deadweight, built on the Isherwood plan, has been launched by Doullut & Williams.

Drydock Corporation

The Drydock and Ship Repair Corporation of Philadelphia, a promotion which was launched in 1919 by the Maritime Finance Corporation of Philadelphia, is again attempting to finance itself through a promotion house in New York city. The site of the proposed dry dock is in Camden, N. J.

Federal

The Federal Shipbuilding Company, Kearny, New Jersey, expects to deliver the tanker Vancolite to the Standard Oil Company of New Jersey in April, following upon the estimated delivery of the sister ship, Walter E. Jennings, in March. The two vessels and three more—E. T. Bedford, Victrolite and J. A. Moffett, Jr.—are of 15,000 deadweight tons each. The keel layings of three freighters, Steel Seafarer, Steel Pathfinder and Steel Pioneer, for the United States Steel Products Company, the Isthmian Line, are scheduled for April.

Foundation

In a letter to the secretary of the Atlantic Coast Shipbuilders' Association Franklin Remington, chairman of the board of the Foundation Company, states the company is in the process of closing up the last of the shipyards at New Orleans, the passing of which will mark the withdrawal of the Foundation Company from the shipbuilding business. The New Orleans yard was established in May ,1918, with three ways on which steel vessels were constructed.

Other yards operated by the company were as follows: Yard No. 1, Kearney, N. J., established May, 1917, five ways, wood vessels; yard No. 2, Victoria, B. C., established June, 1917, ten ways, wood vessels; yard No. 3, Portland, Ore., established July, 1917, ten ways, wood vessel; yard No. 4, Tacoma, Wash., established August, 1917, ten ways, wood vessels; yard No. 5, Savannah, Ga., established February, 1918, nine ways, steel vessels; yard No. 6, Brunswick, Ga., established 1917, four ways, wood vessels; yard No. 7, Port Huron, Mich., established about 1900, repair work; also one dry dock of 410 feet at the Port Huron yard.

Fuller

The George A. Fuller Company has delivered the last vessel building at its Carolina shipyard, Wilmington, N. C. The company has no additional contracts at present, and will temporarily close the yard pending a decision in April as to whether or not it will continue in the shipbuilding business.

Globe of Maryland

The Globe Shipbuilding & Drydock Company of Maryland, situated at Baltimore, schedules the launchings of two 8600 deadweight ton tankers, San Leopoldo and San Leonardo, for the Eagle Oil Transport Company, for April, with deliveries in June. The keels were laid in September.

Harlan

The E. R. Kemp, third of the tank fleet being built for the Sinclair Consolidated Oil Company, was launched at the Harlan plant of the Bethlehem Shipbuilding Corporation, Wilmington, February 12.

Lake Torpedo

United States submarine S-48, which was launched February 26 by the Lake Torpedo Boat Company at Bridgeport, Conn., is the last word in submarine construction, and the most effective of its kind in the world, according to the Navy Department. The vessel is one of ten of the same type soon to be added to the navy. The S-48 is 240 feet in length and displaces 950 tons. She carries four 21-inch torpedo tubes in the bow and one in the stern, in addition to a four-inch 50-calibre gun just forward of the conning tower. The vessel can submerge 200 feet in safety. The inside of the vessel is divided into six watertight compartments. Five main ballast tanks make it possible for her to submerge in water of any density and to fire her torpedoes even at a depth of 200 feet. The radio equipment also is of a type that permits sending and receiving messages even when far below the surface of the sea. The S-48 is equipped with three periscopes, one of which has its eyepiece in the conning tower. The eyepieces of the other two are in the control room.

Merchant

The trial trip of the combination vessel Mount Carroll, launched January 10 by the Chester yard of the Merchant Shipbuilding Corporation, was run March 5 and 6. The Mount Carroll is of the following dimensions: 440 feet length between perpendiculars, 57 feet beam, 28 feet 8¾ inches loaded draft. She has geared turbines and her contract speed is 13 knots. She was built for the United American Lines.

Navy Yard, Boston

The oil-fuel ship Pecos, hull 18, Boston Navy Yard, building for the United States Navy, is scheduled to be launched April 23 and to be delivered in October. The keel of the destroyer tender Whitney is scheduled to be laid in April; launching is estimated for April, 1922, and delivery for October, 1922.

Newburgh

The Newburgh Shipyards, Newburgh, New York, launched the twin-screw steamship Henry D. Whiton for the Union Sulphur Company, New York, February 26. She is designed for the carrying of 7000 tons of sulphur in bulk.

New York

The 535 Wenatchee, built by New York Shipbuilding Corporation for the Shipping Board and assigned to the Pacific Steamship Company for operation, on her trial trip maintained an average speed of 18.75 knots and attained 20.2 at one time.

The combination cargo and passenger steamship Blue Hen State, named in honor of the State of Delaware, was launched February 23 by the New York Shipbuilding Corporation. The vessel is the last of its type of seven ships built at the yard for the Shipping Board and named for various states.

The Granite State and the destroyer Hopkins were delivered to the Shipping Board in March. On March 22 the Camden plant launched the superdreadnought Colorado, 32,600 tons normal displacement, the keel of which was laid in 1919. The Colorado will have electric drive. New York also is constructing the dreadnought Washington and the battle-cruiser Saratoga.

Philadelphia Navy Yard

The 1000-foot drydock at the Philadelphia Navy Yard, known as No. 3, was flooded February 15 as a test preparatory to being put into commission March 1 The drydock is one of the largest in the country. The first work will be on the Kearsarge, upon which a 250-ton Wellman-Seaver-Morgan crane will be erected. The Kearsarge will be a repair ship.

Port Arthur

Two vessels building at the yard of the Port Arthur Shipbuilding Company, Port Arthur, Ontario, will be delivered about May 1 and June 1. The first is the Canadian Harvester, 3950 deadweight tons, for the Canadian Government Merchant Marine, and the second, the Glenafton, 3000 deadweight tons, for the Glen Transportation Company.

Saginaw

The Saginaw Shipbuilding Company, Saginaw, Michigan, expects to deliver the 4245 deadweight ton ocean steamship Lake Miraflores to the Shipping Board in April. She was launched in February.

Standard

The Standard Shipbuilding Corporation of Shooters Island, New York, on March 5 launched the third of four oil tankers contracted for with the Eagle Oil Transport Company, Ltd., of London, England. She was christened San Ubaldo. This vessel is an 8400 deadweight ton oil tanker of the Gold Shell type. She is 427 feet long, with an extreme breadth of 53 feet 5 inches, a moulded depth of 31 feet, and will have a speed of 11 knots. The San Tiburcio, the second of these vessels, had her sea trial a few days after the launching of the San Ubaldo. On a six-hour endurance run made 11.35 knots. She was delivered March 12 and will be used by the Eagle Oil Transport Company between Great Britain and Mexico, flying the British flag.

Submarine Boat

Three freighters for the Submarine Boat Corporation are scheduled to be delivered by the Submarine Boat yard, Port Newark, April 1, and a fourth June 1. All are standard Submarine Boat 5350's. Twelve canal barges for the Submarine Boat will be launched in March and April and delivered in April. These vessels are 100-4 over-all, have deadweight capacities of 206 tons and are designed to be towed in the Lake service between Milwaukee, Cleveland and Buffalo as well as on the New York Barge Canal.

Sullivan

A contract has been awarded by the city of Philadelphia for a new fireboat to John W. Sullivan & Co., New York. The new boat will be the largest of the police or fire craft now on the Delaware river and will cost $249,500. She will be built of steel with twin screws and equipped along the most modern lines. The new boat is to be delivered by November 15. Another vessel also will be built by the city of Philadelphia.

Sun

Two launchings took place at the yard of the Sun Shipbuilding Company during February. On the 19th was launched the tanker Cerro-Ebano, 12,500 deaweight tons, and on the 26th the Cerro-Azul, 12,500 tons, both for the Pan-American Petroleum and Transportation Company.

The first installment of the floating sectional drydock, which is to cost $1,500,000, was sent into the Delaware river February 19 by the Sun Shipbuilding Company. It was the release of the first of eleven pontoons, staged as a companion enterprise to the launching of the Cerro Ebano. The companion enterprises were staged at widely remote sections of the yard, the release of the 110 by 40 foot pontoon having no relation to the launching of the ship. The Sun Company expects to launch one pontoon a week and to have the dock in operation early in the summer.

Terry

The Terry Shipbuilding Corporation, Savannah, Georgia, is building four oil barges for its own account. Each is 285 between perpendiculars, 44 beam, 21 loaded draft and has a capacity of 3500 deadweight tons.

In Pacific Yards

Steel merchant vessels under construction in Pacific Coast shipyards March 1 numbered 44 of 487,270 deadweight tons, as compared with 49 of 516,160 tons February 1, according to returns compiled by Pacific Marine Review. Canadian yards on March 1 were building 7 vessels of 50,870 deadweight tons, their status being unchanged from February 1.

Two new contracts, the first for six months or so, have been announced. These are held by the Bethlehem Shipbuilding Corporation for the construction of two combination ore and coal carriers for the Ore Steamship Corporation, a Bethlehem Steel subsidiary. The vessels will be of 20,000 deadweight tons each and will be the largest merchantmen ever laid down in a yard of the Pacific Coast.

The addition of 40,000 deadweight tons bolsters up the aggregate considerably, inasmuch as February deliveries were 7 vessels of 68,890 tons, classed as follows: Concrete tanker for Shipping Board, 1 of 7500 tons; freighter for Shipping Board, 1 of 5350 tons; tankers for private account, 5 of 56,040 tons. February brought no changes in the status of freighters for private account and tankers for foreign private account.

In the following list of vessels under construction or under contract March 1, the two Bethlehem vessels are classed as cargo carriers:

American Yards.	No. Vessels.	Aggregate Deadwgt.
Freighters U. S. S. B.	8	82,600
Tankers U. S. S. B.	6	60,300
Tankers private	16	187,590
Freighters private	5	74,500
Tankers foreign	9	82,280
Totals	44	487,270
Canadian Yards.		
Freighters government	6	50,270
Freighters private	1	600
Totals	7	50,870

The two Bethlehem vessels will be of 20,000 tons deadweight; 571 feet 6 inches long over all, 550 feet 1 inch between perpendiculars, have a molded beam of 72 feet, a depth of 44 feet, a loaded draft of 32 feet 4 inches and a loaded speed of 11½ knots. They will be equipped with Curtis turbines, which will be built at the Bethlehem Fore River plant, with Falk reduction gears, developing 5000 shaft horsepower; each vessel will be twin-screw and will have three Scotch single-end boilers, 17 feet 6 inches inside diameter by 12 feet in length over the bottom heads, 4287 square feet of heating surface, oil-burning. Kingsbury thrust bearings will be used.

No dates have been set for laying the keels. Delivery is expected to be early in 1922.

On page 197 of this number of Pacific Marine Review will be found a description of the two ore and oil vessels, Marore and Steelore, being constructed for the Ore Steamship Corporation at the Bethlehem Sparrows Point plant. The Chilore and Lebore, which will carry coal instead of oil, differ in some respects from the others, especially in having large bulges on the walls of the ore hold, these being designed to aid in trimming; but in general the two classes of vessels are much the same. Detailed descriptions of the Chilore and Lebore will be published in a future number of Pacific Marine Review.

Each new record vessel of the Pacific Coast shipyards has been forced to surrender its title after only a few months. At the present time the 14,000-ton freighters of the Matson Navigation Company, Manulani and Manukai, launched February 20 by the Moore Shipbuilding Company, hold the record. They will be the largest carriers only until the Moore yard launches the 16,340-ton tanker Tamihua for the Atlantic Steamship Lines of the Southern Pacific; and the Tamihua, in turn, will make way for the big Bethlehem vessels. They probably will stand for years as the largest merchantment built on the Pacific, for freighters or tankers of their size are not to be expected soon. The two Bethlehem vessels will be almost as large as the Minnesota, which remains the first carrier of the world.

Newspaper reports credit the Norway Pacific Shipbuilding Company, Everett, Washington, with contracts for six tankers. No confirmation has been received from the company.

Pacific Coast to Close

When the Shipping Board freighter Nashaba has been completed by the Pacific Coast Shipbuilding Company in June, the yard at Bay Point will be closed. No statement has been made by the company as to the disposition of the plant and equipment.

A future does open for the town of Clyde, however. This town was built by the Shipping Board and the Pacific Coast Shipbuilding Company. The board and the Public Health Service of the Treasury Department are discussing the advisability of using the hotel and houses, of which there are 103, as homes for disabled soldiers. Appropriations for caring for disabled veterans were made by the last Congress, and one home will be situated somewhere in the San Francisco Bay district.

Clyde appears to have good prospects of being selected. The hotel, a handsome structure of stucco, can accommodate 150 persons and could be used as the principal ward; the smaller cottages might house attendants and be used also as smaller wards. Clyde is built on hilly ground, is quite up-to-date in its appointments and has a good water supply.

Hanlon's New Docks

Two marine railways of 6000 and 3000 tons' lifting capacity are being installed by the Hanlon Drydock & Shipbuilding Company, Oakland. The docks were designed by Leland S. Rosener, San Francisco, who planned the large railways of the Moore Shipbuilding Company.

U. S. S. B. Work

Fourteen vessels of an aggregate deadweight tonnage of 142,900 were under construction for the Shipping Board in Pacific Coast yards March 1, as compared with 16 of 155,750 tons February 1; 18 of 173,950 January 1, and 23 of 219,100 December 1. The freighter Memnon, 5350 tons, and the concrete tanker Peralta, 7500 tons, were delivered in February.

The Los Angeles Shipbuilding & Drydock Company laid the last keel of the Shipping Board's Pacific Coast program, the West Chopaka, February 24, following immediately upon the launching of the sister ship, the 11,000-ton West Lewark. The West Chopaka is scheduled to be delivered in November. One vessel, the 9400-ton Meanticut, was to be delivered in March.

In the following table T indicates tanker and C cargo; the figures are of deadweight tonnages and the dates those of estimated delivery:

Bethlehem Shipbuilding Corporation, San Francisco: Hambro, T, 10,100, May 31; Hamer, T, 10,100, July 30; Hammac, T, 10,100, July 30.

Moore Shipbuilding Company, Oakland: West Bohemia, T, 10,000, July 14; West Tustem, T, 10,000, August 25; West Lubrico, T, 10,000, September 30.

Pacific Coast Shipbuilding Company, Bay Point: Meanticut, C, 9400, March 15; Nashaba, C, 9400, June 30.

Los Angeles Shipbuilding & Drydock Company, San Pedro: West O'Rowa, C, 8800, April 10; West Lewark, C, 11,000, May 12; West Faralon, C, 11,000, June 21; West Greylock, C, 11,000; August 9, West Prospect, C, 11,000, September 14; West Chopaka, C, 11,000, November 25.

Pacific Shipbuilding

BALLARD MARINE RAILWAY COMPANY, SEATTLE

Tug Pacific Creosoting Co; 53-6 long; 13-8 beam; 8 deep; heavy-oil engine; launch Mar/21.

B. C. MARINE ENGINEERS & SHIPBUILDERS, LTD., VANCOUVER

Auxiliary power schooner Hudson Bay Co; 3-masted, 200 LOA; 36 beam; 15 deep; 12 loaded draft; 700 DWT; oil engs 360 BHP, built by William Beardmore & Co; speed 7½ knots; vessel delayed by non-arrival of engines, ordered in England; engines expected about the middle of April; vessel scheduled to be launched the end of March and to be delivered complete about May 20.

B. C. YACHT & BOAT BUILDERS, LTD., VICTORIA, B. C.

Two 75-foot motor patrol-boats Canadian Marine Department; 100 HP Fairbanks-Morse engs; launch Jan4 21 and Jan17/21.

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Purchasing Agent: O. W. Street

Hammac, hull 5274, tanker USSB; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec engs 2600 IHP; 3 Scotch marine boilers 15x11-9; launch May 20 21 est; deliver July 30/21 est.

Alameda Works

Hambro, hull 5272, tanker USSB; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec engs 2700 IHP; 3 Scotch marine boilers 15x

11-9; keel Sept8/20; launch Apr15/21 est; deliver May31/21 est.

Hamer, hull 5273, tanker USSB; sister to Hambro; keel Nov1/20; launch May16/21 est; deliver July30/21 est.

K. R. Kingsbury, hull 5306, tanker Standard Oil Co of California; 440 LBP; 58 beam; 28 loaded draft; 11 loaded speed; 11,600 DWT; rec engs 3200 IHP, 3 Scotch boilers 15-6x12-1; keel July2/20; launch Feb7/21; delivery May1/21 estimated.

Frank G. Drum, hull 5308, tanker Associated Oil Co; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec eng 2700 IHP; 3 Scotch boilers 15x11-9; keel Nov5/20; launch Feb18/21; deliver Mar.25/21 est.

Chilore, hull 5309, combination ore and coal carrier Ore Steamship Corporation; 571-6 LOA; 550-1 LBP; 72 molded beam; 44 molded depth; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; Curtis turbines with Falk reduction gears; 5000 SHP; 3 Scotch SE boilers 17-6x12, each 4287 square feet; oil-burners; date of keel laying not set.

Lebore, hull 5310, combination ore and coal carrier Ore Steamship Corporation; sister to above; date of keel laying not set.

F. H. Hillman, hull 5311, tanker Standard Oil Co of California; 500 LBP; 68 beam; 25-11 loaded draft; 11 loaded speed; 15,000 DWT; rec engs 4000 IHP; 3 Scotch marine boilers 16-4x12-9; keel Jan11/21; launch May5/21 est; deliver Aug15/21 est.

H. M. Storey, hull 5312, tanker Standard Oil Co of California; sister to F. H. Hillman; keel Jan19/21; launch June 1/21 est; deliver Sept1/21 est.

W. S. Rheem, hull 5313, tanker Standard Oil Co of California; sister to F. H. Hillman; keel Feb21/21; launch June 15/21 est; deliver Sept15/21 est.

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Naval Work

Destroyers USN; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1308 tons; turbine engs 27,000 IHP; 4 Yarrows boilers as follows: **Kidder, Selfridge, Marcus, Mervine, deliver Feb /21;** Chase, hull 323, keel May5/19, launch Sept2/19; Robert Smith, hull 324, keel May13/19, launch Sept19/19; Mullany, hull 325, keel June3/19, launch July9/20; Coghlan, hull 326, keel June 25/19, launch June 16/20; Preston, hull 327, keel July18/19, launch Aug7/20; Lamson, hull 328, keel Aug13/19, launch Sept1/20; Hull, hull 330, **launch Feb 15/21;** McDonough, hull 331, keel May 24/20, launch Dec15/20; Farenholt, hull 332, **launch Mar9/21;** Sumner, hull 333, keel Aug27/19, launch Nov24/20; Corey, hull 334, keel Sept15/20; Melvin, hull 335, keel Sept15/20.

Submarines USN: S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145, launch Jan5/21; S-41, hull 146.

RALPH J. CHANDLER COMPANY, WILMINGTON

Purchasing Agent: G. R. Crofut.

Delivered sixth and last section floating drydock for Los Angeles Shipbuilding & Drydock Company.

CHOLBERG SHIPYARD, VANCOUVER, B. C.

Purchasing Agent: W. Meed.

Sir Henry Drayton, hull 5, 4-masted barkentine Victoria Shipowners, Ltd; 250 LOA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel; shaft logs fitted for auxiliary but no machinery installed; keel May 15/20; launch Apr1/21 est.

No name, hull 6, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel June 4/20; launch May 1/21 est.

No name, hull 7, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel Feb 21; launch Apr30/21 est; deliver May 30/21 est.

J. COUGHLAN & SONS, LTD., VANCOUVER, B. C.

Purchasing Agent: J. Joseph.

Canadian Transporter, hull 20, steel freighter Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE eng 3000 IHP; 3 Scotch boilers 15-6x11-6; keel Jan6/21.

Canadian Freighter, hull 21, steel freighter Canadian government; sister to above; keel Jan10/21.

HANLON DRYDOCK & SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: C. H. Brown.

Dan F. Hanlon, hull 89, steam schr. D. J. Hanlon; 2500 DWT; 1400 IHP engines; 2 B&W boilers.

HARBOR MARINE COMPANY, VICTORIA, B. C.

Purchasing Agent: B. L. Robertson.

Canadian Traveller, steel freighter Canadian government merchant marine; 400 LBP; 52 beam; 25-2 loaded draft; 11½ loaded speed; 8390 DWT; TE eng; 3 Scotch boilers 15-6x11-6; 2 deck; keel Aug9/19; launch Sept29/20; deliver uncertain; refrigerating plant being installed.

Car ferry Canadian Pacific; 270 LOA; 42 beam; 12 molded depth; single-deck; three tracks, capacity 18 cars; launch Jan25/21.

LONG BEACH SHIPBUILDING COMPANY, LONG BEACH

LOS ANGELES SHIPBUILDING AND DRYDOCK CO., SAN PEDRO

West O'Rowa, hull 30, steel cargo USSB; 410 LBP; 54 beam, 24-2 loaded draft; 10½ loaded speed; 8800 DWT; TE eng 3500 IHP; 3 WT boilers; keel June14/20; launch Dec30/20; deliver April10/21 est.

West Lewark, hull 31, steel cargo USSB; 430 LBP; 54 beam; 28-2 loaded draft; 10½ loaded speed; 11,000 DWT; TE engs 3500 IHP; 3 Scotch single end 15-9; keel July 30/20; **launch Feb. 24/21: deliver May12/21 est.**

West Faralon, hull 32, steel cargo USSB; sister to above; keel Sept27/20; launch Apr10/21 est; deliver June21/21 estimated.

West Greylock, hull 33, steel cargo USSB; sister to above; keel Nov10/20; launch May24/21 est; deliver Aug9/21 estimated.

West Prospect, hull 34, steel cargo USSB; sister to above; keel Dec31/20; launch July2/21 est; deliver Sept 14/21 estimated.

West Chopaka, hull 35, steel cargo USSB; sister to above; **keel Feb24/21;** launch Sept6/21 est; deliver Nov10/21 estimated.

MAIN IRON WORKS, SAN FRANCISCO

Purchasing Officer: B. W. Bengston.

Three tugs for Shipowners' & Merchants' Tug Boat Co; 150 over-all; 30 beam; 16 loaded draft; TE engs 1000 IHP; 2 Scotch marine boilers 11-6; deliveries March 10, April 10, May 1.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: W. E. Hostetter.

West Bohemian, hull 2862, tanker USSB; 425 LBP; 57 beam; 26 loaded draft; 10,000 DWT; rec eng; 3 Scotch boilers 15-2x11; keel Oct23/20; launch May7/21 est; deliver June 7/21 est.

West Tustem, hull 2863, tanker USSB; sister to above; keel Nov24/20; launch June4/21 est; deliver June30/21 estimated.

West Lubrico, hull 2864, tanker USSB; sister to above; keel Jan/21; launch June4/21 est; deliver June30/21 est.

Manulani, hull 158, freighter Matson Nav Co; 480 LBP; 62 beam; 30 loaded draft; 14,000 DWT; Parson engs; 5 Scotch marine boilers 15-6x12-3½; keel Aug5/20; launch Feb20/21.

Manukai, hull 159, freighter Matson Nav Co; sister to above; keel Aug17/20; launch Feb20/21.

H. T. Harper, hull 163, tanker Standard Oil Co of California; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engs; keel Oct/20.

Gargoyle, hull 164, tanker Vacuum Oil Co; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec. engs; 3 Scotch marine boilers 15-2x12; keel Sept13/20; launch Jan9/21; **deliver Feb14/21**.

Tamihua, hull 165, tanker S. P.-Atlantic S S Co; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; rec engs; 3 Scotch boilers 15-9x12; **keel Feb28/21**.

No name, hull 166, tanker Vacuum Oil Co; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec engs; 3 Scotch marine boilers 15-2x12; keel Dec9/20.

NAVY YARD, PUGET SOUND

Nitro, ammunition carrier for government; 460 LBP; 61 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp; turbine engs 5300 IHP; 4 Babcock & Wilcox WT boilers; keel Mar 19/19; launch Dec16/19.

Medusa, repair ship for government; 460 LBP; 70 beam; about 19 loaded draft; 17-5 loaded speed; turbine eng 7000 IHP; 2 WT express type boilers; 10,000 tons disp; keel Jan2/20; date of launching not set.

Holland, submarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K. loaded speed; turbine eng 7000 IHP; two WT express type boilers; 10,000 tons disp; date for keel laying and estimated date of launching not set.

NAVY YARD, MARE ISLAND

California, battelship USN; 600 LBP; 97-3½ beam; 30-3 loaded draft; 21 loaded speed; 32,300 disp; turbo-electric engs 26,800 SHP; 8 Bu's express boilers 50,984 sq ft; keel Oct25/16; launching Nov20/19.

Montana, battleship USN; 660 LBP; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 disp; turbo-electric engs 60,000 SHP; 12 Bu's express boilers 74,040 sq ft; keel Sept1/20.

Zane, destroyer USN; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 disp; geared turbine eng 26,000 SHP; 4 Normand boilers 27,000 sq ft; keel Jan15/19; launch Aug12/19; **completed and commissioned Feb15/21.**

Wasmuth, destroyer USN; sister to Zane; keel Aug12/19; launch Sept15/20.

Trever, destroyer USN; sister to Zane; keel Aug12/19; launch Sept15/20.

Perry, destroyer USN; sister to Zane; keel Sept15/20.

Decatur, destroyer USN; sister to Zane; keel Sept15/20.

NORTHWEST BRIDGE & IRON COMPANY, PORTLAND

Purchasing Agent: W. C. Smith.

Swiftstar, tanker Swiftsure Oil Trans Co (France & Canada S S Co); 12,000 DWT; shelter-deck; Isherwood system; 465-7 LBP; 60 beam; 26-3 loaded draft; 10½ loaded speed TE eng 3150 IHP; 3 Scotch boilers 15-5½x11-9; **launch Feb 5/21; deliver Feb25/21.**

Swiftscout, tanker Swiftsure Oil Trans Co; sister to above; **launch Mar12/21.**

Swifteagle, tanker Swiftsure Oil Trans Co; sister to above.

Swiftking, tanker Swiftsure Oil Trans Co; sister to above.

Swiftlight, tanker Swiftsure Oil Trans Co; sister to above.

PACIFIC COAST SHIPBUILDING CO., BAY POINT

Purchasing Agent: J. A. Smiley.

Meanticut, hull 949, steel cargo US SB; 402-6 LBP; 53 beam; 26-6 loaded draft; 9400 DWT; rec eng 2800 IHP; 3 Scotch boilers 11x15-6; keel July18/19; launch Dec22/20; **deliver Mar/21.**

Nashaba, hull 950, steel cargo USSB; sister to above; keel Aug25/19; launch Mar25/21 est; deliver June/21 est.

PACIFIC MARINE IRON WORKS, PORTLAND

Steel hull Port of Portland dredge Columbia; **launch Feb.24/21; deliver Apr15/21 est.**

J. H. PRICE CONSTRUCTION CO., ANDERSON SHIPBUILDING PLANT, SEATTLE

Wood M/S Donna Lane; launch Nov 15/20.

Wood MS Muriel, launch June26/20.

PRINCE RUPERT DRYDOCK & ENGINEERING COMPANY, PRINCE RUPERT

Canadian Reaper, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Sept27/19.

Canadian Thrasher, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Oct20/19.

These vessels will be completed by the Wallace Shipbuilding & Drydock Co, North Vancouver. The terms are time and material plus 8 per cent.

JAMES ROBERTSON SHIPYARD, ALAMEDA

Purchasing Agent: James Robertson

No name, hull 102, side-wheel ferryboat Richmond-San Rafael Ferry Co; 190 LBP; 34 beam; 17 loaded draft; 10 loaded speed; diagonal cross comp eng 500 IHP; 2 marine dry back boilers 9x17; keel Nov15/20.

SAN FRANCISCO SHIPBUILDING COMPANY, OAKLAND

Last concrete vessel, tanker Peralta, delivered, and yard turned over to supply and sales division, Shipping Board.

SEACRAFT CORPORATION OF CALIFORNIA, WILMINGTON

Purchasing Agent: C. D. Callahan.

Recently took over yard of Marine Equipment Co; overhauling equipment preparatory to construction of pleasure craft.

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

Montebello, hull 21, Isherwood tanker Union Oil Co; 440 LBP; 58 beam; 29-2 loaded draft; 11 loaded speed; 12,000 DWT; QE engs 3300 IHP; 3 Scotch boilers 15-6 x 12-1; keel April20/20; launch Jan24/21; **deliver Mar4/21.**

La Placentia, hull 22, Isherwood tanker Union Oil Co; same as above; keel May20/20; **launch March8/21;** deliver April/21 est.

La Purisima, hull 23, Isherwood tanker Union Oil Co; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engs 2800 IHP; 3 Scotch boilers 14x12; keel Dec22/20; deliver July/21 est.

Scopas, hull 24, Isherwood tanker Nederlandsch - Indische Tankstoomboot Maatschappij; 412 LBP; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engs 2800 IHP; 3 Scotch boilers 15-6x11-7; keel Oct20/20; launch Mar/21 est; deliver Apr/21 est.

Silvanus, hull 25, Isherwood tanker Nederlandsch - Indische Tankstoomboot Maatschappij; same as above; keel Oct 20/20; launch Apr/21; deliver May/21 estimated.

Semiramis, hull 26, Isherwood tanker Nederlandsch - Indische Tankstoomboot Maatschappij; same as above; keel Nov 5/20; launch May/21 est; deliver June/21 estimated.

G. M. STANDIFER CONSTRUCTION CORP., VANCOUVER, WASH.

Livingston Roe, hull 18, shelter-deck oil-tanker Standard Oil Co of New Jersey; 11,740 DWT; QE eng 2800 IHP; 3 Scotch boilers 14-4; Isherwood; **deliver Feb/21.**

Calgarolite, hull 19, shelter-deck oil-tanker Imperial Oil, Ltd; same as above except boilers, which are 14-9 diam.

Albertolite, hull 20, shelter-deck oil-tanker Imperial Oil, Ltd; same as Calgarolite.

W. F. STONE & SON, OAKLAND

Purchasing Agent: Lester F. Stone.

Sea Monarch, Sea Ranger, Sea Scout, tugs Main Iron Works; 150 LBP; 30 beam; 16 loaded draft; 12 loaded speed.

TODD DRYDOCK & CONSTRUCTION CORPORATION, TACOMA

Kennecott, Isherwood steel motorship Alaska S S Co; 360 OA; 49-6 beam; 22 loaded draft; 6500 DWT; McIntosh & Seymour 4-cycle Diesel engs 1200 IHP; 140 RPM; launch Jan6/21; **deliver Mar/21.**

Three scout cruisers USN, 555-6 LOA; 550 LBP; extreme beam 55-4; molded beam 54-9; depth molded 26; mean loaded draft 13-6; disp 7100 tons; Westinghouse Parsons turbines and reduction gear, developing 105,000 HIP, driving 4 propellers; designed speed 34 knots; RPM each propeller 375 to 389; shaft HP to each propeller 24,500 max at 389 RPM, 22,500 max at 375 RPM; 12 Yarrow WT boilers, working pressure 265 pounds; oil-burning; 12 6-inch rapid-fire guns; 2 3-pounders, 2 machine guns, 2 twin torpedo tubes.

First of these vessels launched Dec 14/20 and christened Omaha; keel by Seattle Construction & Drydock Co July /17 but removed for merchant work; relaid by Todd Dec/18; second **launch March24/21; christened** Milwaukee.

UNION CONSTRUCTION COMPANY, OAKLAND

R. J. Hanna, hull 14, oil-tanker Standard Oil Co of California; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engs 3000 IHP; 3 Scotch marine boilers 15-2x11-6; keel July12/20; launch Feb5/21; deliver Apr 1/21, estimated.

Acardo, hull 15, oil-tanker Anglo-Saxon Petroleum Corp, Ltd; 412 LBP; 53-5 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec engs 2600 IHP; 3 Scotch marine boilers 15-6x11-7; keel Aug7/20; **launch March12/21;** deliver April/21 est.

Tampa, hull 16, cutter USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engines 2600 IHP; 2 WT boilers; keel Sept27/20; launch Apr 16/21 est.

Haida, hull 17, cutter for USCG; same as above; keel Sept27/20; launch Apr19/21 est.

Mojave, hull 18, cutter USCG; same as above; launch Sept10/21 est.

Modoc, hull 19, cutter USCG; same as above; launch Sept10/21 est.

Shawnee, hull 20, cutter USCG; 150 LOA; 30 beam; 13-6 loaded draft; 12½ loaded speed; 1000 DWT; rec engs 1000 IHP; 2 WT boilers.

Achatina, hull 21, oil-tanker Anglo-Saxon Pet Corp, Ltd; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec engs 2600 IHP; 3 Scotch marine boilers 15-6x11-7; keel Dec15/20; launch May21/21 est.

Ampullaria, hull 22, oil-tanker Anglo-Saxon Pet Corp, Ltd; sister to Achatina; keel Feb5/21; launch June20/21.

Amalthus, hull 23, oil-tanker Anglo-Saxon Pet Corp, Ltd; sister to Achatina; **keel Mar12/21;** launch July 15/21 estimated.

All cutters on transverse system; others on Isherwood system.

WALLACE SHIPBUILDING & DRYDOCK CO., VANCOUVER, B. C.

Canadian Skirmisher, cargo Canadian government; 8400 DWT; 413 long; 52 beam; 31 deep; 11½ loaded speed; keel Oct/20; **launch Mar17/21.**

Coastwise steamship Canadian Pacific; 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel Oct/20; launch May/21 est; deliver Aug or Sept/21 est.

This company also will complete the Canadian government steamships Canadian Reaper and Canadian Thrasher, each of about 8400 tons deadweight, work on which was suspended when the Prince Rupert Drydock & Engineering Company went into the hands of a receiver.

Miscellaneous Construction

BABCOCK & WILCOX CO., CHARLES C. MOORE, SAN FRANCISCO, PACIFIC COAST MANAGER

Steamer Pacific, Pacific Marine Iron Works, installation of two Babcock & Wilcox marine boilers.

COLUMBIA STEEL COMPANY, PITTSBURG, CALIF.

Steel castings for many steel vessels now under construction in the Pacific Coast yards, including the dreadnought Montana and sister ships 49, 50, 52; also for Coast Guard cutters under construction in the Union Const Co. yard.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING COMPANY, PHILADELPHIA

Twelve Parsons manganese bronze propellers for scout cruisers 4, 5 and 6 building by Todd Drydock & Construction Corpn, Tacoma. Two right-hand and two left-hand propellers for each vessel. Weight of propellers 13,200 pounds each; diameter 11-3; pitch 11-10.

ALLAN CUNNINGHAM COMPANY, SEATTLE

On order and under construction: Six steam and electric steering gears; 13 steam and electric anchor windlasses; 18 steam and electric and hydro-electric and hand capstans; 37 steam and electric winches.

DOW PUMP & DIESEL ENGINE COMPANY, ALAMEDA

H. T. Harper, motorship Standard Oil Co; one 200 IHP, two 267 IHP Diesel auxiliary electric drive engines.

FORD & GEIRRINE, AGENTS, SAN FRANCISCO

McNab direction indicator, mfd by the McNab Co for hulls 12, 14 at Union Const Co, hull 163 at Moore's; Willett-Bruce whistle control, mfd by the McNab Co for hull 14 at Union Const Co; Brown steam tiller, Hyde Windlass Co, for hull 5308 at Bethlehem; National stockless anchors, Upson Walton Co, for hull 165 at Moore's; Dean feed pumps, Dean Bros' Steam Pump Works, for 166 at Moore's; Reliance forced draft equipment, John Reid & Co, for hulls 165, 166 at Moore's; National stockless anchors, Upson Walton Co, hull 166, at Moore's; Dean feed pumps, Dean Bros' Steam Pump Works, hull 23, Southwestern; Balsa wood for cold storage spaces, hulls 158, 159, Moore's; hull 14, Union Const, hull 5306, Bethlehem; Willett Bruce whistle control, McNab Co, hulls 16, 17, 18, 19, Union Const, hulls 19, 20, Standifer, and Yale and Harvard; Tracy steam purifiers, Tracy Engineering Co, Yale and Harvard; ten sets Welin davits, American Balsa Co, hulls 158, 159, Moore; McNab direction indicators, McNab Co., hulls 16, 17, 18, 19, Union Const, hulls 21, 22, Southwestern; Reliance forced draft equipment, John Reid & Co, hull 23, Southwestern: Anchor chain, Lebanon Chain Co, hull 23, Southwestern: windlass, gypsy and steering gear, Hyde Windlass Co, hull 20, Union Const.

LIDGERWOOD MFG. CO., NEW YORK SAN FRANCISCO, LOS ANGELES

One 10x10 inch screw gear steering engine for USS Holland building at Puget Sound Navy Yard.

LLEWELLYN IRON WORKS LOS ANGELES

Five marine engines for G. M. Standifer Const Corp, 24½x41½x72, 48-stroke, TE, 2800 IHP.

MARINE IRON WORKS, CHICAGO

Five hundred special ice machines.

SKANDIA PACIFIC OIL ENGINE COMPANY, OAKLAND

Purchasing Agent: A. Bolander.

Ten 850 BHP Werkspoor Diesel engs building for USSB; 6 cyl, 135 RPM; four delivered.

Ten 140 BHP 4-cylinder Skandia engs for self-propelling barges on Erie Canal.

Fifteen 16 BHP 1-cylinder Skandia engs, auxiliaries for above.

One 180 BHP Skandia 2-cylinder stationary eng for driving generator, Benguit Consolidated Mining Co; delivery in April.

One 120 BHP 2-cylinder Skandia eng for river freighter for N. Fay & Son.

STEWARD DAVIT & EQUIPMENT CORP., NEW YORK, SAN FRANCISCO, SEATTLE

Steward davits are being installed in the following: At Union Const Co: Coast Guard cutters, hulls 16, 17, 18, 19.

For Swiftsure Oil tankers building at Northwest Bridge & Iron Co.

For Canadian Pacific steamer building at Wallace yard, Vancouver, B. C.

UNION GAS ENGINE COMPANY, OAKLAND

Purchasing Agent: E. H. Cole.

Pacific Yard News

B. C. Marine

Engines for the auxiliary power schooner being constructed by the B. C. Marine Engineers and Shipbuilders, Victoria, for the Hudson Bay Company, have been shipped from England and are expected about the middle of April. The yard expected to launch the schooner in March and to deliver her complete about May 20.

Bethlehem

Data concerning the two 20,000-ton combination ore and coal carriers to be built by the Bethlehem Shipbuilding Corporation for the Ore Steamship Corporation will be found in the shipbuilding summary and also on page 197.

The 10,100-ton tanker Hammac for the Shipping Board is scheduled to be launched about May 20 and delivered about July 30; the Hambro to be launched about April 15 and the Hamer about May 16. Delivery of the 11,600-ton tanker K. R. Kingsbury to the Standard Oil of California will be made about May 1, and the 10,100-tonner Frank G. Drum was delivered to the Associated Oil March 26.

Hulls 5311, 5312 and 5313, which are 15,000-ton tankers for the Standard Oil of California, will be named F. H. Hillman, H. M. Storey and W. S. Rheem. The name F. H. Hillman formerly was assigned to a small motor tanker under construction at the Moore yard. The W. S. Rheem will be the second vessel of that name built by Bethlehem, the first having been delivered in August, 1918, to the Shipping Board, which had commandeered her. In order to permit the Standard Oil to name one of its own vessels for Mr. Rheem, the Shipping Board recently changed the name of the former W. S. Rheem to Shreveport.

Chandler

The Ralph J. Chandler Company has delivered the sixth and last section of the 12,000-ton floating drydock of the Los Angeles Shipbuilding and Drydock Company. The dock has a length of 540 feet.

Cholberg

Due to the necessity of preparing the barkentine S. F. Tolmie for sea as soon as possible, work on three sisters building by the Cholberg Shipyard, Vancouver, B. C., was suspended, but will go forward hereafter.

Hanlon

The Hanlon yard, Oakland, is adding forty feet to the length of the steamship Dan F. Hanlon, recently purchased on the Atlantic and towed to San Francisco Bay. A 1400-horse power engine will be installed and the vessel will be fitted otherwise for the coastwise lumber trade.

Harbor Marine

Delivery of the steamship Canadian Traveler, 8390 deadweight tons, under construction by the Harbor Marine yard, Victoria, for the Canadian Government Merchant Marine, is uncertain, due to the installation of refrigerator machinery. The car ferry for the Canadian Pacific was launched January 25.

Los Angeles

The Los Angeles Shipbuilding and Drydock Company launched the 11,000-ton freighter West Lewark, the first of five sisters under construction for the Shipping Board, February 24. She probably will be delivered about the middle of May. This vessel is the thirty-first hull to be launched by the company, all of the others having been standard 8800-tonners. Of the thirty smaller vessels twenty-nine have been delivered and the last, the West O'Rowa, is scheduled for completion early in April. Los Angeles has received the sixth and last section of its floating drydock, built by the Chandler yard, Wilmington, and offers the best docking facilities in California south of San Francisco Bay. Several vessels had been docked in the other five sections prior to completion of the last.

The new dock has been busy of late. Vessels raised include: tankers La Brea and Los Angeles; tanker Liebre, damaged in going aground; coastwise steamship Yale; yacht Henrietta; U. S. S. Gannet; yacht Venetia.

Moore

Delivery of the 10,100-ton tanker Gargoyle to the Vacuum Oil Company was made by Moore, Oakland, February 14. Two weeks later the company laid the keel of the great tanker Tamihua, 16,340 tons, for the Southern Pacific Atlantic lines. A revised schedule for the three 10,000-ton tankers building for the Shipping Board calls for delivery of the first, the West Bohemian, June 7, and for the launching of the others, West Tustem and West Lubrico, June 4 and delivery June 30. As was stated last month, Moore launched the two 14,000-ton Matson freighters, Manulani and Manukai, together on February 20.

Navy Yard, Mare Island

Mare Island Navy Yard completed and commissioned the destroyer Zane, the first of four sisters, February 15.

Northwest Bridge

The 12,000-ton tanker Swiftstar, built by the Northwest Bridge and Iron Company, Portland, for the Swiftsure Oil Transportation Company, was delivered February 25. She was the third of seven vessels to be completed, having been preceded by the Swiftsure and Swiftarrow. The sister Swiftscout was launched March 12. This vessel was to be named Swiftwind, which was changed to the new name, however, in compliment to the Boy Scouts, one of whom, Harold Adams of Portland, christened her. He was selected because he was farthest advanced in scout work.

Pacific Coast

The Pacific Coast Shipbuilding Company, Bay Point, delivered the 9400-ton freighter Meanticut to the Shipping Board in March. The last of the program of ten vessels, the Nashaba, will be delivered in June.

Pacific Marine

The Pacific Marine Iron Works, Portland, launched a new steel hull for the Port of Portland dredge Columbia February 24. The Columbia will have a steel deck and lower deckhouse of steel. Completion of the dredge is scheduled for April 15.

The beginning of the end of the world's greatest shipbuilding program. The Shipping Board freighter West Chopaka, 11,000 deadweight tons, as the hull appeared March 10 at the plant of the Los Angeles Shipbuilding & Drydock Company. The keel was laid February 24, immediately after the launching of the West Lewark, the first of five 11,000-tonners. Below is the West Lewark leaving the ways.

San Francisco

The San Francisco Shipbuilding Company, Oakland, has delivered the 7500-ton concrete tanker Peralta to the Shipping Board. She was the last ocean-going concrete vessel under construction on the Pacific Coast. The yard at Government Island, Oakland, of which the San Francisco Shipbuilding Company was agent for the government, has been turned over to the supply and sales department of the Shipping Board.

Southwestern

Three 8400-ton tankers under construction by Southwestern Shipbuilding Company, Los Angeles, for the Anglo-Saxon Petroleum Company, have been transferred to the Nederlandsch-Indische Tankstoomboot Maatschappij. Southwestern delivered the 12,000-ton tanker Montebello to the Union Oil Company March 4 and launched the sister, La Placentia, March 8. La Purisima will be the name of the third Union Oil tanker, a 7500-ton vessel, building at Southwestern.

Standifer

The G. M. Standifer Construction Corporation, Vancouver, Washington, delivered the 11,740-ton tanker Livingston Roe to the Standard Oil of New Jersey in February. This was the last of three for the Standard, but two sisters are under construction for Imperial Oil.

Todd

The Todd Drydock & Construction Corporation, Tacoma, delivered the steel motorship Kennecott to the Alaska Steamship Company in March and launched the Milwaukee, the second of three large scout cruisers for the United States Navy, March 24.

Union Construction

Union Construction Company, Oakland, expects to deliver the 10,200-ton tanker R. J. Hanna to the Standard Oil Company of California April 1. The first of four 8400-ton tankers for Anglo-Saxon Petroleum, the Acardo, was launched March 12. The status of the other Anglo-Saxon tankers is: Achatina, to be launched about May 21; Ampullaria, keel laid February 5, to be launched about June 20, and Amalthus, keel laid March 12, to be launched about July 15. Two Coast Guard cutters, Tampa and Haida, will be launched about the middle of April and the second pair, Mojave and Modoc, about the middle of September.

Wallace

The Wallace Shipbuilding and Drydock Company, Vancouver, B. C., launched the 8400-ton freighter Canadian Skirmisher for the Canadian Government Merchant Marine March 17.

Yard Notes

Moore Shipbuilding News has this to say of the shape punch department:

"The record for punching is held by L. E. Wells of this department, having punched 10,841 holes in eight hours on average runs of material that is various lengths and sizes of angles and clips. The average output of the entire department is better than 5000 holes per punch per day. On an average the punchings of this department show less than one per cent defective or off-center holes."

A German ship operator is quoted in the Boersen Zeitung, published in Berlin, as predicting a great German shipping trust that will include all ships operating and shipbuilding companies in that country. The yards will turn out ships by program, confining themselves at first to three or four types. The general estimate of Germany's shipbuilding capacity is 750,000 tons a year, but this amount may be doubled in the first year, and the plan foresees building 3,000,000 in the third year. The restoration of Germany's commercial fleet under this plan will not require more than ten years. What persons or groups are behind this plan is not stated.

According to a report from Consul Frank W. Mahin, dated January 10, 1921, preliminary arrangements are completed for constructing another extensive shipyard in Amsterdam, covering 62 acres, to be located near the Amsterdam entrance of the North Sea Canal. It will include all the latest machinery and devices for shipbuilding and repairing, and will be able to deal with ships of at least 25,000 tons. In addition, the Netherlands Shipbuilding Company, with extensive works in Amsterdam, is enlarging its construction and repairing plant. On completion of these extensions, Amsterdam will have facilities for building and repairing ships equal in size, with few exceptions, to the largest now afloat.

Experience gained in the war has prompted Spain to branch out as an industrial country and in the last few years it has made remarkable progress toward self-sufficiency. This is noted in shipbuilding as well as other industries. Considerable shipbuilding activity has followed since Spain lost thirty-six vessels from German U-boat attacks in the war. In Catalonia two new yards were established, one in Barcelona, the other in Tarragona. Several smaller yards were set up on the coast north of Barcelona. These small works mostly turn out three or four masters, equipped with Diesel motors and oil engines, part of the machinery coming from the United States.

Drydocking and Repairs

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

New connecting rod: SS Cape Romair. Miscellaneous repairs: MS Piru; SS Wolverine State, Ventura, Stockton, Oleum, Frederick Luckenbach, Liberator, Hawkeye State. Miscellaneous repairs, drydocking, painting: SS West Katan; USAT Buford; SS D. G. Scofield (also cleaning cargo tanks); MS Carnegie; SS Santanta, Sylvan Arrow, Matinicock (also damage repairs); MS Piru; SS Phoenix, Royal Arrow; Schr. Maweema, Alvena; SS Jeptha, Standard Arrow. Overhaul circlg pump: Schr. Dora. Drydocking for survey: SS Heber. Welding on boilers: Tug Wyadda; SS Bradford; Barge Simla. Repairs to steering gear: SS Rose City. Miscellaneous repairs, hull repairs, drydocking, painting: MS George Washington; SS Cuba (also engine and boiler repairs). Making new sea stool: SS Bradford. Repairs to damaged bow: MS Benicia. Making new tail shaft: SS Atlas, SS La Brea (also new propeller hub). Engine, boiler, hull repairs, drydocking, painting: SS Manoa, Tahiti, Senator; Barge Midway (no boiler repairs); SS Wairuna, Waikawa (no drydocking or painting). Drydocking for survey, damage repairs: SS Alaskan. New propellers: SS C. A. Smith, Maricopa, Angel Island. Damage repairs: SS Liebre. Installing heater coils in tanks: SS Frank H. Buck.

Alameda Works

Miscellaneous repairs, drydocking, painting: SS San Diego, Avalon (also damage repairs), Phyllis (also electric welding on tiller); USS Angel Island; SS Coquille River, C. A. Smith, Daisy Gadsby (also new propeller, electric welding on stern). Electric welding on hull: Barge Benicia. Engine, boiler, hull repairs, drydocking, painting: SS Halco. Drydocking, painting: Tug Slocum. Miscellaneous repairs: SS. Pacific.

MOORE SHIPBUILDING COMPANY, OAKLAND

Drydocking, miscellaneous repairs: SS Multnomah, Depere, Hawarden, Colorado Springs, Liebre, Point Lobos, Santa Inez; Schr. Horace X. Baxter, Ernest H. Meyer, Santa Monica, Santa Barbara; Ferry Yerba Buena; Gas Schr Herman. Extensive engine repairs: Tug H. J. Biddle, Relief; USAT Edgemoor, Slocum; SS Matsonia, West Katan, Wm. Herrin.

NAVY YARD, PUGET SOUND

Drydocking, cleaning, painting bottom, miscellaneous alterations and repairs: Destroyers Edwards, O'Bannon, Renshaw, Howard, Stansbury; Patrol Boat Eagle No. 57; SS City of Spokane (also extensive repairs); Ammunition Lighters 15, 16 (no alterations). Care and preservation: Armored cruisers Seattle, Charlotte, Missoula. Miscellaneous repairs and alterations: Destroyers McKenzie, Hogan, Welles, Aulick, Turner, Gillis, Delphy, McDermot; S. C. 295, 301; Minesweepers Swallow, Ortolan. Radio installation: Light Vessel 88. Miscellaneous repairs: Tugs Pawtucket, Sotoyomo, Tatnuck, Mahopac, Iroquois, Explorer.

TODD DRY DOCKS, INC., SEATTLE

Repairs: Queen (rudder); Nile (voyage); Adm Sebree, Tyndareus, Kayseeka (miscellaneous); West Cayote, Manila Maru (bottom). General overhaul: President. Docking, cleaning, painting: Adm Schley (also change propellers); Santa Inez (also repairs forepeak tank). Cleaning, painting: City of Spokane, Cross Keys. Drawing tail shaft: Cordova. Propellers: West Jappa (renew); Edward Luckenbach (change).

Shipping Briefs

The Nippon Yusen Kaisha's Puget Sound schedule for the period March, 1921, to January, 1922, lists sixteen freight vessels, nine of which will call at Dairen in addition to Yokohama and Kobe.

The Globe Line of Gaston, Williams & Wigmore has turned back to the Shipping Board vessels operated in the Baltic service. The ships have been reallocated to the Susquehanna Steamship Company.

The George H. Wells Steamship Company will maintain a fortnightly service between New York and Manchester, England, with Shipping Board vessels. The first sailing was in March. Formerly the International Mercantile Marine operated vessels on the Manchester route, but turned all its government tonnage back to the board.

The China-Pacific Company, affiliated with the Columbia Pacific, has been appointed agent of the Roosevelt and Kerr lines in Japan, China and the Philippines. Services will be from New York via Suez.

The Shipping Board freighter Brookline, 9000 tons deadweight, 425 feet long, passed through Lake Washington ship canal, Seattle. She was the largest vessel to use the locks.

Portland, Maine, has been made a port of call of the North Atlantic & Western's intercoastal vessels.

Instead of taking their places on the waiting list with other seamen, Americans henceforth will be given preference over aliens at Seattle, arrangements to this end having been made by Shipping Board operators.

Consul Hurst, Cadiz, Spain, reports that a company at Cadiz has recently established a number of new steamship connections for passengers and freight between that city and New York, and also Spanish Morocco and the Canary Islands; a regular service has been established between Cadiz and all Spanish ports along the Atlantic and Mediterranean coasts; and a monthly service from Cadiz to New York direct has been instituted.

Steamship Operations

Conference Re-formed

After a protracted series of meetings the members of the Pacific Westbound Conference have succeeded in restoring harmony in the ranks of the organization and in persuading the Java-Pacific Line, the withdrawal of which had threatened to start a trans-Pacific rate war, again to become a member. Thus the latest of several breaks, and by far the most serious, has been patched up. To accomplish this, however, required the earnest and diplomatic effort of the conference lines.

Northern Lines Hold

The one factor that prevented a general rate war during the period of secession of the Java-Pacific apparently was the refusal of the Northern lines to take the situation as seriously as the circumstances warranted. Had they appreciated the withdrawal of the Java-Pacific at its true weight they might have taken independent action, thus destroying hope of a settlement. Another element of importance also was that the northern foreign companies naturally were more impressed by rate-cutting in their own territories, Puget Sound and the Columbia River, than in California, where unrestricted competition would not have the immediate and marked effect upon them that it would have in the north. The California lines managed to hold together during the trying period, and the Puget and Columbia companies, attending a general meeting in San Francisco, were of great influence in restoring the conference. Especially was the Canadian Pacific active. This company, although not formally a conference member, does work in harmony with the organization.

At the meetings of the conference the old question of rate-cutting arose. Accusations were made that one line in particular had not been abiding by conference tariffs. After long discussion the representative of the company admitted that reduced rates had been granted, but he countered by asserting that still other lines had begun the secret war. Whatever the beginning of the cutting, the line in question agreed to maintain conference rates, and upon this the Java-Pacific agreed to rejoin.

Rates Sag Badly

Despite the restoration of the conference ranks, trans-Pacific rates have fallen badly. The Java-Pacific steel rate of $6.50 had to be met and rates in general readjusted. When this was done, trouble arose in New York. It is apparent that cuts in the trans-Pacific trade would have an immediate effect on the North Atlantic-Orient lines and that they would counter immediately. So they did. Their first action was a vigorous protest against the reductions of the Pacific Westbound Conference, and they followed this by a demand that the old rates be restored. A vigorous exchange of telegrams ensued. The Atlantic regarded the reductions as violations of the Atlantic-Pacific agreement of May, 1920; such it was, in principle; in fact, the Pacific lines were compelled to restore the conference, if restoration were humanely possible, and they faced, moreover, the necessity of reducing rates if they were to compensate for the railroad increases of last August. Nor was this all; they knew that steel was being booked from New York at $15, despite the formal quotation of $20. At length the Pacific Westbound Conference agreed to restore the old tariffs, but in turn demanded that its New York committee and the North Atlantic lines rectify the trans-Pacific rates in conformity with the present overland rail charges.

Steel to $5.88

This was done. Trans-Pacific steel thereupon fell from $11.25, the formal quotation (although everyone knew that the Java-Pacific was protecting its reduction to $6.50 and that other lines were meeting its competition) to $5.88. That became the going rate on steel on and after March 19. With this rate in effect the Pacific Coast can compete with New York for Pittsburgh production, but how much money the trans-Pacific lines will earn is something else again. Automobiles fell from $10 to an arbitrary $8, that is, no basing point was fixed, and few cars can be commanded except such as are assembled on the Pacific. Machinery dropped from $16 to $9, without basing point. In tobacco, however, there may be an opportunity to compete with New York, the rate having been fixed at 75 cents a hundred pounds for unmanufactured leaf, Richmond-Petersburg basing, as against an old rate of $25 a short ton. This means that a reduction of 50 cents a hundred pounds has been made. Cigarettes, Richmond-Petersburg, have changed from $11 for 40 cubic feet to 50 cents a hundred pounds. Finally, the trans-Pacific tariffs were brought into complete accord with the maximum rates of the subsidized Japanese liners. As is well know, the Japanese government fixes maxima that may be charged for certain commodities by subsidized vessels. When cargoes were in excess of space, these maxima did not enter greatly into reckoning; they merely worked a hardship on the subsidized lines, which would be transporting rice by one vessel at a much lower rate than was charged by one that did not receive a subsidy. The slump in shipping, however, made the subsidized rate situation of prime importance, inasmuch as trade naturally gravitated to the lowest rate level.

At Through Rates

By the terms of an agreement executed by intercoastal and trans-Pacific steamship operators, cargo moving from the Atlantic seaboard to the Orient will be accepted at the direct-line rate and transshipped at Pacific Coast ports for delivery to the trans-Pacific lines. This agreement is an extension to westbound business of the arrangement made last year for eastbound freight.

The intercoastal and trans-Pacific lines will divide the receipts equally after the expense of transshipment at a Pacific Coast port, which is about $2 a ton, has been deducted. The intercoastal lines are permitted to pay brokerage in Atlantic ports, but such payments will be for their own account and no portion of them will be borne by the Pacific lines. Arbitraries for freight consigned to out-ports of the Orient will be collected by the intercoastal lines for the trans-Pacific operators, who will receive all such added charges. The arbitrary scale to be employed was published in Circular 2, Pacific Westbound Conference, effective January 25. Those arbitraries apply, however, only to goods moving by other than direct steamships, and inasmuch as several so-called outports are regular ports of call of different lines, the collection of arbitraries will depend upon what trans-Pacific vessel takes the cargo. A T. K. K. vessel scheduled to call at Dairen or a China Mail vessel calling at Singapore would impose no arbitraries for these two ports, whereas a steamer calling only at Japan and China ports would impose arbitraries for Dairen and Singapore.

The first attempt of the intercoastal and trans-Pacific operators to overcome the ill-effects of the railroad rate increases was the publication of import and export water rates by intercoastal lines. This plan was supplanted by the simpler method of accepting cargo at the going direct-line rate, which was made effective for eastgound business in January. Some fair-sized lots of cargo consigned from the Orient to the Atlantic have been moved through Pacific Coast ports, but operators do not anticipate so large a volume of westbound business. They reason that a shipper in the Orient might wish to dispatch his cargo for transshipment at a Pacific Coast port because of the opportunity thus afforded to divert the goods, which would not be offered were the shipment to go directly to the Atlantic; this factor, however, would not operate in the case of westbound freight.

A minimum rate of $16 a short ton has been set. Inasmuch as the New York-Orient rate on steel apparently is $15, despite the $20 rate still quoted formally, little if any steel may be expected. The general cargo rate is $23, the same as that of the direct lines.

Panama Canal tolls are borne entirely by the intercoastal lines. As the tolls are $1.20 a net ton the actual profit of the intercoastal line for the shorter haul is less than it appears to be.

Hawaiian Sugar to Atlantic

Between 125,000 and 150,000 tons of raw Hawaiian sugar will be dispatched to the refineries of the Atlantic Coast during the season of 1921. An announcement to this effect has been made by the Matson Navigation Company, which has received a contract for transporting this tonnage. In view of the inadequacy of completed vessels to handle the entire amount, however, at least one steamship of the American-Hawaiian, and perhaps more, will be used; and the two 535s, the Hawkeye State and Buckeye State, allocated by the Shipping Board to the Matson Line, will handle a portion. As soon as the two 14,000-ton freighters, Manulani and Manukai, now under construction by the Moore Shipbuilding Company for the Matson Navigation Company, have been completed they probably will be placed in the intercoastal service, but a large portion of the crop will have been shipped prior to their completion.

All Refined on Pacific

Before the war a large part of the Hawaiian crop was refined on the Atlantic. Since the last years of the war, however, the entire output of between 550,000 and 600,000 tons had been shipped to the California & Hawaiian and Western refineries, situated on San Francisco bay. The return to the old system of disposing of the Hawaiian crop is entirely due to marketing exigencies, because the Hawaiian planters would have every reason to sell all their raws on the Pacific Coast, provided only that the Western market were sufficient to absorb the total. This condition was not met in 1920, as a result of which the planters have signed a contract for the present season with Eastern refineries for the disposal of approximately one-fourth the crop, the remainder to be shipped to San Francisco. The contract is for the current season only, however, and may be renewed or not renewed next year.

The disposition of the 1921 output of raws had been of considerable interest because of the large tonnage involved and the consequent bearing on the Hawaiian and intercoastal freight services.

Rate to be Reduced

A freight rate of $17 a ton of 2000 pounds on raw sugar in sacks, from Hawaiian Island ports of call to Baltimore, Philadelphia and New York, direct service, was made effective by the Matson line in January. This rate will be reduced, however, although the new tariff has not been published as this is written.

Deliveries of the Hawaiian raws will be made at Philadelphia and New York with option of Boston or New Orleans.

Coincident with the completion of arrangements for transporting 125,000 tons of sugar to the Atlantic, the Matson line announced a reduction in Hawaii-San Francisco rates, sugar being cut from $6 to $5.50 a short ton and general cargo from $7 to $6.50, effective March 1. The rate obtaining prior to the war and during the early years of the war was $4 for sugar.

Coastwise Laws in Force

The privilege of carrying passengers between Honolulu and San Francisco has been withdrawn from the Nile of the China Mail, which is under the British flag, and from all the vessels of the Toyo Kisen Kaisha. Normally these vessels could not have engaged in this business at all, except under penalty of $200 for each passenger, but the withdrawal of American vessels during the war and the consequent shortage of passenger accommodations led Congress to authorize suspensions of the coastwise laws in this particular. Except for the suspension travel between Honolulu and San Francisco would have been practically stopped, but now that regular steamers have returned to their routes and Shipping Board passenger vessels have been assigned to the Pacific, facilities have been enlarged greatly.

Other Privileges Withdrawn

The Shipping Board did not stop, however, with abrogating the coastwise suspension, but it also has denied to the China Mail the right to engage in coastwise trade with its two American flag vessels, the China and the Nanking, because 75 per cent of the company's stock is not owned by American citizens, as required by the Merchant Marine Act of vessels engaged in coastwise trade. The wide distribution of China Mail stock, which is held in San Francisco, Honolulu and China, would make compliance with the law, through transfer of stock, exceedingly difficult.

In addition to forbidding the transportation of passengers between San Francisco and Honolulu by the T. K. K. and China Mail, the board has withdrawn the stopover privilege whereby passengers traveling in either direction were permitted to remain in Honlulu not to exceed thirty days and to continue on their journey by vessels of the same line. For westbound passengers on vessels of the T. K. K. and China Mail no stopover in Honolulu will be possible; but eastbound passengers might quit a steamer in Honolulu and continue to San Francisco on American vessels fully qualified for coastwise trade, such as those of the Pacific Mail.

Travel to Hawaii Grows

These orders of the Shipping Board are severely felt by the China Mail, which is subject to all the admitted handicaps of American registry and now cannot participate in the greatest benefit of that registry—that is, coastwise trade.

Travel to Hawaii is increasing greatly, although facilities also are being enlarged rapidly by the placing of the 535's of the Matson and Pacific Mail and the 502's of the Pacific Mail in the island service. Local passengers arriving during the year 1920 were 11,073, as compared with 5292 in 1919 and 4773 in 1918. In 1920 and 1919 through passengers were practically the same in number, between 24,000 and 25,000.

Cap Finisterre to T. K. K.

Almost simultaneously with the arrival of the first 535's on the Pacific Coast, the Hawkeye State, assigned to the Matson Navigation Company, and the Golden State, operated by the Pacific Mail, both of which made their appearance in March, came announcement by the Toyo Kisen Kaisha that it had chartered the large ex-German Cap Finisterre of the Japanese government and would place her in the San Francisco-Orient service. The Cap Finisterre will offer vigorous competition to the Shipping Board vessels. She was built by Blohm & Voss, Hamburg, for the Hamburg - South American Line, and was turned over to Japan by the Reparations Commission as recompense for Japanese shipping losses during the war. Her gross tonnage is 14,503, net 8749; she is 560 feet long, twin-screw and driven by eight-cylinder quadruple-expansion engines. Her speed as rated by Lloyds is 16½ knots, but inasmuch as Lloyds is conservative in speed-ratings, she probably could do much better than this. She can carry 408 first, 80 second and about 800 steerage. In size and speed she will be practically a sister to the Manchuria and Mongolia of the old Pacific Mail.

The Cap Finisterre was taken to Japan by the N. Y. K., which announced that she would be placed in its Puget Sound service. Some difficulty arose, however, perhaps over the subsidy to be paid for her operation, and the N. Y. K. declined to handle the vessel, although it retained the ex-German Kleist, 8959 gross tons, and placed her in the Liverpool service.

With the Cap Finisterre the T. K. K. will have five large passenger vessels in the San Francisco-Orient trade: Tenyo and Shinyo Maru, sister ships; Siberia and Korea Maru, also sisters, which were owned by the old Pacific Mail Company; and the Cap Finisterre. The route of these vessels is: San Francisco, Honolulu, Yokohama, Kobe, Nagasaki, Shanghai, Manila and Hongkong, except that the Siberia calls at Dairen instead of Nagasaki.

Wenatchee on Way

The third 535 of the Shipping Board assigned to the Pacific departed from New York March 12. She was the Wenatchee, which will be operated by the Pacific Steamship Company in the Seattle-Orient service. Seattle has been without a trans-Pacific passenger steamship under the American flag since the Great Northern liner Minnesota departed for the Atlantic six years ago. A rousing welcome has been arranged for the Wenatchee upon her arrival at Seattle April 4. She will sail on her first trans-Pacific voyage April 9.

The second 535 of the Pacific Steamship Company, the Keystone State, will be delivered in New York by the New York Shipbuilding Corporation about April 15 and will sail for Seattle April 30, arriving May 23 and departing for the Orient May 31. With the five vessels of the 535 class assigned to it, the Pacific Steamship Company will maintain two-weekly sailings from Seattle, thus meeting the competition of the Nippon Yusen Kaisha, which dispatches its passenger liners at intervals of fourteen days.

Pacific Mail Report

During 1920 the Pacific Mail Steamship Company operated 46 steamships of a total deadweight of 281,000 tons and transported cargo of approximately 1,078,000 tons, the largest volume of traffic carried in one year in the company's history, says the annual report of the board of directors, made public in New York in March. The report reviews traffic conditions on the several lines and concludes by summarizing the outlook for 1921 as follows:

"The conditions which marked the high point of wartime shipping prosperity and brought about the drastic slump in ocean transportation during 1920 have continued into 1921, and many of the most disturbing factors have not yet run their course. The outlook for the next twelve months reflects this situation with its uncertainty as to volume of freight offerings and profitableness of rates. At the same time it is your company's opinion that it has a fleet of ships and an organization ashore adequate to provide proper service and meet competition, and with an improvement in business and export conditions, your company should profitably participate in the extension of American trade in just proportion to the reputation it has built up for service to the traveling public and to shippers."

Operating income for the year was $1,647,533 as compared with $2,123,012 for 1919, although the revenues increased from $7,505,273 in 1919 to $10,136,098 in 1920. This increase was offset by expenses other than depreciation jumping from $4,606,246 to $7,746,609. The net income from all sources was $1,622,470 as compared with $2,376,760 for 1919. Increases of $319,917 in steamer investment (Cuba, $400,000, less $80,000 from Pennsylvania replacement fund); $180,091 in real estate and other property, and $37,957 in floating equipment were made during the year. Among permanent assets steamers are carried at $9,005,107, other floating equipment at $45,295, and real estate and other property at $368,750, total $9,419,153; less reserve for accrued depreciation and amortization of $4,517,125, the net being $4,902,027. Total assets are $10,473,157. The balance of profit and loss for the year was $3,548,478 as compared with $2,364,760 December 31, 1919. The company owns twelve steamships.

In the Far East

Japan's Building Policy

The Provisional Financial and Economic Investigation Commission of Japan, the chairman of which is Premier Hara, has adopted a resolution urging that shipbuilding materials and machinery be admitted free of duty. The committee entitled its report "Fundamental Policy for Maintaining Japan's Shipbuilding Industry" and first considered the subject under "A Necessity of Such Policy from Shipping's Viewpoint." This first paragraph was general in its nature.

First Industry of Empire

Then followed "(b) Need of a Fundamental Policy from the Industrial Standpoint." The importance of shipbuilding was thus outlined: "In 1918 no less than 700,000 tons of ships were launched and their total value, including the cost of repairs and other work, amounted to 450,000,000 yen, thus giving them the most important position among the manufacturing industries of this country. .. .. .. In 1918 the paid-up capital and debentures of the shipbuilding companies amounted to no less than 150,000,000 yen. .. .. .. The state should pay profound attention to the maintenance and development of the shipbuilding industry in view of the fact that its bearing on economic and social matters is very comprehensive as one of the most important industries.

"Means of Realizing Above.

"(a). General Protection.

"1. In view of the present development of the shipbuilding industry in this country, such means of protection as the Shipbuilding Encouragement Act formerly in force is deemed not advisable.

(Note: The Shipbuilding Encouragement Act granted direct shipbuilding subsidies, and for many years was an important factor in Japanese construction. The commission's recommendation against a subsidy is quite important, therefore.)

Abolition of Duties Recommended

"2. It is considered necessary that the import duty be abolished on steel and timber used for the construction and repairs of vessels, including ships and boats used in warfare, so that the Japanese shipbuilders can be brought nearer a parity with foreign builders in regard to the acquisition of shipbuilding materials.

"As regards articles necessary for the fitting out of vessels, including ships and boats used in warfare, engines and parts thereof, including half-manufactured articles, the import duty should be abolished when the articles required are special things which it is difficult to manufacture in Japan or when they are new inventions.

"3. As a matter of fundamental principle it is desirable that vessels for the government, including ships and boats used in warfare, should be built at home shipyards.

"4. It is deemed advisable that the policy of encouraging the employment of home-built vessels by, for instance, the Shipping Route Subsidy Act, should be continued for the future.

Tariff on Foreign-built Vessels

"5. It is deemed advisable that the import duty on foreign-built vessels should be retained with proper modifications.

"6. Steps should be taken to give

special facilities for the long and ample financing of vessels.

"7. The government should immediately take steps to establish the proposed shipping laboratory, whose labors are expected to yield the basis of the reform of vessels.

"(b) Special Protection for Superior and Special Vessels.

"Respecting the protection of superior and special vessels, it is necessary that their maintenance should be preserved by affording assistance in regard to the cost of building them and by bearing part of the expenses for operating them in ordinary times."

19 Major Yards

Japan now has nineteen shipyards capable of building vessels of more than 1000 gross tons (smaller craft are not listed in the Department of Communications' reports) as compared with seventy at the height of the war boom. The following shows the work on hand at the different yards about the middle of February, the first figure indicating merchant vessels and the second other craft, principally naval:

Mitsubishi, Kobe, 3, 0; Mitsubishi, Nagasaki, 3, 1; Kawasaki, 5, 1; Uraga, 4, 1; Yokohama Dock, 4, 1; Asano, 3, 1; Osaka Iron Works, Osaka, 4, 2; Osaka Iron Works, Innoshima, 3, 0; Mistui, 2, 0; Suzuki, Toba, 1, 0; Suzuki, Harima, 1, 0; Aizawa, 2, 0, and each of the following yards had one merchant vessel: Hakodate, Ishikawajima, Uchida, Nitta, Ono, Okamoto, Tochigi, Matsuo, Fujinagata and Harada.

Output of 1920

During 1920 the output of Japanese yards was 93 vessels of 433,265 gross tons, a decrease of about 180,000 tons from 1919. During 1920 ten vessels, aggregating 50,745 gross, were built for the United States Shipping Board, and 28 of 231,290 tons for builders' account, the others being on domestic order. The outputs of the last seven calendar years are:

	No.	Gross Tons.
1914	16	78,010
1915	8	40,485
1916	40	141,827
1917	89	348,430
1918	189	518,786
1919	136	621,513
1920	93	433,265

Trade Commissioner Halleck A. Butts of Tokyo, under date of February 9, reports that "the recent fall in prices of vessels has caused the cancellation of many contracts. It is considered advantageous to pay compensation for canceled contracts and to make new ones. Construction costs are now roughly estimated at 100 yen per ton for cargo boats."

In view of the fact that 100 yen is approximately $50, the estimate appears to be very rough indeed. It is, in fact, incredibly low. Steel plate today is worth about $60 at tidewater on the Atlantic, and about $80, current exchange, in the United Kingdom, to which is to be added the freight rate to Japan, $15 to $20, so that the price of delivered plate would be at least $75 to $100. On the approximate ratio of three deadweight tons of ship to one of steel, the steel alone in a vessel would cost $25 to $33, not to mention labor, propelling and auxiliary machinery, overhead expense and profit. If Mr. Butts means gross or net ton instead of deadweight, his error is all the greater.

Regardless of the market prices quoted for vessels, there is good reason to believe that Japan's construction costs are at least equal to those of the United States, or about $150, yen 300, a ton; three times the figure Mr. Butts gives.

Mr. Butts reports that the government foundry at Yawata had on hand about 70,000 tons for naval and military use and about 300,000 tons for commercial. Quotations were above the market, however, and recent reductions were expected to have little effect. The Kure Naval Arsenal recently bought 5000 tons of British pig-iron at prices ranging from yen 155 to yen 157.87 a ton. If those figures be criteria of the cost of steel plates, the market price of plates in Japan probably exceeds $100.

Both the Toba and Harima yards of the Teikoku Kisen Kaisha (Suzuki & Co.) will be transferred to the Kobe Steel Works, another Suzuki corporation, and their activities limited, the Toba yard engaging in the repair of men-of-war and Harima in the construction of small warships. These yards, therefore, will be no longer factors in merchant shipbuilding.

Shipping Slump Bad

Shipping remains in a bad slump. At the end of January there were 163 vessels of 100 gross tons and more, totaling 189,166 tons, tied up in the principal Japanese ports. This is an increase of 62 vessels, 85,500 gross tons, over the idle tonnage at the end of December. Kobe had the largest tonnage, 84,064. Seven vessels of 39,640 gross tons were launched in January, ships of less than 1000 gross tons being excluded, so that the idle tonnage doubtless will increase, but the Japan Shipowners' Union has rejected a suggestion that Japan propose to shipowners of the world a retirement of 30 per cent of their vessels.

Japan and the East Coast of Asia are sending little to Europe, although some business is reported eastward of Colombo. North American business is improving a little; South American is very poor; Australia is little better; India is bad but may become better. So rates continue to break. Moji coal freights dropped 30 to 50 sen late in February; European freights were 10 to 15 shillings lower; the trans-Pacific trade remained relatively stable.

In times such as these membership in the deferred rebate conferences, which bind their members to regularity of sailings, is a doubtful blessing. Yet the larger companies are maintaining their scheduled services and also, despite the declines in rates, are continuing to pay the same proportional rebates, usually 10 per cent.

Wage Reduction Proposed

Operation costs are not falling materially. A recent statement says that the expenses of operation of a Japanese vessel now are about yen 8.50 a ton a month, as compared with yen 3.30 in 1915 and 1916, yen 3.80 in 1917, yen 5.50 in 1918 and yen 7.50 in 1919. To counteract these increases shipowners are proposing that bonuses, which range from yen 75 to yen 7.50 a month, be limited to 40 per cent of salaries.

The following table of monthly salaries recently appeared in the Japan Advertiser. Figures are in yen:

	1915 Yen.	1918 Yen.	1920 Yen.
Master maximum	260	300	350
Minimum	55	180	240
First mate	160	170	220
	20	60	170
Second mate	....	120	150
	....	40	140
Third mate	....	90	120
	....	20	90
Chief sailor	38	50	50
	17	22	....
Chief engineer	260	300	350
	55	80	240
First engineer	120	150	220
	20	50	170
Second engineer	....	125	170
	....	30	100
Third engineer	....	80	120
	....	20	90
Chief fireman	40	50	50
	20	22	....

The Japanese government has introduced a bill providing subsidies for the Toyo Kisen Kaisha as follows: San Francisco line, 1922, yen 866,950; 1923, yen 819,279; South American line, 1922, yen 1,478,140; 1923, yen 1,398,009. All for the calendar years. Another bill would appropriate yen 1,450,000 annually for the N. Y. K. for transporting mails on its Antwerp, Puget Sound and Melbourne vessels, beginning April 1, 1921. Under the old subsidy system the N. Y. K. received about yen 2,700,000 a year.

$62 a Ton Valuation

The O. S. K. has paid a 15 per cent dividend for the last six months of 1920. Said President Hori: "For the last business term we made yen 39,260,000. This shows a decrease of yen 11,180,000, as compared with the receipts for the previous term. The decrease is due to the continued depression of the shipping situation, but we have economized expenses as much as possible. A sum of yen 3,000,000 was saved under the head of money paid for the charter of ships, and yen 5,000,000 in other items. At the same time, we drew on our reserve funds, and thus the decrease in the net profit was reduced. This was fixed at yen 5,210,000, a decrease of only yen 600,000 on the figure for the preceding term.

"It will be very difficult for the shipping market to recover unless there is an improvement in the political and economical situation in Europe, but European countries are doing their best toward this end, and, as a matter of fact, it seems that arrangements for the opening of trade between Great Britain and Russia have now been made. International trade is generally improving, and we may expect that normal conditions will be restored in a year or two, when the shipping situation will probably take a turn for the better.

"Even if the present unfavorable conditions continue for the next several years, we need not be alarmed. The company's value of its vessels now is only yen 124 per ton on an average. When the new ships to be delivered the first half of this year are taken into account, the average valuation will be yen 134 per ton. With ships valued at such low figures on the books of the company, there need be no pessimism for the future, for the lower the valuation the more secure will be the position of a shipping company.

"Moreover, we have considerable reserve funds to draw upon. I think it will not be difficult for the company to maintain a dividend of 10 per cent in the future."

The N. Y. K. fleet is carried at $41.50 a gross ton, considerably less than that of the O. S. K.

Union Agitation On

Efforts are being made in Japan to form a seamen's union. Prospects of success are problematical. The Japanese have lagged in organizing unions probably their most conspicuous success having been with the plantation workers of Hawaii, but in that case racial solidarity was of great weight. There are literally scores of minor shipping organizations in the Island Empire today, some of which are local unions and others organized and supported by steamship operators. The latter as a matter of fact are nothing more than devices to satisfy the growing demand for organization of workmen. A recent meeting in Kobe was attended by representatives of twenty-four unions; the same number took no part. Japanese say that there are no less than eighteen bodies organized by cooks. In view of these conditions, American shipowners need not expect too much of Japanese unions, which by raising the wage scales of the Orient would assist materially in making Japanese operation more expensive and so tend toward a parity with the United States.

With Exporters and Importers

Railroad Rates

A letter addressed by Admiral W. S. Benson, chairman of the Shipping Board, to Edgar E. Clark, chairman of the Interstate Commerce Commission, manifests an intention on the part of the board to press for readjustments of import and export railroad rates so as to restore the old parity between the Atlantic and Pacific and again to permit the diversion of overland business to Pacific Coast ports. This action is the most noteworthy that has been taken in the rail rate controversy since the Eastern lines refused to assent to the reductions made by the transcontinental lines west of Chicago. The importance to Pacific Coast shipping cannot be overestimated.

Although the letter bears the signature of Admiral Benson, it evidently was written by Commissioner J. N. Teal of Portland, whose initials it bears. Mr. Teal is the recognized Shipping Board authority on railroad rates. Both as a statement of the present situation and as a review of the developments of the last few years, the letter is worth careful study. It follows in full:

1. For many years prior to the war, it was the practice of railways to maintain export and import rail rates through Pacific Coast ports on a basis lower than the domestic rates. This rate adjustment permitted the movement through said ports of traffic originating in or destined to territory both east and west of the Mississippi River

2. The exigencies of the war made it advisable for the director general to discontinue this practice temporarily and he accordingly on May 25, 1918, issued General Order 28, effective June 25, 1918, which cancelled all export and import rates and provided that domestic rates should apply to and from the ports.

3. Early in the year 1919 requests were made to the United States Railroad Administration by the Gulf, South Atlantic and Pacific ports for restoration of the former relationship so that said ports be placed in position to secure a reasonable share of the import and export traffic.

4. After a careful analysis the said Railroad Administration made effective export and import rates lower than domestic rates via Pacific Coast ports to and from territory north of the Ohio river and east of the Mississippi river.

5. Thereafter the said Railroad Administration made effective export and import rates to and from the same Eastern territory via South Atlantic and Gulf ports, using the same basis to determine the through rate as was used to determine the through rate via the Pacific Coast ports.

6. When the application for a percentage increase in rates was sought by all of the railroads in the United States in Ex Parte 74, it was recognized that if the increases were allowed as applied for on a horizontal percentage basis, it would throw out of line said import and export rates via Pacific Coast ports, and attention was called to the fact that this would result at the time of the hearing on the applications.

7. Thereupon at said hearing the Interstate Commerce Commission requested the petitioners to furnish for the record and for the information of the commission and the parties concerned in said hearing, certain information. Among other questions submitted was the following:

"(11). A clear statement of all general inter-territorial rate adjustments and definite proposals as to methods of increasing each." (Record, Page 933).

In response to this and other questions propounded by the commission, the carriers through their counsel filed on June 8, 1920, their joint and several answer, which was designated Exhibit 1. The answer to the inquiry relating to export and import rates via Pacific Coast ports is as follows:

"Export and Import rates via Pacific Coast." Rates made to equalize the rail and ocean rates via the North Atlantic ports to be advanced the same amounts in cents per hundred pounds as the base point rate to and from North Atlantic ports is advanced.

The questions propounded, including No. 11 as above set out, were presented to the carriers as a whole and not to any one carrier or any one group of carriers, and it was answered and filed in the record on the behalf of all carriers without reservation.

8. No doubt the Interstate Commerce Commission in common with shippers and carriers relied upon the answer as one made by all the carriers without reservation, and it was regarded by all interested parties as a definite promise on the part of the carriers to expedite the readjustment and restoration of export and import rates via the Pacific Coast ports on the basis stated—a relationship and basis that was thoroughly understood by all concerned.

9. Thereafter the interested transcontinental lines prepared a tariff on the basis as stated. The Eastern lines, to wit, lines in the territory north of the Ohio and east of the Mississippi river, refused to concur in the adjustment proposed by the transcontinental lines, giving as a reason that they could not afford to make the reductions that would result from the establishment of rates on the basis stated. This condition of affairs having come to the attention of the United States Shipping Board—which board is directly concerned in the subject matter—and having in mind the fact that several months had elapsed since the order in Ex Parte 74 was made and entered, it requested the executives of certain of the Eastern roads, as above described, to attend a conference or send representatives to confer on the subject of export and import rates at a meeting to be held in the office of the United States Shipping Board in the city of Washington on February 4, 1921. The invitation was accepted and the conference in accordance therewith was duly held on said date, on which occasion representatives were present on behalf of the following described roads: Pennsylvania Railroad Company; New York Central Lines; Baltimore and Ohio Railroad Company; Erie Railroad Company; New York, New Haven and Hartford Railroad Company. There were also present Commissioner McChord of the Interstate Commerce Commission, Director of Traffic Hardie and members of the Shipping Board.

10. At said meeting it developed that after the order had been issued in Ex Parte 74, there had been a number of conferences between the representatives of transcontinental lines and said Eastern lines, and that the proposition of the transcontinental lines in respect to the establishment of export and import rates via Pacific Coast ports was rejected by the Eastern lines as they did not consider the proposition fair to them. Without further detail the result of the conference was an agreement on the part of the chairman of the Shipping Board to call a joint meeting of the representatives of the transcontinental and Eastern lines to be thereafter held in the city of New York at an early date. Thereupon, the chairman of the Shipping Board sent a telegram to Mr. George H. Ingalls, vice-president, New York Central Lines, New York city, of which the following is a copy:

"After conference with representatives of Eastern lines today it was concluded that a joint meeting between representatives of trunk lines and transcontinental lines should be held as soon as possible to endeavor to reach adjustment of the export and import rates through Pacific Coast ports. Would it be convenient for your committee if arrangements could be made with representatives of transcontinental lines, to meet in New York 10th or 11th of February. If not, what dates and place would be convenient?

"BENSON, Chairman."

Thereafter and on the 11th day of February, 1921, the joint conference was held as suggested.

11. Following this conference, telegrams with respect to the same were exchanged between Mr. Ingalls and the chairman of the board. The more important telegrams follow:

"New York, Feb. 12th.

"W. S. Benson, Chairman, U. S. Shipping Board, Washington, D. C.: In accordance with your wire conference was held between executives of the trunk lines and transcontinental lines on Friday, 11th, and steps were taken to endeavor to reach some understanding, results of which if accomplished will be given to you at a later date.

"G. H. INGALLS."

"Washington, Feb. 17th.

"G. H. Ingalls, Vice-President, New York Central Lines, New York city: Your wire 12th advising conference has been held. Shipping Board greatly interested and would view failure to agree on fair basis as placing serious handicap on development American merchant marine. Particularly call your attention to answer submitted Interstate Commerce Commission Ex Parte 74 by Attorney Wood for all carriers in response to commission's direct question as to how export and import rates via Pacific Coast were to be adjusted. 'Rates made to equalize the rail and ocean rates via the North Atlantic ports to be advanced the same amount in cents per hundred pounds as the base point rate to and from North Atlantic Coast ports is advanced.' All parties concerned expecting rail carriers promptly carry out this adjustment. In view of long time this matter has been under consideration board feels it should have your answer not later than Saturday, February 19th.

"BENSON, Chairman."

"New York, Feb. 18th.

"W. S. Benson, Chairman, U. S. Shipping Board, Washington, D. C.: Yours 17th. Would respectfully advise there are other considerations not outlined in statement before commission in Ex Parte 74 that Eastern lines consider part of any concurrence on their side in statement made by Mr. Wood. I beg to assure you that this question involves large revenues and is being dealt with by the lines in Eastern territory with as much dispatch as is commensurate with importance of subject.

"G. H. INGALLS."

"Washington, Feb. 19th.

"George H. Ingalls, Vice-President, New York Central Lines, New York city: Yours 18th. Regret you cannot give board any definite assurances of prompt action on export and import rates. You have been advised that board considers matter of great importance and in view attitude of the lines you represent the board has directed me to take such steps as may be necessary to bring matter to a conclusion, which will be done.

"BENSON, Chairman."

12. The answer of Mr. George H. Ingalls is considered by this board entirely unsatisfactory and in view of the statement made in Ex Parte 74 heretofore referred to, meetings that have been held since by the interested parties, the failure to arrive at agreement and the time that has elapsed, the board has concluded that there is no likelihood of an adjustment of said rates by the interested carriers within a reasonable time.

13. The Shipping Board views the question involved as one of great importance and urgency. The Interstate Commerce Commission is aware of the export and import rates applying through Canadian ports to points on Canadian rail lines, and that said rates affect not only movement through the American ports and to Canadian territory but to points in the United States as well. The maintenance of these rates by the Canadian lines, and the failure to establish such rates by the American lines directly affects the business and operation of vessels of the United States Shipping Board and other operators, as well as the business of the Pacific Coast ports. The traffic of American rail carriers is also reduced. The failure and refusal by the American rail lines to establish export and import rates from the territory referred to through Pacific Coast ports is opposed to the expressed policy of Congress with respect to the upbuilding of an American merchant marine, and the

use of the various ports of the United States as we understand the law and policy declared therein. After having exhausted every effort to bring about an amicable adjustment of this matter, the Shipping Board believes it to be its duty to do all possible to enforce and maintain the law and the policy with respect to the subject matter of this communication as declared by Congress.

14. The policy of placing Pacific Coast ports as well as the Gulf and South Atlantic ports on an equality with North Atlantic ports as to through rates on export and import traffic in the large producing and consuming territory east of the Mississippi river and north of the Ohio river has long been recognized as a helpful one in enabling the operation of regular lines of ships to and from the ports on the different seaboards.

15. The division of the country's import and export traffic to a reasonable extent among all ports places the different sections of the country in position to get minimum rates to foreign countries for local production, which production by itself would not support a regular line.

16. The policy outlined above is generally accepted as being wise and in the best interests of the country as a whole, not only in connection with the particular matter involved herein, but in preventing, congestion and securing a better use of the ports and in tending to build up an American merchant marine of the greatest use and service. It is the opinion of the board that in both the Transportation Act and Merchant Marine Act, 1920, the policy herein above stated is recognized and approved.

17. The board, therefore, appeals to and requests the Interstate Commerce Commission to institute a proceeding of inquiry and investigation into this matter at as early a date as possible, with a view to issuing such order against the interested carrier as it may find necessary and just, to correct the rate adjustment against which complaint is made, and to bring about the re-establishment of export and import rates to and from Eastern territory through the Pacific Coast ports in relation to corresponding domestic rates on the basis which existed prior to General Order 28 of the director general, and the decision of the commission in Ex Parte 74.

Freight Report

San Francisco, March 15, 1921.

Our last circular was dated February 19th.

The Norwegian steamer Rio Grande, which arrived here in ballast from Baltimore seeking, and which could have obtained 70/- for wheat from Portland to United Kingdom continent before she started for this coast, was eventually chartered by M. H. Houser at $10.50, which, less commissions, amounts to about 55/-. This charter was quite a break, namely, 15/- per ton from the previous fixture of the steamer Hermion, and it was the cause of several liners, for March-April loading, accepting as low as 50/- for grain from the north to United Kingdom and continental ports. As soon as 50/- was done for parcels, shippers came into the market in a lively fashion, as they resulted in the motorship Asia getting a cheap freight, and the active inquiry resulted in the motorship Ahia getting 55/- on a firm offer from Kerr-Gifford & Co., for about 7000 tons of wheat to United Kingdom continent, with option of the Mediterranean, not east West Coast Italy, at the same rate.

From San Francisco the only charter made has been that of the French ship General Faidherbe, which has been lying here for the last sixty odd days. Previous to her arrival she was offered 135/- for barley to United Kingdom. The owners in turn asked 150/- without success, and she has now been obliged to accept 32/6 per ton, which Strauss & Co. here have paid her to carry a full cargo of barley to the United Kingdom.

Lumber freights have continued to decline under the small inquiry from different parts of the world. The schooner Fearless was chartered late in February at $24.50 per 1000 from the North to Callao, by the Mohns Commercial Company, and at the first of this month the schooner Ella A. was offered in the market for lumber to Callao, and the best rate she actually secured was $20 per 1000 feet, prepaid from W. R. Grace & Co., and further tonnage can be secured at this rate.

There have been no lumber charters reported to Australia or United Kingdom or Africa. We quote $18 to $20 according to the port, for Australia, $25 to $26 for United Kingdom for steamers, and about $28 to $30 for Africa.

A General Steamship Line steamer has been chartered for nitrate to San Francisco at $5 per ton, and the steamer Natal was chartered at 20/- to load at various Peruvian ports for sugar to Vancouver.

Several United States Shipping Board steamers have been chartered at $10 for lumber to Japan and China.

The schooner Betsy Ross was reported fixed at $15 for lumber from the North to Poughkeepsie, and the steamer Freeport Sulphur No. 5 was fixed at $17 to the same destination, for account of the Dutton Lumber Corporation.

The schooners James Tuft and Meteor are both reported chartered for copra at $13, the first from two ports in Fiji and the second from one port in the South Seas. Both vessels come to Burns-Philp & Co., and we understand that other vessels are now asking $12.50 for the same business.

Outside of the reported purchase by the Robert Dollar Company of two or three more of the ex-German sailers at Santa Rosalia, on private terms, we hear of only one other sale; namely, the sailing tanker Falls of Clyde from G. W. McNear to the General Petroleum Corporation. The reported price mentioned was $150,000, but for this we cannot vouch.

Several tankers are now indicating they will accept from 26/- to 25/- per ton per month, on the deadweight, for from one to two or three years, without takers.

PAGE BROTHERS,
Brokers.

Fruit in Ordinary Stowage

Trial shipments made by California fruit growers and intercoastal steamship lines of lemons and oranges to the Atlantic Coast in ordinary stowage, that is under neither refrigeration nor ventilation, have led to the fixing of rates for this business. Lemons take a rate of 70 cents a hundred pounds and oranges a rate of 80 cents, as compared with the old rates of lemons $1.05 and oranges $1.15 under ventilation and lemons $1.25 and oranges $1.40 under refrigeration. The new tariffs thus are materially lower than the old and a large volume of business is expected to result.

Stowed Below Water Line

In accepting fruit at these reduced rates for ordinary stowage, the steamship lines assume no responsibility for loss, but they do endeavor to protect the shipments. It is said little doubt is felt that lemons will stand up well, but oranges are more uncertain, although some varieties may be received on the Atlantic in practically as good condition as lemons. No rates had been quoted on ordinary stowage fruit prior to the recent innovation.

Since the railroad rate increases the situation of California fruit growers has not been enviable. Statements have been made that at the end of February the grower lost $1 on each box of lemons sold in the Eastern markets at $3.50 delivered. As a result of the experiment of the steamship lines, the lemon growers will be able to dispatch their fruit to New York for 70 cents as against a railroad rate

What effect this arrangement will have upon the plans of the United American lines, operating the American-Hawaiian intercoastal service, for a refrigerator fleet is not altogether clear. The New York office of the United American Lines has the subject under consideration. Inasmuch as ordinary stowage cannot do away with the necessity of refrigeration for some fruits, however, the new departure may not have a deterrent effect of any consequence.

Northwestern fruit growers are endeavoring to bring about the installation of refrigerator spaces in intercoastal steamships. "Pacific Northwest orchardists are interesting Puget Sound commercial organizations in their effort to get intercoastal steamship lines to put refrigerator space in the majority of the ships," says a statement of the Seattle Chamber of Commerce. "A brief prepared by Washington apple and pear growers shows that 35,000 to 40,000 carloads of apples and pears, amounting to 26,000,000 to 30,000,000 boxes, must be moved. All of this crop is produced within 300 miles of Seattle, and the larger portion of it within 200 miles. The brief points out that 56 per cent of the population of the United States lives within 300 miles of the coast line of Pacific and Atlantic oceans and the Gulf of Mexico.

"Transportation is a life and death problem of the fruit industry of the Pacific Northwest, and growers estimate that 30 to 40 per cent of the fruit crop of the Pacific Northwest will move to domestic and foreign markets through the port of Seattle provided that ample and efficient refrigeration is provided on the steamships sailing from this port. This represents a tonnage equal to the freight of 12,000 cars and is dependable cargo.

"Fruit growers are willing to assist the steamship companies which will put in refrigerator space by urging Puget Sound concerns to bring cargo from the Atlantic Coast in ships rather than by rail. The 1921 crop of the Pacific Northwest orchards is expected to be a record-breaker, as conditions throughout the winter have been extremely favorable."

Large shipments of citrus fruits also will go to Europe by vessels of the Holland-America Line at a large saving as compared with the New York rail and water combined rate.

Fruit Rate Cut

When the Pacific Coast-North Atlantic Eastbound Conference reduced the rate on dried fruit in sacks from $1.40 a hundred pounds to 60 cents, it started a neat little disturbance on the Pacific Coast, which though local was none-the-less vigorous.

For a long time the rail differential between sacked and boxed fruit has been 20 cents in favor of boxed goods. The steamship differential varied prior to the opening of the Panama Canal, but at no time was it great, and, in fact, prior to the resumption of intercoastal traffic in 1920, shipping had not been an important factor for any considerable period.

Upon the resumption of intercoastal business early in 1920, the steamship lines made rates of $1.40 on sacked fruit and 90 cents on boxed. Very little boxed goods moved, and practically no sacked, because the differential of 50 cents was so great as to force packing in California and the shipment of processed fruit. But the Prune & Apricot Growers' Association, which controls probably 80 per cent of the acreage of California and almost 80 per cent of the crop, wishing to secure a closer connection with the Eastern markets and also to make itself more independent of the California packers, appeared on the scene as a potential shipper of a large tonnage of sacked fruit. The association requested a rate of 60 cents. This rate appearing profitable to the intercoastal lines, the conference published the tariffs, and no less than 100,000 tons of cargo was booked.

20-Cent Differential Asked

When word of this was noised about, the California packers began a vigorous offensive. They cited the old preferential of 20 cents and urged that it be restored, although they were oblivious of the fact that the actual differential by steamship had been, not 20 cents, but 50. That this error was made and continues to be made indicates how little consideration was given by packers to steamship transportation. Aside from this, the fixing of a 20-cent preferential for packed fruit would necessitate a rate of 40 cents, which, the steamship companies discovered, would not be profitable; the sacked goods contracted for at 60 cents must be transported at that rate; and the California packers found themselves protesting against an accomplished fact. Should the intercoastal lines increase the rate for any future bookings of sacked fruit, however, the demand of the packers would be met.

Somewhat curiously, the packers and their supporters, while requesting the application of the 20-cent rail differential to the steamship business, offered the intercoastal lines nothing in return. The natural assumption is that shipments of packed fruit would be forthcoming, but, as stated, practically no business has been done in this commodity and none is in sight, because, the packers say, Eastern buyers insist upon rail shipments. And there probably are good reasons why packed fruit cannot be shipped advantageously through the warm waters of the tropics.

On the other hand, prunes will make up the bulk of the dried fruit dispatched via the Panama Canal, as apricots would be more liable to deterioration.

San Francisco Chamber's Attitude

In the following resolution adopted by the San Francisco Chamber of Commerce, the water differential is given as 20 cents, whereas it should be, as was stated, 50 cents:

"The dried fruit packing industry of this city and state has developed chiefly by reason of the differential maintained by both rail and water carriers between dried fruit moving in boxes or sacks. A differential in favor of dried fruit in boxes proceessed and packed by local packers has always been carried in the tariffs of the water carriers between San Francisco and New York, the present rate on boxed fruit being 90 cents and on fruit in sacks $1.10. These carriers have recently agreed to reduce the rate on sacked fruit from $1.10 to 60 cents, leaving the rate of 90 cents on boxed fruit standing. This reversal of differential relationship will be fatal to the dried fruit packing industry of the Pacific Coast, which will be forced to Atlantic Coast territory.

"Therefore, it was resolved to recommend that the San Francisco Chamber of Commerce, in defense of the best interests of the city, state and coast, urgently support the maintenance of the present differential relationship on dried fruits boxed and sacked."

Quite in Earnest

To the steamship operator the chief and perhaps the only interest of the situation is the fact that 100,000 tons of new business has been developed. The Western packer and the grower, however, find the controversy one of many facets, and the quarrel is not likely to be quieted soon. Moreover, as demonstrating that the growers are in earnest, plans have been made for the opening of a processing plant in the Bush Terminals, Brooklyn, where the sacked fruit will be prepared for Eastern markets.

The protests of the packers were heard by the operators and at length were submitted to the Washington office of the Shipping Board in compliance with a request of the traffic department. Briefs were filed by both packers and growers.

Another interesting rate reduction in the intercoastal trade was that on canned fruits and vegetables, the rate having been reduced from 65 cents to 50 cents a hundred pounds, effective March 16 to July 31. This reduction was purely an emergency measure, designed to assist in moving the accumulation of last year's pack. Reductions recently were made by the canners in an effort to dispose of their stocks prior to the next season's crop; to this same end the lower rates will contribute, so that goods may be shipped from Atlantic ports, as far west as Chicago and the Mississippi, at less than the direct rail rates would be. The cost of canned goods in the Mississippi Valley, therefore, should be smaller than it has been heretofore. Three or four months probably will be required to clear out the stocks in California.

Other reductions

Other intercoastal reductions have been made as follows, effective March 3: Denatured alcohol from $1 to 75 cents; talc from 60 to 50 cents; oranges, ordinary stowage, newly established rate of 60 cents; magnesite, crude or calcined, from 55 to 40 cents; returned defective metal auto parts, less than carload lot, at new established rate of $2; prepared mustard in barrels from $1 to 65 cents; onions in bags from 65 to 50 cents, and cotton duck or denim clothing, less than carload lot, at new rate of $2. The rates govern one-hundred pound shipments in carload lots, except when stated otherwise.

Wharfage Charges Dropped

All wharfage charges on import and export freight through the port of Seattle are to be eliminated and work on revising the tariffs has been begun by the Port Commission and some private dock owners, as the tariff of both public and private dock owners is to be uniform in all particulars, the revision covering storage charges and practices as well as overseas, intercoastal and other cargo movements, says the news service of the Seattle Chamber of Commerce. Decision to abolish wharfage charges of 25 cents a ton on imports and 30 cents a ton on exports, now assessed against the shipper, was made so that this port might be the cheapest one on the Pacific Coast for the shipper as well as for the ship operator.

Port Improvements

The Skinner & Eddy Corporation, Seattle, has sold to A. M. Castle & Co., dealers in iron and steel, 150,000 feet of land and two buildings, one of which is a large warehouse having 52,000 square feet of floor space. Stocks of iron and steel will be stored in the latter.

Frank K. Hitching, vice-president and manager of A. O. Anderson & Company, San Francisco, has resigned and has opened an office at 244 California Street for the sale, purchase and chartering of steamers and sailing vessels. He has established connections in London and Japan. Mr. Hitching also has taken the agency of the United States Transport Company's intercoastal fleet, the first vessel of which, the C. H. Livingstone, is due on the Pacific Coast in April, and the second, the Anne E. Moss, sailed from New York late in March. The third, the O. C. Morse, will depart from New York April 10 and there will be sailings each fifteen days thereafter. The vessels are privately-owned 9400-tonners.

The board of engineers for rivers and harbors of the War Department has ruled that the Duwamish waterway, Seattle, is an industrial development and therefore is not entitled to appropriations as a commercial harbor.

Towage Results in Loss

Towage by the port of Portland resulted in a loss of $48,113 in 1920, according to the biennial report of the port commission. The loss in 1919 was $32,703. During 1920 the two tugs made 128 tows between the sea and Portland or way ports and made 636 harbor tows, earning $74,458. The port dredges moved 4,480,856 cubic yards of matter in 1920, as against 3,829,529 in 1919. The average cost increased about 2 cents in 1920. The report summarizes improvements at the mouth of the Columbia as follows: "The entrance to the Columbia river, where a bar once existed, now has a depth of 42 feet at mean low water. The entrance channel is over half a mile wide. This conditions has existed since completion of the jetties and is permanent; in fact, the channel is gradually widening and deepening. With this adequate and permanent entrance channel existing, the next step is to secure a channel of equal stability between the Columbia river entrance and Portland of such depth and width that any vessel that can enter the river may proceed to Portland without hindrance. To accomplish this, the port of Portland will concentrate its future efforts, as it recognizes the channel to be first requisite of the port."

The port of Portland commission has authorized the issuance of $600,000 in bonds of $1000 denomination maturing in five years and bearing 6 per cent. The funds obtained will make up the $400,000 deficit of the commission pending the issue of 30-year bonds, recently authorized by the Oregon Legislature.

Lumber Center Built

Anticipating large cargoes of forest products from Western Washington and the Inland Empire territory, the Weyerhauser Forest Products Corporation is completing an assembling and distributing yard in Baltimore with a capacity of 100,000,000 feet of lumber to receive water shipments from Puget Sound. This distributing plant marks the first step of lumber interests in taking definite action too escape by water shipment the high rates on railroads. The Baltimore yard is expected to be completed this spring and it now has a capacity of storing 40,000,000 feet for immediate distribution in the markets of the East.

Lumber can now be shipped to New York by steamship at a cost of $13 to $14 less than by rail. Figuring wharfage expenses, a saving of $10 a 1000 feet of lumber can be effected by the water route and distribution from assembling yards.

Two of the three bonded warehouses built in Santiago de Cuba by the Snare & Triest Company of Havana for Desiderio Parreno have been placed in service. The warehouses, which are of concrete with iron roofing, will have an area of 47,437 square feet. The charge made for storing goods in the Parreno bonded warehouses will be 5 cents a month or fraction thereof for each 200 pounds or less, and it is believed that this low charge will make Santiago the cheapest storage warehouse port in the West Indies.

A decree has been approved providing for the construction of port works at Fortaleza, in the State of Ceara, Brazil. At present the port has no docking facilities, not even a breakwater, a long bridge extending out into deep water being the only anchorage afforded vessels. The budget for this work has been estimated at 12,893,565 milreis, this amount being considered sufficient to construct works comparable to those at Pernambuco. (On February 14 the milreis was quoted at 15 cents, United States currency.)

Consul Homer Brett states that the Chilean government has appropriated 1,700,000 pesos ($340,000 at normal exchange) for the prompt beginning of construction work on the new pier at Arica. It is thought that the work will be done directly by the Ministerio de Obras Publicas, Santiago, without the intervention of a contractor, and that the construction will be similar to that of the several piers now existing, with piling of steel tubes connected with steel-rod braces and a flooring of timber. Three or four steel cranes of from 20 to 50 tons capacity will be required.

The bay at Santa Marta, Colombia, by reason of its depth of water, easy and safe accessibility for all kinds of water craft, and existing dock facilities, is the best harbor on the north coast of Colombia. The construction of wharves to supply the necessary facilities for handling incoming and outgoing cargo has been undertaken by the Santa Marta Railway Company, Ltd., a British corporation, which, under the terms of its concession from the Colombian government, not only operates 97 kilometers of railway line, with about the same amount of branch trackage, but also is authorized to provide dock facilities for its transportation system.

A law dated April 16, 1910, authorized the extension of the Port of Rouen, France, the nearest port to Paris. Eighty-four hectares (207.5 acres) have been purchased to the west of Rouen and the cornerstone has been laid and active work will soon commence.

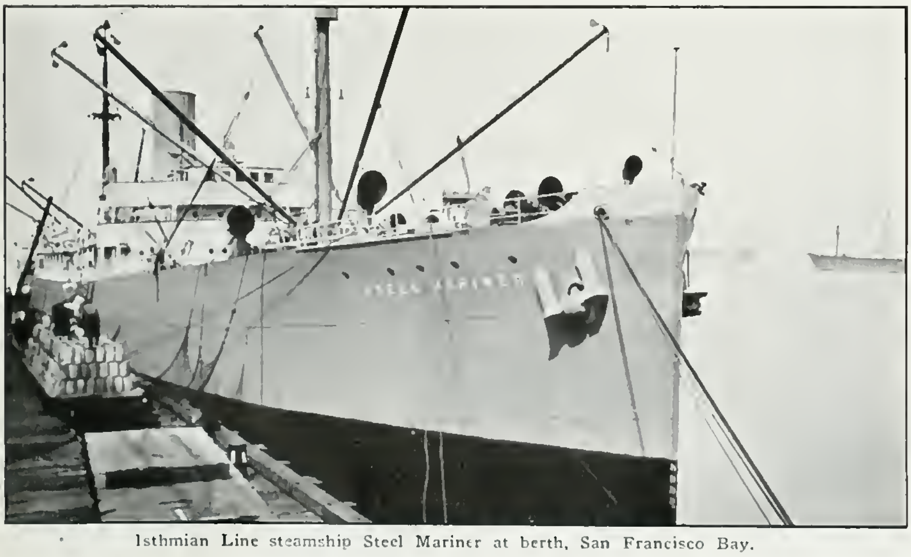
When completed this port will have 3660 meters of new quays with a water surface of about 35 hectares (86.4 acres). The entrance to this new port will be 140 meters (460 feet) wide and the minimum depth alongside the wharves will be 9 meters (29.5 feet). The cost has been estimated at 60,000,000 francs ($11,320,750 at the normal rate of exchange). The work will extend over a period of seven years and will consist of dredging 3,000,000 square meters, the construction of concrete wharves, filling in the land in back, and finally the construction of warehouses, the equipping of unloading and loading machinery, etc., and a complete system of tracks which will be joined to the main line to Paris. A map showing the proposed improvements at Rouen can be examined at the Bureau of Foreign and Domestic Commerce or its district offices by referring to file No. 18579.

Starboard bow of the American-Hawaiian steamship Alaskan as she appeared in the floating drydock of the Bethlehem Shipbuilding Corporation, San Francisco. See page 237.

In the Orient

The report of the engineer in chief of Chefoo Harbor Commission for the year ended December 31, 1920, shows that work on the breakwater was completed by December 1 and that work on the mole has been steadily carried on. The mound is approximately to its full height and protected by heavy rubble on the slopes for a length of about 3200 feet. A total length of about 1700 feet of parapet wall has been built. Since the commencement of the work 18,000 tons of cement has been received.

The Whangpoo Conservancy Board, Shanghai, has requested each government represented on the Shanghai Harbor Commission—Great Britain, United States, France, Japan and Holland—to appoint an engineer to attend a conference to be held in Shanghai in October, at which the Shanghai harbor problem will be studied. The need of shipping facilities at Shanghai has become acute. The conference will be asked also to study silting at the mouth of the Yangtse.



Isthmian Line steamship Steel Mariner at berth, San Francisco Bay.

About People

Letson Balliet, efficiency engineer of the Moore Shipbuilding Company, Oakland, has resigned to take up a practice as consulting engineer with offices in 1508 Hobart Building, San Francisco. Prior to entering the service of the Moore Company three years ago, Mr. Balliet was in charge of the surveys for the Colorado River hydro-electric development in 1914 and also was for years a mining engineer.

Harry Brandt has resigned as disbursing officer of the Seattle district, Shipping Board, and has entered manufacturing business in Chicago. Mr. Brandt joined the board organization in May, 1917, as chief clerk to Captain John F. Blain at Seattle.

P. S. Newcomb, of Dodwell & Company, Seattle, has been appointed assistant manager, San Francisco.

C. P. Morse, vice-president and assistant manager of the Inter-Island Steam Navigation Company, Honolulu, has resigned and has been succeeded by O. C. Scott, treasurer. M. M. Graham has been made secretary and treasurer, succeeding Mr. Scott. For many years Mr. Morse was in charge of American-Hawaiian interests in the islands; he entered the Inter-Island service after the American - Hawaiian suspended its Hawaiian service.

Commander Charles Belknap, Jr., has resigned the presidency of the General Steamship Corporation, San Francisco, to associate himself with Russell & Company, Boston. H. S. Scott, president of the Trans-Oceanic Company, succeeds Commander Belknap as present of the General Steamship Corporation, and Drew Chidester, also of the Trans-Oceanic office, will act as vice-president and general manager.

Edward F. Wright, general marine superintendent of the International Mercantile Marine, retired February 28 after fifty-four years of service with the American Line, which he joined in 1867. His retirement was on the fifty-fourth anniversary of the day when he entered the American Line office in Philadelphia as a boy.

Senator Joseph E. Ransdell of Louisiana has announced the following members of the executive committee of the National Merchant Marine Association: Senator Ransdell, chairman; Matthew Hale, president, South Atlantic States Association, Washington; Winthrop L. Marvin, vice-president, American Steamship Owners' Association, New York; Edwin H. Duff, attorney, Washington; Homer L. Ferguson, president, Newport News Shipbuilding & Dry Dock Company; Hugh Gallagher, Pacific Steamship Company, Seattle; William Allen, special representative of the city of New Orleans in Washington. One other member representing the Great Lakes section remains to be appointed.

Yonejiroh Ito, vice-president of the Nippon Yusen Kaisha, Tokyo, has been elected president, succeeding the late Baron Kondo. Mr. Ito, formerly managing director, was elected vice-president in November to succeed Dr. Suda, resigned. Mr. Ito's position as vice-president will be filled by Y. Nagatami, formerly director of the finance division. In 1896 Mr. Ito became a clerk in the Yokohama office of the N. Y. K. and has served the company in England and the United States.

Hamilton & Wade, Inc., 1 Liberty Street, New York, announce the election of William G. Marvin, the company's counsel, as a director.

Sir James Charles, K. B. E., C. B., R. D., R. N. R., commander of the Cunard liner Aquitania and senior Cunard captain, has been made commodore of the fleet. Sir James has served forty-one years at sea, twenty-six of which he has been a Cunard officer. He was made C. B. in 1911, C. B. E. in 1919 and subsequently was made K. B. E., which carries with it the title of Sir. Sir James was in command of the Aquitania during the spring of 1918, when the vessel transported almost 50,000 American troops to Europe in nine voyages.

Three officers of the Isthmian steamship Steel Mariner. On the left is E. Lindahl, first officer, and in the center J. Tyson.

Captain Frederic A. Gainard has been elected secretary and treasurer of the Neptune Association, succeeding Captain Arthur N. McGray.

A. C. F. Henderson has been appointed joint manager of the Cunard Line, serving in that capacity with S. J. Lister. The Cunard will be managed by A. D. Mearns, general manager, Messrs. Lister and Henderson, joint managers, and R. Crail and C. E. Cotterell, assistant managers.

The Pittsburgh office of the Independent Pneumatic Tool Company has been moved from 1208 Farmers Bank Building to 718 Bessemer Building, Fort and Dusquesne way.

Thomas W. Harrison has resigned as advertising manager of the Berger & Carter Company, San Francisco, and has opened an advertising agency service with offices in 923 Hearst Building. He will give special attention to the advertising of machinery and mechanical goods.

Captain William M. Smith, port captain of the White Star at New York, has retired after forty-three years of continuous service with the line. After five years on the training ship Conway, Captain Smith was an apprentice for the same length of time on sailing vessels in the East Indian and Cape Horn trades. In 1878 he was appointed fourth officer of the old White Star liner Britannic; for the next ten years he commanded the Arabic, Tauric, Teutonic and Majestic, and in 1888 he took the Arabic to Hongkong under charter to the Oriental & Occidental. In 1890 Captain Smith was transferred to the Oceanic, also in the Orient-San Francisco service, and on that vessel had Nellie Bly as a passenger from Hongkong to San Francisco when that traveler made her record-breaking trip around the world. Captain Smith remained on the Pacific until 1895. In June, 1899, he was appointed marine superintendent at New York.

H. E. Manghum, examiner in charge of the division of regulations, has been appointed commerce attorney of the Shipping Board, Washington.

Charles R. Page, head of marine insurance Syndicate A, made a tour of Pacific Coast cities in March.

S. L. Kreider, who was a recent visitor in San Francisco, reports favorable movement of freight on the intercoastal lines both east and southwest from Los Angeles. Mr. Kreider, who is agent for the Williams Steamship Line and also the T. K. K. Line, has offices in Los Angeles and San Diego, at which latter point he is enlarging his staff.

Deaths

Richard Sanderson, for several years head of Sanderson & Son, New York, in London February 24, at the age of 90. Mr. Sanderson founded Sanderson & Son in 1878, retiring in 1890. The business thereafter was carried on by two sons, Harold A., now chairman of the White Star, London, and Oswald, now managing director of Ellerman's Wilson Line, Hull. Three other sons, the widow and two daughters survive.

J. Richard Lane, vice-president of Frank Waterhouse & Co., in Seattle, February 9.

Captain Henry Smith, a pioneer mariner of the Northwest, in Victoria, B. C., February 7.

Captain James R. Herriman, commander of old clipper ships, his last vessel having been the America, in San Francisco, March 9.

Max Kalish, former vice-president and general manager of the Humboldt Steamship Company, in San Francisco February 26.

John Rahn, president of the Rahn-Larmon Company, lathe manufacturer of Cincinnati, March 11.

Colonel A. Papst, founder of the Marine Iron Works, Tacoma, and for a time connected with the Dockton Shipbuilding Company, in Tacoma, March 14.

PACIFIC MACHINERY

NEW COMPRESSOR INSTALLATIONS

THE Rix Compressed Air & Drill Company has recently installed a three-stage compressor at the new plant of the Stewart Oxygen & Hydrogen Products Company in San Francisco.

This compressor will be used for compressing oxygen for filling oxygen cylinders at 1800 pounds pressure. The oxygen is compressed at 65 pounds at the first stage and delivered at high pressure stage at 1850 pounds pressure. Tests have shown this compressor is maintaining an efficiency of 76 per cent. The gas delivered at the third stage shows the low temperature of 70 degrees Fahrenheit.

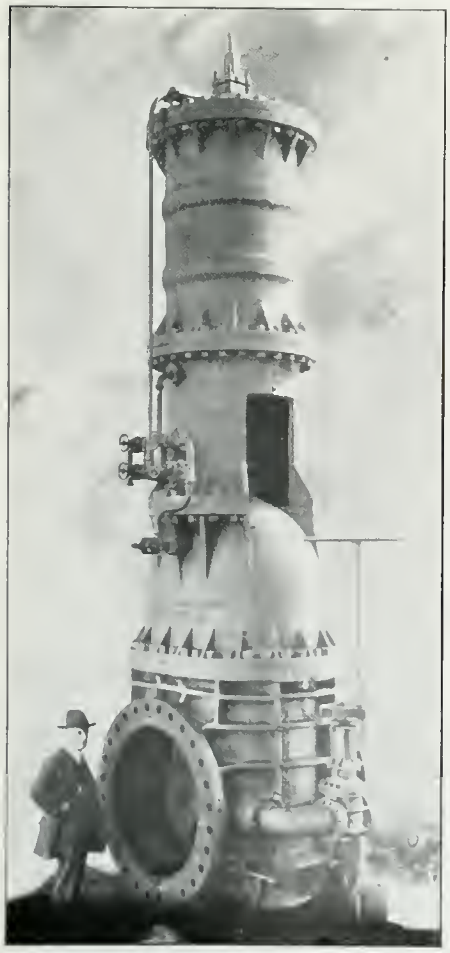
Owing to the impossibility of using oil in connection with compressed oxygen, the Rix Company has designed a special lubricating system for this compressor whereby a composition of soap, water and glycerin is used for lubrication. The floor space occupied is 6 feet by 30 inches. The inter-cooler for all three stages of the Rix compressor is enclosed in one case with dimensions of 20 inches in diameter by 4 feet in height.

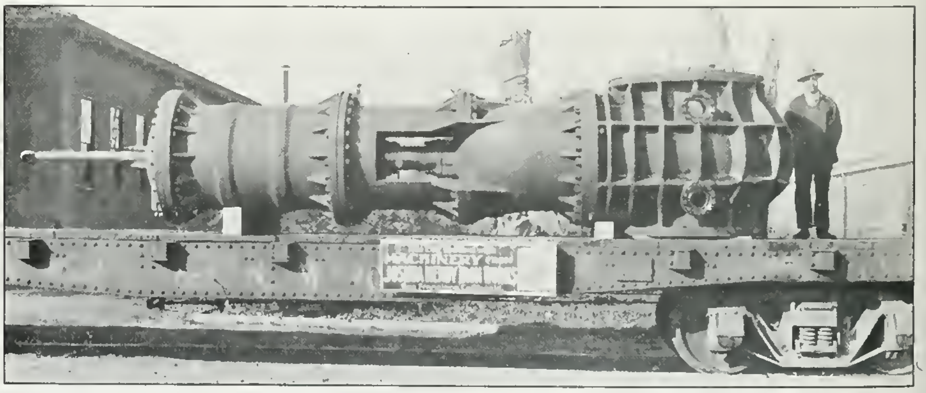
The Rix compressor, which requires a 20 horsepower motor, has a rating of 41 feet per minute. A recent test in filling six oxygen cylinders at 1800 pounds pressure, which totaled 1200 cubic feet of free oxygen, was made in forty minutes. This indicates the capacity of the Rix equipment to be 43,200 feet of compressed oxygen in twenty-four hours.

The Rix Compressed Air & Drill Company are in receipt of an order from the Falk Company of Milwaukee for a 9 by 4 by 6 Duplex Tandem two-stage air compressor.

Rix duplex tandem two-stage compressors of the same size have been installed recently on the motorship Charlie Watson; also the motorship Harper of the Standard Oil fleet, and a recent shipment of this same type of air compressor was made to the New London Ship & Engine Company of Groton, Connecticut.

The fact that the Rix Compressed Air & Drill Company is shipping its equipment to many Eastern points, as well as to Pacific Coast motorship builders, indicates the resourcefulness and progressiveness of the local organization. The Rix Compressed Air & Drill Company has a modern factory in Los Angeles, and sales offices and warehouse in San Francisco.

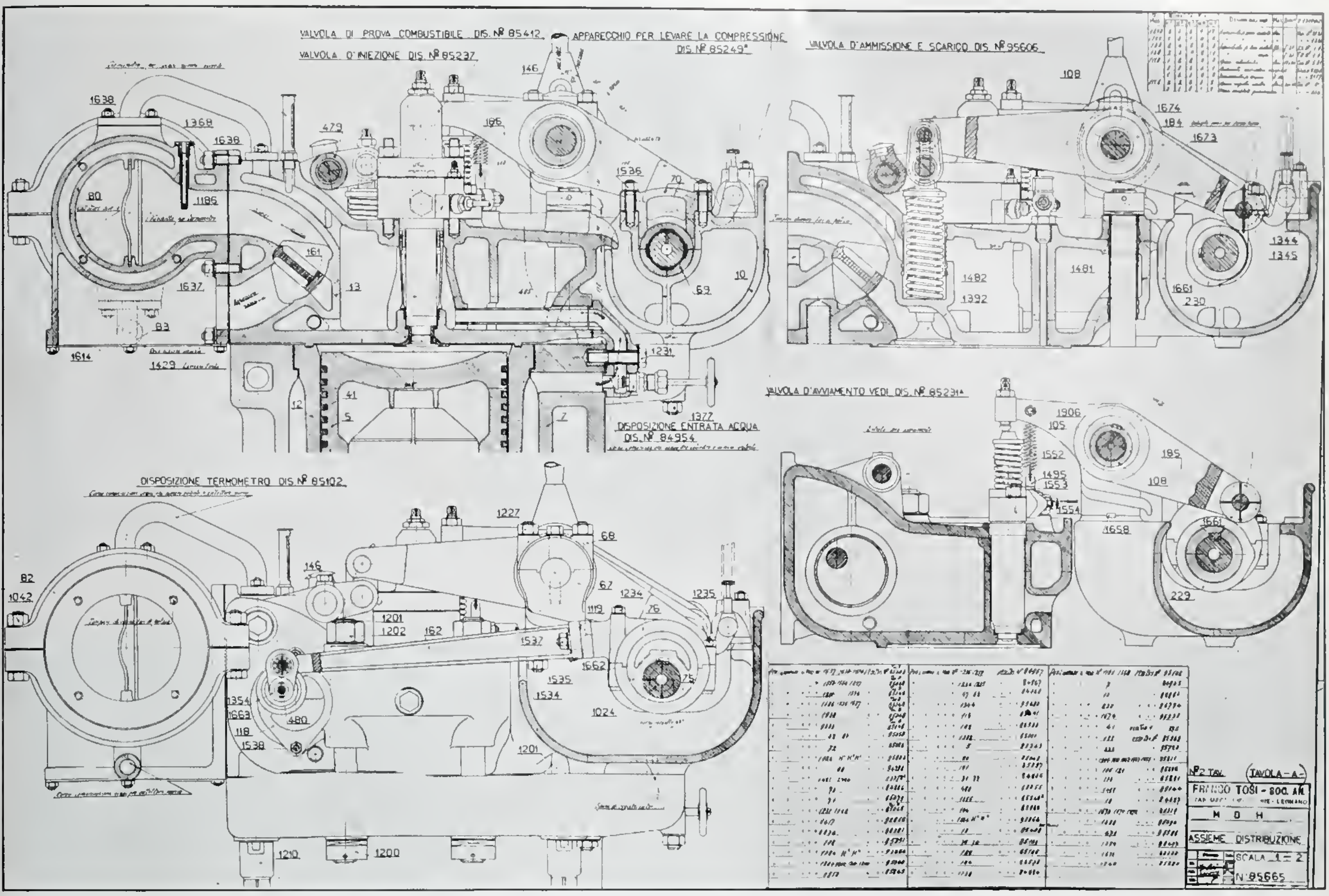

Gate valve complete on erecting shop floor. Chief Engineer H. L. Rexworthy of the Joshua Hendy Iron Works is shown by the valve.


Hydraulically operated cast steel gate valve built by the Joshua Hendy Iron Works of San Francisco, California, for the Great Western Power Company

HUGE GATE VALVES

The Joshua Hendy Iron Works of San Francisco have recently completed an order from the Great Western Power Company which includes four 42-inch cast steel hydraulically-operated gate valves for the Caribou hydro-electric power project. As will be seen from the attached illustration, these valves are of colossal dimensions; in fact, the assembled valve measures 23 feet in height from the bottom of the valve chamber to the top of the hydraulic cylinder. The weight of each valve is 50,000 pounds. The valve chamber, the hydraulic cylinder, the valve chamber dome and tandem connecting piece are all made from cast steel of the highest quality, the valve being designed to stand a test of 1000 pounds hydraulic pressure to the square inch. As will be noted in the illustration at the left, a bypass is provided, controlled by a hand wheel through suitable spur gearing.

EFFICIENT VALVE DESIGN ON TOSI ENGINES



Reproduction of drawings which show the design of valves on the Tosi Diesel Engine. This drawing was furnished by the United Engineering Company of San Francisco, who are licensed manufacturers of the Franco Tosi Full Diesel Marine Engines

A RECENT visit of a representative of the Pacific Marine Review to the works of the United Engineering Company, San Francisco, developed a new and very interesting feature in the design of the Tosi-Diesel engine, for which the United Engineering Company hold the building license for the Pacific Coast.

As is shown in the drawing reproduced above, the valve in the Tosi engine used for exhaust and intake remains open from the beginning of the exhaust phase of the stroke to the end of the suction phase. A swinging baffle covers the outer end of the port to this valve. This baffle is actuated by an eccentric on the camshaft in such manner that during the exhaust stroke it directs the gases from the cylinder to the exhaust manifold, and at exactly the proper time it swings over opening a valve port to the fresh air inlet. This design allows the attainment of several advantages. The temperature of this combination exhaust and intake valve can be kept much lower than that of a straight exhaust valve, and the valve itself can be made of much larger diameter so as to give less velocity of the exhaust gases and thus eliminate burned valve seats and distorted stems and cages. The rocking baffle is carried on a stem working in ball bearings, and the baffle has an absolute clearance in its housing of .002 inches. In practice it has been found that the slight amount (one per cent) of exhaust gas drawn in with the intake air does not in any way detract from the output of the engine.

The eccentric which rocks this bafflle is keyed to the camshaft and does not require shifting of its position for reversal of the engine so that in the new design there are but two cams(one ahead and one astern) for each cylinder. Valve cages are also eliminated, thereby bringing the cooling water much closer to the valve seats. In the larger size engines two of these combination valves operated by a single set of gears are used in each cylinder head, this being done in order to keep a symmetrical casting.

Another improvement in the Tosi design is in the elimination of stuffing box on the injection nozzle stem. These stems are fitted to a long vertical bearing with a clearance of .001 inch and with a number of labyrinth grooves on the stem. The stem at its bottom end has a conical valve seating on the housing, and it has been found in practice that for the very short period during which the stem is open there is absolutely no leakage of air past the labyrinth grooves.

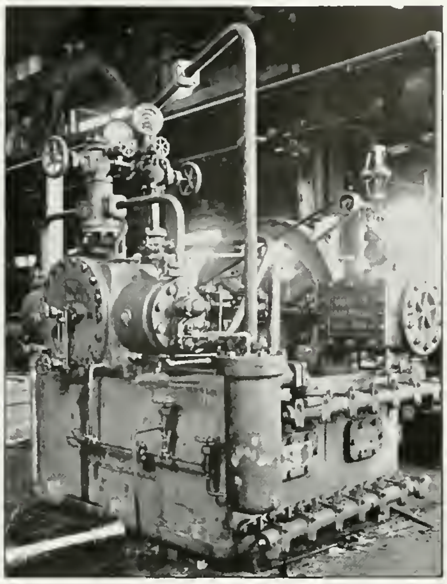
SOUTHERN PACIFIC SHOPS

THE placing in service of the new locomotive boiler shop at Bay Shore, South San Francisco, announced by the Southern Pacific Company, completes the general plan for the Bay Shore shops, and provides facilities for the taking care of all engines on the Coast Division and helping out the Western Division shops. The new boiler shop, a frame structure with outside walls practically all of glass, is 100 by 178 feet in size, with eight tracks and a capacity of six fire boxes a month. The large amount of glass usedi n the construction of the building provides excellent lighting and the fact that one side of the building is made up of sliding doors is an additional convenience to the work.

VULCAN REFRIGERATING EQUIPMENT

FOR many years the Vulcan Iron Works of San Francisco have built high-grade refrigeration equipment, and their marine type refrigeration machines have been installed on many of the ships which operate on the Pacific Coast.

The illustration shows a No. 11 C Marine type refrigerating machine which is one of a lot of three that have recently been shipped to a Japanese shipbuilder for installation on cargo ships. This equipment is the design of the Vulcan Iron Works, and special consideration has been given to meet the severe operating requirements for work aboard ship, and with the limited space allotted for such equipment a very compact machine is required. The No. 11 C has a capacity of 10 tons of refrigeration. Two ammonia cylinders of opposed piston design have a diameter of 7 inches with 8-inch stroke. The steam cylinder is of 10-inch diameter with 9-inch stroke. The speed of the machine is designed for oeration at 75 to 150 R. P. M., 1½-inch pipe connections are used, and the engine develops from 10 to 14 horsepower. The diameter of crankshaft is 3½ inches. The floor space required for this compact machine is only 5¾ by 7 feet.


No. 11C Vulcan Marine Type Refrigerating Machine

The refrigerating machine may, in one sense, be termed the most important machinery on the ship; for, if the main engines would break down at sea, the most serious result would probably be the time lost in making repairs, whereas if the refrigerating machinery would stop working for any undue length of time, the perishable cargo and ship's food supplies would spoil. For these reasons, the Vulcan Iron Works have given great attention to the design of a durable and rugged machne to meet the special requirements for marine refrigeration equipment.

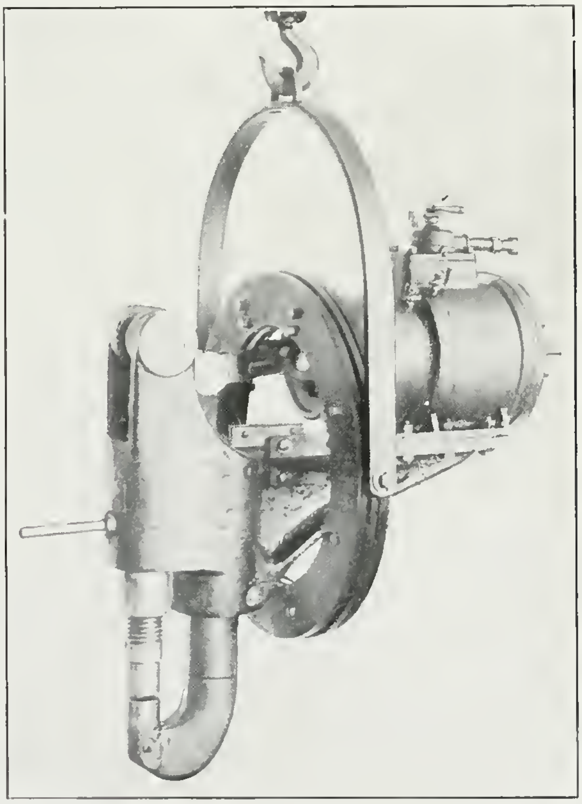
Special Riveter for Marine Boiler Construction

THE accompanying illustration shows a special riveter designed by the Baird Pneumatic Tool Company of Kansas City, Missouri, for riveting the flanges on Morrison corrugated furnace Scotch marine boiler construction.

The machine has a reach of 5 inches and a gap of 12 inches with a die adjustment of 3 inches to accommodate the various length of rivets and thickness of plate. The air cylinders are of the tandem type, with two pistons on a single rod. The toggle is of simple construction, composed of three pieces arranged in a compact unit.

The machine is hung from the direct gravity point in a circular supporting frame which revolves on a ball-bearing runway, permitting the riveter to be operated at any angle. It has a capacity for one-inch steam tight rivets.

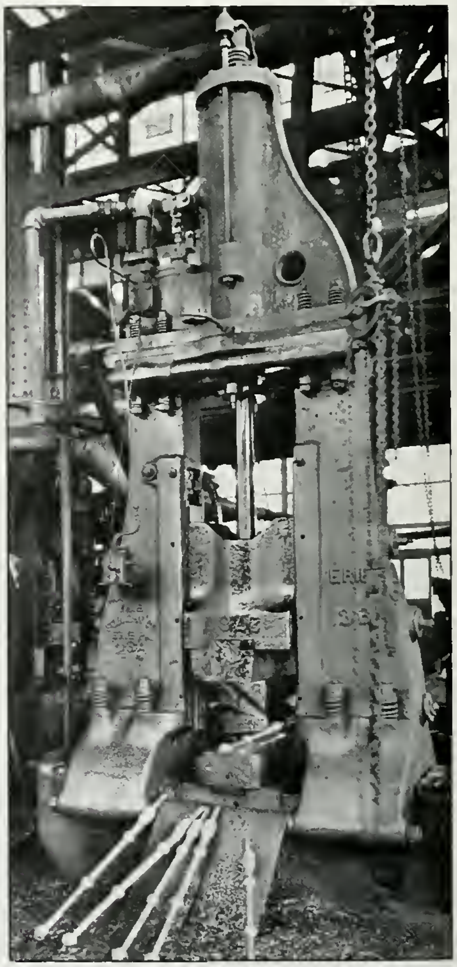
It is a closely designed unit, being 33 inches long by 40 inches high, and weighing approximately 750 pounds. It has many other uses in boiler work where extreme portability and adjustment in difficult positions are important features.


The Baird Pneumatic Riveter designed for riveting flanges on corrugated furnace Scotch boilers

POLLAK OFFICES MOVED

THE general sales offices of the Pollak Steel Company at New York City have been changed recently in order to secure larger accommodations, and are now located in Suite 3115-3116-3117, Equitable Building.

The Pollak Steel Company has built up an enviable reputation for high-grade marine forgings, which include heavy hollow bored propeller shafts, pistons, connecting rods, stern frames, motor pump and turbine forgings.


A 2000 pound Erie Steam Drop Forging Hammer used in forging three ball stanchions at the Federal Shipbuilding Company. Equipment built by the Erie Foundry Company is handled on the Pacific Coast by Louis G. Henes.

CALIFORNIA MACHINERY COMPANY

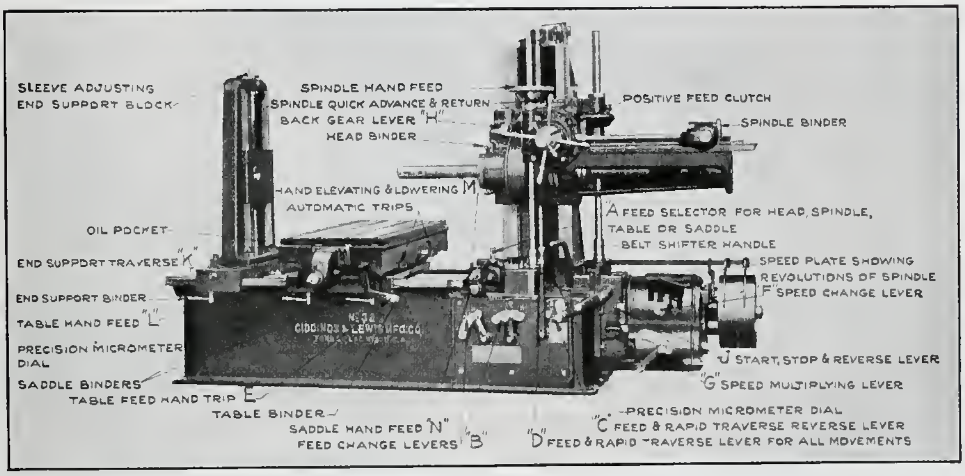
THE California Machinery Company, who have specialized in marketing high-grade rebuilt machinery, have recently moved to larger quarters at 67 Beale Street, in San Francisco, where an attractive showroom and sales offices have been opened.

The list of machine tools which are carried by the California Machinery Company includes many types of both iron-working and wood-working machinery. Appearing on this list is a Giddings & Lewis No. 0 horizontal boring, drilling and milling machine. This high-grade tool is built for maximum production, while maintaining high precision standards. Owing to its rugged construction and simple design, manufacturers have found that the Giddings & Lewis equipment may be relied upon for hard, continuous service. The No. 0 Giddings & Lewis machine has a spindle bar diameter of 3⅛ inches; the longitudinal travel of spindle is 26 inches; length of spindle is 63½ inches; the size of table is 24 by 50 inches, and the traverse travel of table is 30 inches, with a longitudinal travel of 32 inches. The 16 feeds in each direction make this tool adaptable for many purposes.

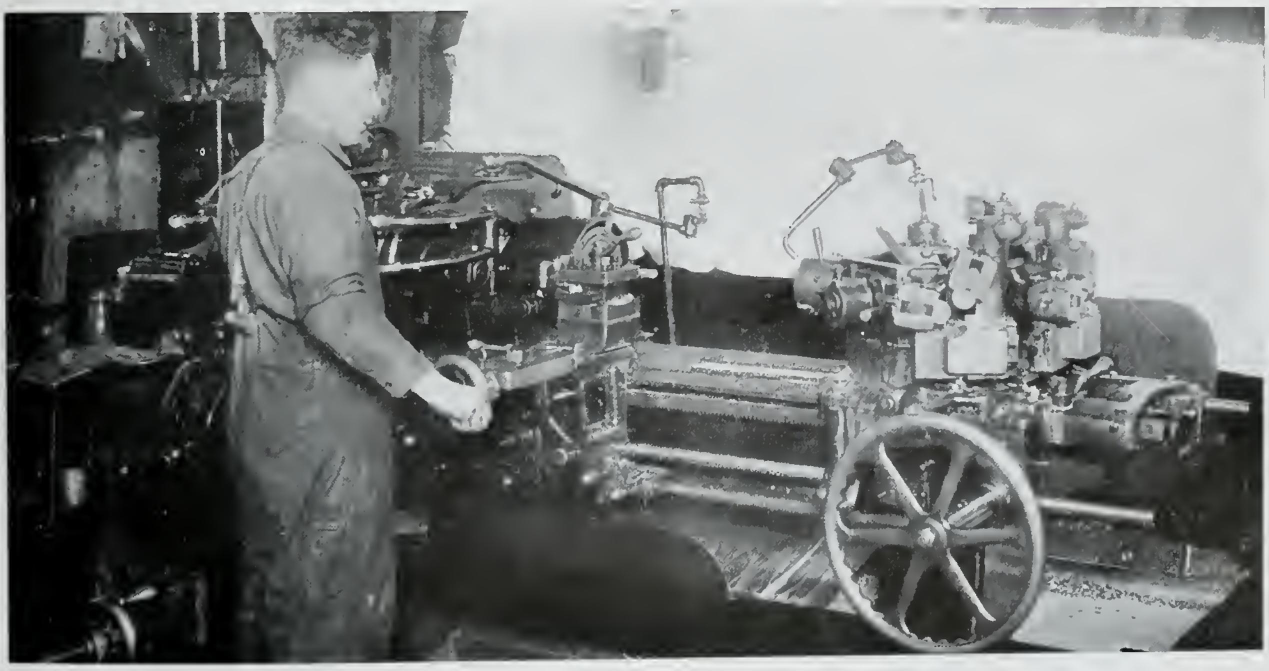
Another manufacturing tool listed by the California Machinery Company is the 3A Warner & Swasey Universal hollow-hexagon turret lathe. This lathe is equipped for bar and chuck work, the bar capacity being 3½ inches, and chucking capacity 16 inches. The machine is fully tooled and carries the same guarantee as when it left the factory.

Two Cleveland open-side planers are listed by the California Machinery Company, one with a capacity of 36 inches by 36 inches by 12 feet, and the other 48 inches by 48 inches by 18 feet. The open-side planer is in great demand in many of the large jobbing shops for the reason that this type allows for planing of much wider work than is possible with the old-style machines. This machine can be arranged for belted motor or reversing motor drive if desired. The machine can be equipped with supplemental rolling tables for extremely wide work, and if a fourth head is required by part of the work, outside demountable columns can be equipped.

A No. 5 Ingersoll vertical slab milling machine and a 2500-pound Chambersburg single frame steam hammer are also listed by the California Machinery Company.


SLEEVE ADJUSTING
END SUPPORT BLOCK
SPINDLE HAND FEED
SPINDLE QUICK ADVANCE & RETURN
BACK GEAR LEVER "H"
HEAD BINDER
POSITIVE FEED CLUTCH
SPINDLE BINDER
HAND ELEVATING & LOWERING M
AUTOMATIC TRIPS
OIL POCKET
"A" FEED SELECTOR FOR HEAD, SPINDLE, TABLE OR SADDLE
BELT SHIFTER HANDLE
END SUPPORT TRAVERSE "K"
SPEED PLATE SHOWING REVOLUTIONS OF SPINDLE
"F" SPEED CHANGE LEVER
END SUPPORT BINDER
TABLE HAND FEED "L"
PRECISION MICROMETER DIAL
"J" START, STOP & REVERSE LEVER
SADDLE BINDERS
"G" SPEED MULTIPLYING LEVER
TABLE FEED HAND TRIP E
TABLE BINDER
PRECISION MICROMETER DIAL
SADDLE HAND FEED "N"
"C" FEED & RAPID TRAVERSE REVERSE LEVER
FEED CHANGE LEVERS "B"
"D" FEED & RAPID TRAVERSE LEVER FOR ALL MOVEMENTS
No. 32
GIDDINGS & LEWIS MFG. CO.

The No. O (32) Giddings & Lewis horizontal boring, drilling and milling machine listed by the California Machinery Company. This high grade machine tool has been designed for heavy production work where close standards of precision are required.



The No. 3A Warner & Swasey turret lathe on hand at the California Machinery Company. This manufacturing tool with its well known rugged construction has gained many friends in Pacific Coast industries

AN IMPROVED TWIST DRILL GRINDER

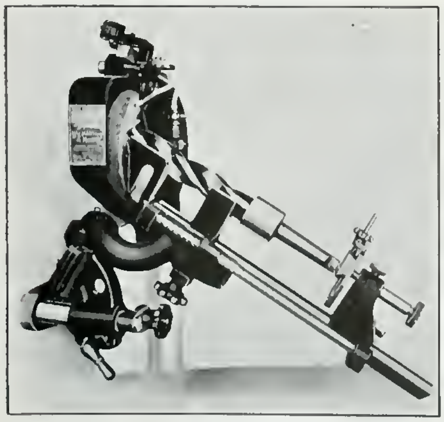
TWENTY-TWO years ago the Wilmarth & Morman Company, Grand Rapids, Michigan, placed on the market the "Yankee" twist drill grinder. This machine was of the gauge jaw or calipering type, it being necessary to adjust the machine for each different size drill ground.

Shortly afterwards, a drill grinder was marketed, and in view of marked improvements the machine was called the New Yankee. The preliminary calipering was eliminated, thereby making the positioning of the drill entirely automatic. The only adjustment required was the setting of the tailstock for the various lengths of drills. This style of drill grinder remained the standard machine with the Wilmarth & Morman Company until recently, when they brought out the Improved New Yankee twist drill grinder.

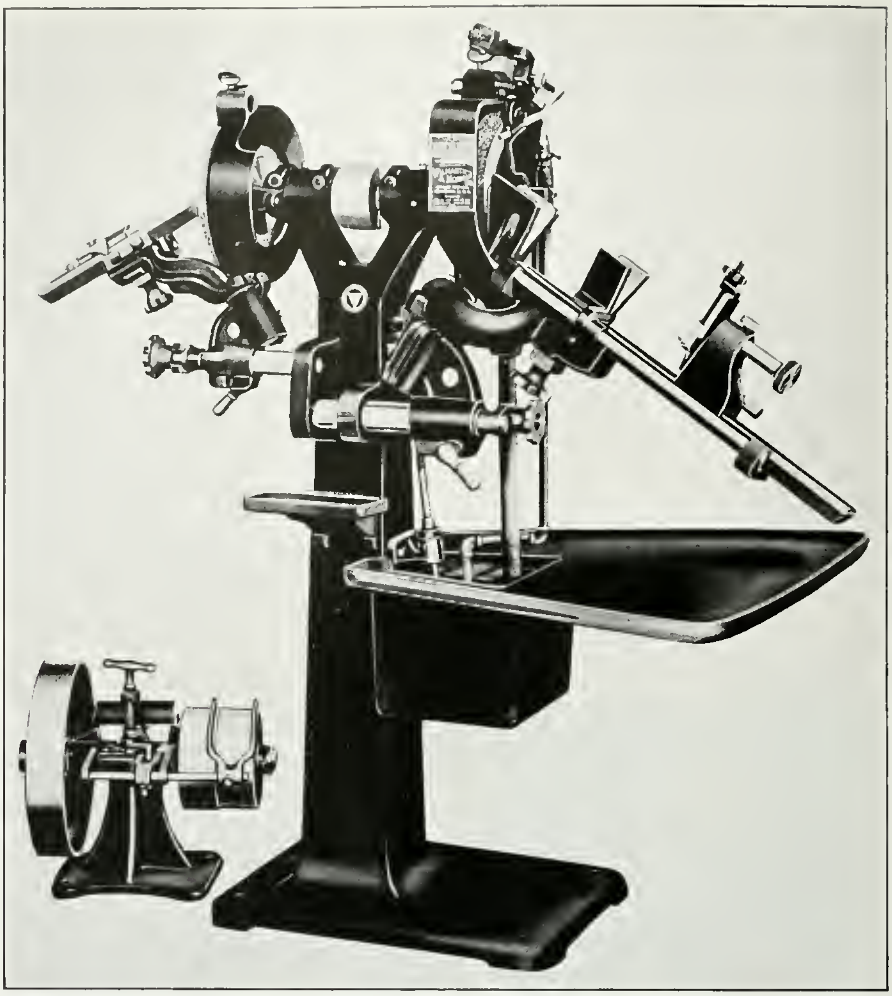
The original machine was adapted to the grinding of straight shank drills only, while the advent of taper and collared shank drills made a special attachment necessary. In the new machine (as photograph shows) the basic features of both types are incorporated so that straight and taper shank drills can be readily ground without any time consuming adjustments whatsoever.

The operation of the grinder is shown in the accompanying illustrations. The illustration shows how long straight, taper and collared shank drills are positioned. When the body of taper and collared shank drills becomes too short to be supported by the sliding "V" block, this part is thrown out and the shank of the drill is supported by a center detail in the elevating tailstock.

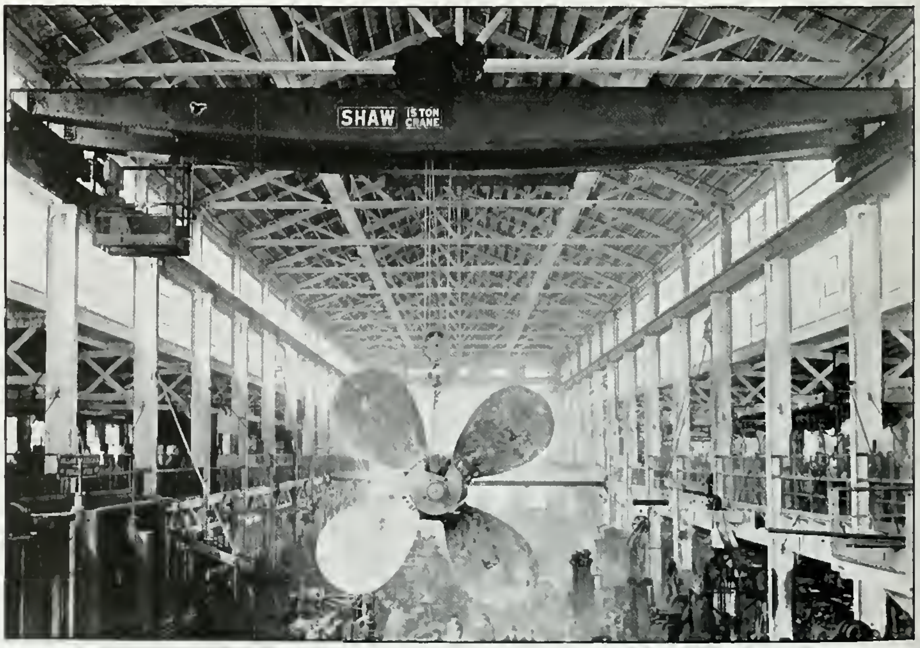
Nine belt and eight motor driven styles are offered. These are made up in different combinations from four holders having the following capacities: No. 52 to ⅝ inch; 3/32 to 1½ inch; ¼ to 2½ inch; and ½ to 4 inch. Each machine is equipped with means for obtaining different clearance angles and a built-in wheel trueing device.



Illustrating how long straight, taper and collared shank drills are positioned for grinding.



The Improved New Yankee Twist Drill Grinder manufactured by Wilmarth & Morman. The Herberts Machinery Supply Company with sales offices in San Francisco and Los Angeles are selling agents for the Wilmarth & Morman line of grinders.



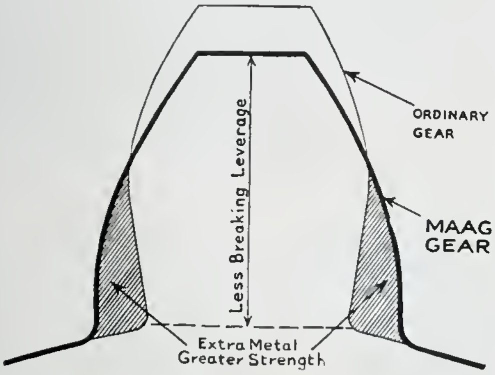
A sixteen-ton bronze propeller wheel suspended under the 15-ton Shaw Electric Traveling Crane at the Moore Shipbuilding Company's machine shop. This propeller wheel with a diameter of 18' 6" was cast and machined at the Moore plant for the new Matson cargo ship Manulani. The cast iron hub weighed 11,570 pounds and the four bronze blades weighed 21,167 pounds. The pitch area of this wheel totals 120.52 square feet and will absorb 5500 h. p. at 98 r. p. m. The Manulani is designed for a loaded speed of 13.05 knots.

Super-Accurate Gears for Marine Turbine Use

HITHERTO the one weak spot in steam turbine practice has been the reduction gears. These have never been quite satisfactory because of two reasons—lack of accuracy in the gears and lack of strength in the pinions. Maag Gears overcome both these obstacles to success.

Cut, first of all, with an accuracy far beyond that possible in ordinary gears, Maag Pinions for high speeds are case hardened and then GROUND to final perfection.

By case hardening, the originally very strong Maag tooth—which is strongest at the base where other gears are weakest—is made still stronger. By grinding, any distortions due to the hardening process are not only remedied to produce a tooth outline of superaccuracy, but the grinding actually increases the resistance of the metal to wear and tear.



Maag turbo-reduction drives, made in this way, have given results that approach 100% efficiency. For example a standard set of Maag Gears, after being more than 12 months in continuous service, have shown no discernable wear whatever; the original fine grinding lines still remaining visible and unchanged.

We'll be glad to give you figures on high speed Maag Gears for steam turbine, rotary pump, and electric motor reductions.

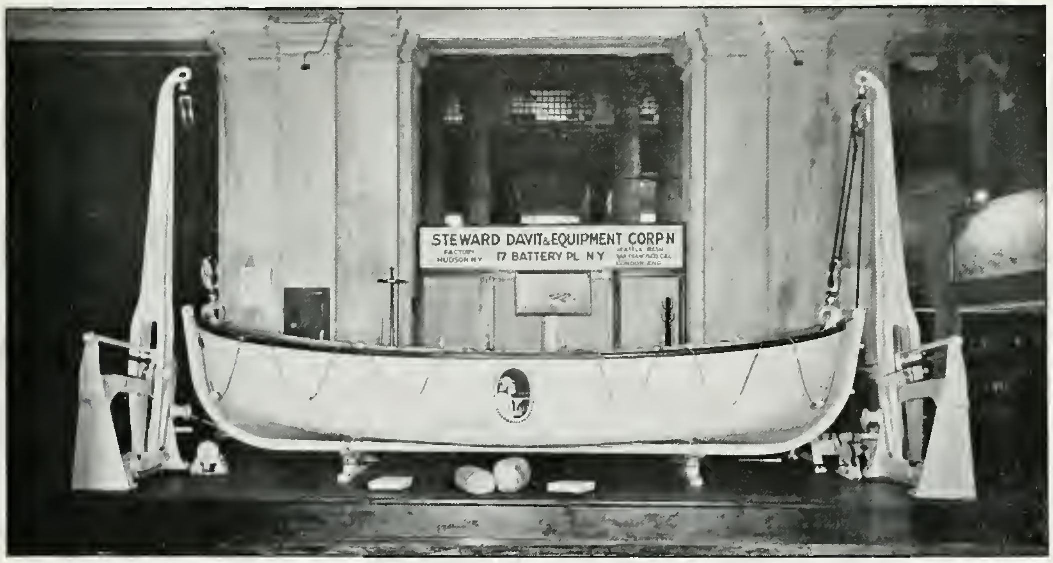
MAAG GEARS

NILES-BEMENT-POND CO.

111 BROADWAY NEW YORK CITY

See them at the Marine Show, January 24-29, Grand Central Palace, New York.

FOUR INTERESTING EXHIBITS

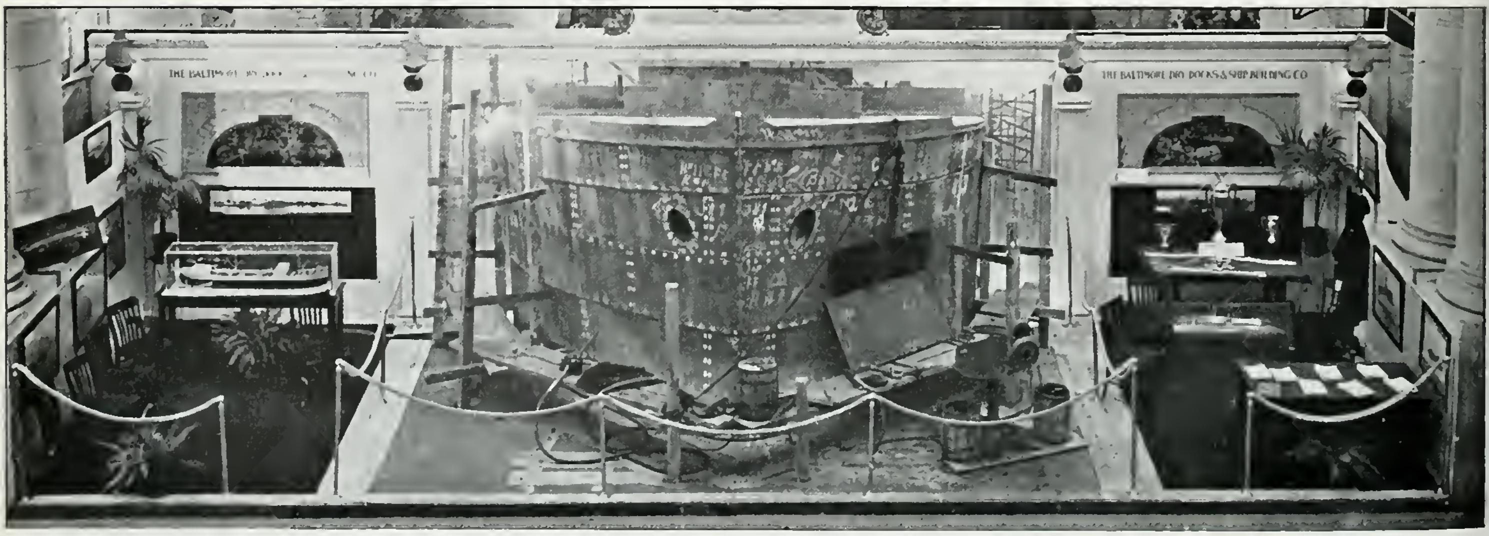


The illustrations on this page show four very interesting exhibits at the recent National Marine Exposition at New York. At the upper left is the booth of the Wager Furnace Bridge Wall Company, in which were shown models of this fitting as used both in watertube and Scotch boilers for marine purposes. Up to the date of the Exposition, 9500 sets had been used in Scotch boilers and 1100 sets in watertube boilers.

The American Engineering Company's booth emphasized particularly electric hydraulic steering apparatus driven by the Hele-Shaw pump and controlled by American Engineering improved hydraulic telemotor. There were also shown electric winches, steam windlass, and an electric planetary geared hoist.

The left center shows the booth of the Steward Davit & Equipment Corporation, which is self-explanatory.

Below is the interesting exhibit of the Baltimore Dry Docks & Shipbuilding Company, in whose booth was staged a practical demonstration of shipbuilding method.



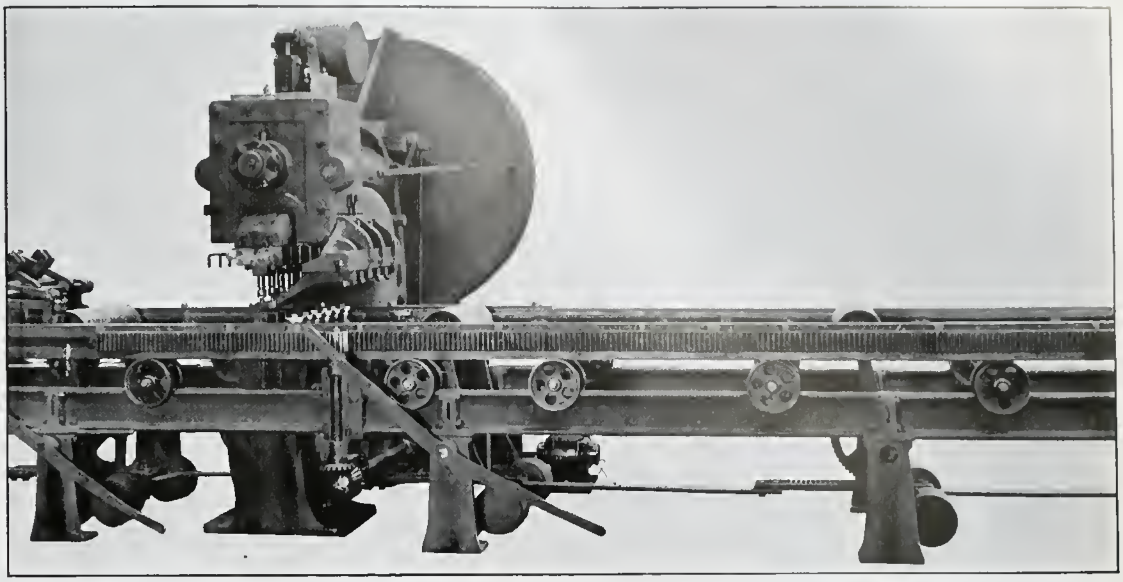
CLEVELAND SPACING TABLE

THE semi-automatic spacing table built by the Cleveland Punch & Shear Works Comany, Cleveland, Ohio, marks a istinct advance in spacing tale design, embodying as it does nany important new features hich simplify the operation, hile reducing the number of novable parts to a minimum. he machine is adaptable to ither vertical open gap punchs or multiple punches and can e used for plates, beams, anles, girders, channels or other tructural shapes.

While the machine illustrated as a runway of 100 feet and movable table to handle maerial up to 50 feet long, it an be furnished in lengths to uit requirements. Provision is nade for adding additional units o the runway and table should t be necessary to do so at ome future time. These units an be furnished promptly and an be erected by your own vorkmen with very little labor, t being only necessary to bolt he additional units to the mahine and provide for foundaion.

The movable table moves on ollers of large diameter and is ropelled by rack and pinion on ach side. An adjustable tie asting is provided for each nd of the movable table, which s adjustable so as to take minmum and maximum length maerial. The tie castings are fitted with improved clamps for conveniently gripping various styles and kinds of material. The clamps are so designed hat punched material can be released and the table returned for loading, which permits of unloading and loading going on at the same time. The construction of the table is such that material may be fed thru the machine from left to right or right to left as shop conditions permit. Strippers and gags may be placed on either side of the machine.

The rollers which support the naterial are counterbalanced by weights and have an adjustment of 24 inches from the top of the dies, so that material ranging from plates to 24-inch beams can be conveniently handled. The rollers are raised and lowered through rack and gear segment by hand, which eliminates numerous gears and many complicated parts found on tables where roller supports are operated by power. The material supporting rollers may be so adjusted that all material will ride clear of the dies to eliminate friction. When the rollers have been set to the desired level they are securely locked in position by means of jaws located at the extreme end of the runway. The lever for locking and releasing this device is conveniently located close to the levers for raising and lowering the rollers. Provision is made to take up the clearance allowed between the dies and material when the punch is in operation.



Semi-automatic spacing table built by the Cleveland Punch & Shear Works Company of Cleveland, Ohio

Springs located near the locking device act as a cushion when the punches force material down on the dies. This spring cushion also absorbs the shock when material is loaded on to the table. Continuous rollers are provided at intervals for the convenient setting up of angles when being punched in multiple. When these plate supporting rollers are in their topmost position for the punching of plates, they extend above the movable table so that plates wider than the table and equal to the throat depth of the machine may be punched. When this width of material is punched it is necessary to unload before the table can be run backward for a new load. Adjustable roller guides are provided just ahead of the die sockets so as to correctly gauge angles as they pass under the punches.

The movable table is propelled by motor through double friction clutches and is controlled by push buttons. For obtaining the correct pitch or spacing of holes a notched bar or adjustable stops may be used. In feeding the material through the machine the large friction clutch lever is thrown forward. To start the material on its way, the operator releases the stop pin which starts the motor. He then allows pin to ride along the edge of the notched bar until a notch is then reached, at which point the stop pin shoots into the notch, pushing the top button which brakes the circuit and dynamically braking the material, bringing the table to instant stop. If the notched bar has not quite reached the stop pin when the motor has come to rest due to the varying load on the table, an additional push button is provided for "inching" which allows the operator to move the table fractionally as desired. When the material is finished, the friction clutch lever is reversed, and by pulling out the stop pin the table travels back at high speed.

The feeding speed has been figured at 10 feet per minute and the quick return at 35 feet.

INTERESTING ACTIVITIES

"JOIN the Plymouth Cordage Hospitality Club today. Membership free. Ask the Pilgrim Attendant." This message, prominently displayed in the booth of the Plymouth Cordage Company, confronted all the visitors to the Marine Exposition in Grand Central Palace in New York City recently; while at the same time the inhabitants of the West, the South, the East, read a similar message in the windows of their hardware dealers.

An inquiry directed to the "Pilgrim Attendant" or to the clerk in the hardware store revealed a very interesting and very unusual activity of one of America's largest industrial corporations. Briefly, it is this: Next summer an event of national interest will be celebrated in Plymouth, Massachusetts, for next summer marks the 300th anniversary of the establishing of the Plymouth Colony and the founding of America. Thousands of new people will visit the famous watering place during the summer months, while many other thousands, while interested in the activities there, will be unable to attend.

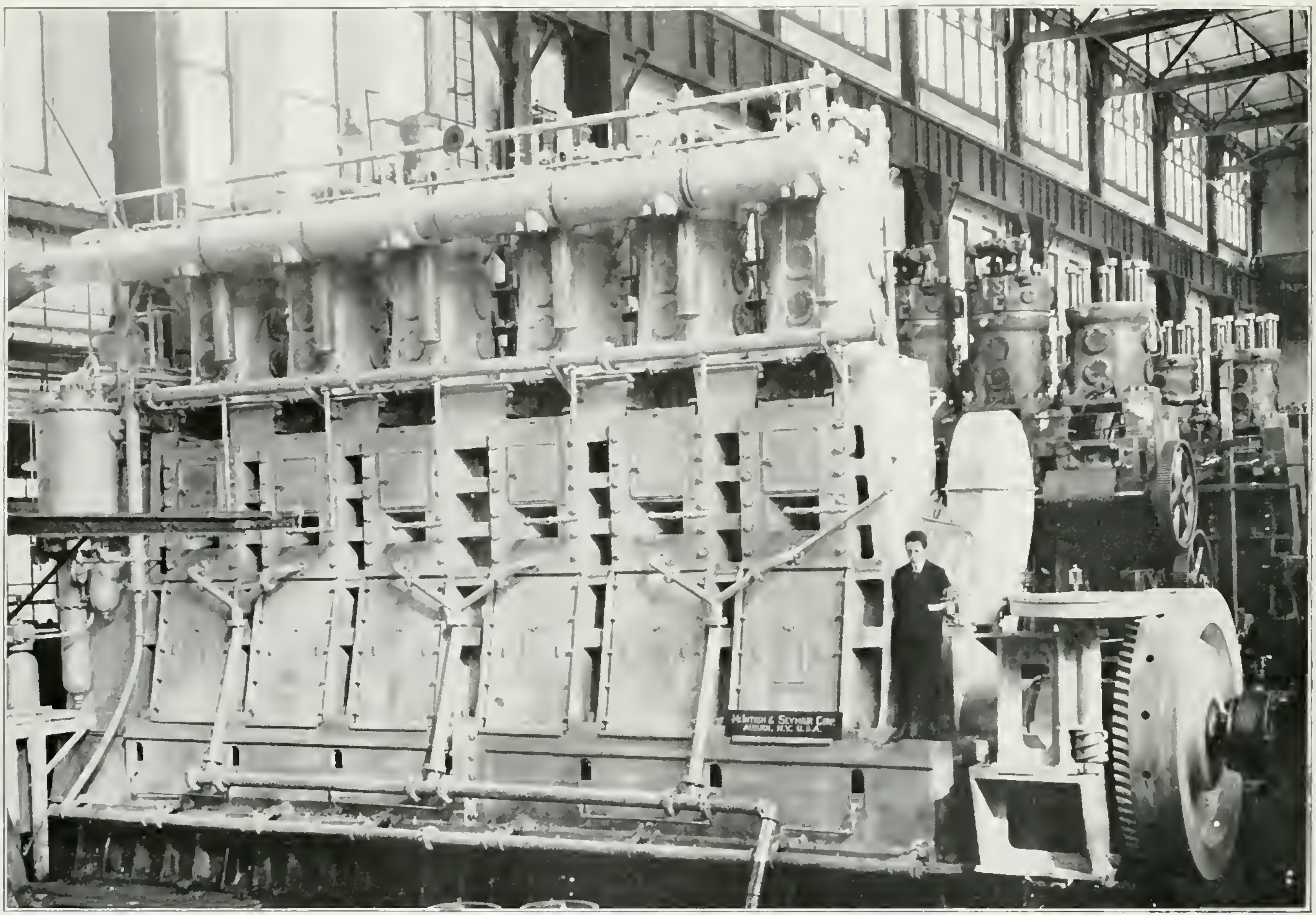
Plymouth's leading industrial institution is preparing to welcome those who come and to furnish those who cannot come with interesting information as to the activities.

To do this properly, the Plymouth Cordage Hospitality Club has been formed. It is not a commercial organization. A new brick clubhouse is being built. Information bureaus will be established and special recreational facilities have been decided upon. All this has been done for those who come.

But the club officers realize that but very few of the people who are interested in the celebration will be able to attend and to these members who cannot come they are preparing a series of souvenir booklets. The first of this series is now ready for distribution. It contains the address of Calvin Coolidge, Vice-President-elect of the United States upon the occasion of the 300th anniversary of the actual landing of the Pilgrims on December 21, 1920. Other bulletins and books of exceptional interest are planned and will be sent out from time to time.

Furthermore, the information bureau of the Plymouth Cordage Hospitality Club is always open to all its members, whether they are coming to Plymouth or not. This bureau will give any information required about New England—its motor routes, train schedules, every activity in which the average vacationist is interested.

There are no dues nor obligations connected with this club. Everything is free. It is founded in the spirit of good-fellowship. The very unusual object and activities of this club have caused thousands to become members.



The above picture shows one of our 1200 I. H. P. Directly Reversible Marine Engines on the test floor. A pair of these engines have been installed on the M S "KENNECOTT."

Other sizes available for Marine work, 390, 640, 1550, 2000 and 3000 I. H. P. all four cycle and directly reversible.

DIESEL TYPE MARINE ENGINES

HEAVY DUTY

McINTOSH & SEYMOUR CORPORATION

AUBURN, NEW YORK

149 BROADWAY
NEW YORK

412 BISBEE BLDG.
JACKSONVILLE, FLA.

815 SHELDON BLDG.
SAN FRANCISCO, CAL.

NEW PACIFIC COAST DIESEL

An oil-burning Diesel-cycle engine with a rated capacity of 25 horsepower per cylinder which employs mechanical injection of fuel oil under comparatively low pressure has been developed on the Pacific Coast, and a three and a four cylinder unit have recently been completed and shipped by the Enterprise Engine Company of San Francisco.

This engine should be of especial interest to small commercial craft because it eliminates all of the difficulties inherent in high pressure air compressors. As compressed air is used only for starting the engine and for blowing the siren, a small single stage air pump takes care of all the requirements.

The engine is of the four-cycle trunk piston type and is not reversible, a mechanical reverse gear of the planetary spur gear type being fitted in the propeller line shaft between the thrust block and the crankshaft, with a multiple disk type clutch, all running in an oil bath.

Each cylinder head has three valves operated by rocking arms which are actuated by long push rods from the camshaft, the latter being situated on the side of the engine frame just above the crankcase and being driven from the crankshaft through helical timing gears. The outer two valves are respectively inlet and exhaust, while the central rocker arm actuates the air starting valve.

The fuel pump is driven by an eccentric rod at the after end of the camshaft. This pump forces the oil under comparatively light pressure into a chamber in a wrought steel cup which is flanged and bolted into the cylinder head. This cup is so arranged that it is completely surrounded by the cooling water. The fuel enters the cup at a certain point of the compression stroke, and as the compression temperature rises, the more volatile parts of the fuel ignite and force the injection of the fuel oil into the combustion chamber of the cylinder through three nozzle holes in the side of the wrought steel cup.

Speed control is attained through the action of a centrifugal governor driven off the camshaft which automatically changes the stroke of the fuel pump, thus regulating the amount of fuel oil injected at different loads. This method of handling crude oil in this engine has shown some remarkable results in respect to overload capacities. On test the three-cylinder engine rated at 75 horsepower with 14 degree Baume fuel turned 315 revolutions per minute against a Prony brake, showing a brake horsepower of 126.

Lubrication is on the force feed system, a Manzel force feed lubricator being operated by an eccentric from the camshaft, forcing the oil through pipes to the various working parts of the engine. Oil is run through the engine bedplate in a ¾-inch pipe having two separate leads to each main bearing, maintaining a continuous flow of oil under pressure onto the crankshaft, the shaft being bored with oil holes to carry this oil also to the crank pin bearings and the connecting rod being drilled to carry the oil from the crank pin bearings to the wrist pin, so that with the crank at top center the oil is forced from the main bearings through the crankshaft and connecting rod into the wrist pin bearings.

This engine working on 14 degree gravity crude oil will produce approximately 15 B. H. P. per gallon per hour, and on a 3-cylinder 75 horsepower engine such as we have been describing the consumption of lubricating oil is approximately one gallon per eight hours at full load.

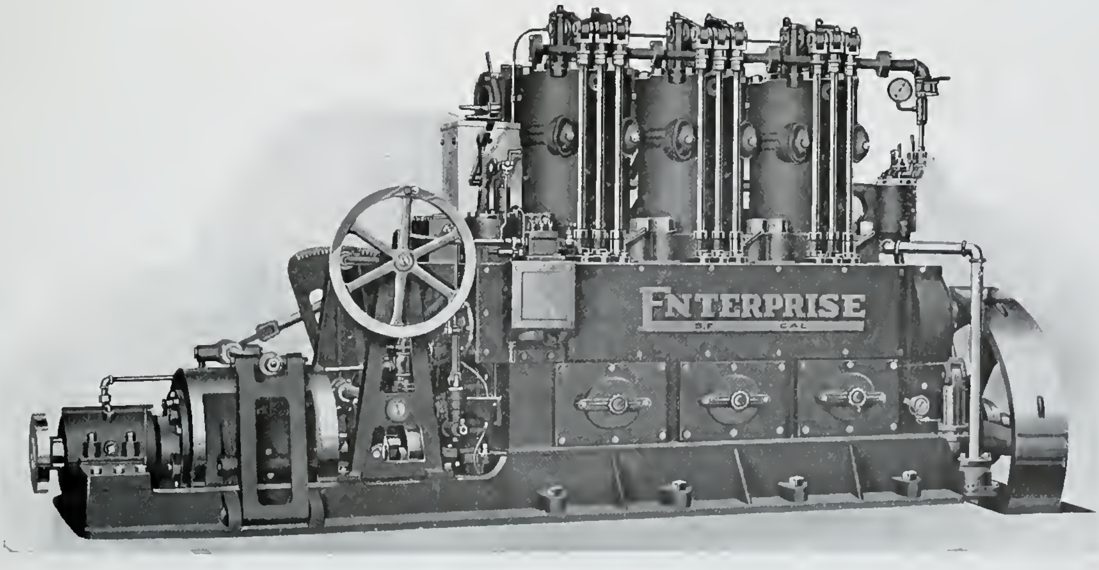
The cylinders are 10¼ inch bore by 14 inch stroke. The crankshafts are forged from a solid billet of best hammered steel in one piece and accurately machined and ground to size at all bearings. The connecting rods are made of the same material, and their upper ends are fitted with hard phosphor-bronze bushings and the lower ends with cast steel bearings lined with the best grade of Diesel babbitt. The wrist pins are of high carbon steel carefully machined, hardened and ground. The frame casting carries the camshaft with bearings on both sides of each set of cams. The camshaft can be easily removed without disturbing any other part of the mechanism.

The Enterprise Foundry Company, affiliated with the Enterprise Engine Company, have for years made a specialty of high grade castings for internal combustion engines, and they are taking a peculiar pride in the construction of the cylinders for these Diesel engines, using a special quality of gray iron. The cylinders are cast separately and have at the bottom an extension or skirt fitted to the cylinder proper, which can be removed to enable the removal of the piston through the bottom of the crankcase.

In the design of this engine special attention is paid to the circulation of the cooling water, all of the passages being of large area, free from interferences, and designed to insure free circulation. The engine is equipped with both centrifugal and plunger water circulating pump, the centrifugal pump having a brass runner driven by a large friction pulley off the flywheel. The plunger pump is driven off the camshaft at half of engine speed, allowing the checks to properly seat at each stroke of the plunger and making a very efficient pump. Special check valves are used in this pump, having hard rubber seats easily removed without disturbing any of the piping.

The following table shows the relative economy of gasoline, distillate, kerosene, and of Diesel engines of the Enterprise type based upon an assumption of 15 B. H. P. per gallon for the Diesel engine and 10 B. H. P. per gallon for the internal combustion engines, using the lighter fuels, and on prices of twenty-seven cents per gallon for gasoline, seventeen and a half cents for distillate, sixteen and a half for kerosene, and six cents for 14 degree gravity fuel oil.

Fuel	Cost per Hour	Cost per Day 10 Hours	Cost per Mo. 25 Days	Cost per Year
Gasoline	2.02½	20.25	506.25	6075.00
Distillate	1.31¼	13.12½	328.12½	3927.50
Kerosene	1.23¾	12.37½	309.37½	3712.50
14 degree gravity	.30	3.00	75.00	900.00



Enterprise Diesel oil engine

HOW SAFE IS SAFE ENOUGH?

When the test comes and the safety of your vessels with their cargoes of human lives depends upon the action of the anchor chain cable—HOW SAFE IS SAFE ENOUGH?

AS SAFE AS POSSIBLE!

AS SAFE AS POSSIBLE means that your ships are safeguarded by the strongest chain obtainable—anything else—any substitute—any chain that merely passes the test specifications, is not "SAFE ENOUGH."

AS SAFE AS POSSIBLE means that your ships are equipped with the cable that provides the GREATEST MARGIN OF SAFETY;—the cable that is proof tested to the breaking load provided for wrought iron chain, and furnished to specifications, 40% higher that those established for corresponding sizes of any other type of anchor chain cable. That cable is:

"NACO" *Electric* CAST STEEL
ANCHOR CHAIN CABLE

Write for illustrated booklet telling the "Naco" story.

THE NM&C

Tested strength is 40% higher than any other chain of equal size

THE NATIONAL MALLEABLE CASTINGS CO.

CLEVELAND, OHIO

LOCOMOTIVE SUPERHEATER EXPANSION

FOR years the Locomotive Superheater Company as its name implies has served the steam railroads of the world and the millions of people who depend on the railroads for transportation.

Necessity for greater conservation of fuel in other fields in addition to that represented by the steam locomotive is urgent.

To render still greater service in effecting economy in fuel by the preheating of water, the organization has become actively engaged in the intensive development of feed waterheating equipment for locomotive and marine application.

With this expansion, the name of the organization has become inadequate. Effective March 1, 1921, therefore, the name of Locomotive Superheater Company is changed to the Superheater Company.

The following changes in organization are significant of success for the company under its new name, and renew the assurance of service to all co-operating friends.

Gilbert E. Ryder has been elected vice-president of the Superheater Company in charge of sales, with office in New York. He was born in Minneapolis, Minnesota, in 1880. He studied engineering at the University of Wisconsin and also at the University of Illinois. His railroad experience began with apprenticeship on the Chicago, Milwaukee and St. Paul Railway and included service as a journeyman in the mechanical department of that road at Dubuque, Iowa; Ottumwa, Iowa, and West Milwaukee, covering five years. Engineering experience followed in the fuel testing bureau of the technologic branch of the United States Geological Survey. He later served the city of Chicago as deputy smoke inspector in charge of locomotives which placed him again in intimate contact with the locomotive fuel conservation problem. This was followed by editorship of the Railway Review of Chicago after which he entered the service of the Locomotive Superheater Company ten years ago. He became a member of the service department and later took charge of that department which today is responsible for the operation of 30,000 superheaters on locomotives in this country alone, in addition to stationary and marine applications. He also developed and had charge of the publicity department. Mr. Ryder takes responsibility of the sales of this company (railroad, stationary and marine) with an unusual preparation in wide and very valuable engineering and practical experience.

Gilbert E. Ryder, vice-president in charge of Sales Department, The Superheater Company

Henry B. Oatley, vice-president in charge of engineering department, The Superheater Company

Henry B. Oatley has been elected vice-president in charge of engineering of the Superheater Company, with offices at 30 Church street, New York. Mr. Oatley was born at Rochester, New York, and attended the public schools at that place. He received his engineering education at the University of Rochester and the University of Vermont, graduating from the latter in 1900 with the degree of mechanical engineer. Upon graduation he entered the service of the Schenectady Locomotive Works. His experience while on this work was very broad, embracing locomotive design and shop testing. He was associated with Mr. F. W. Cole in the early development of the superheater for locomotives by that company. In 1910 upon the formation of the Locomotive Superheater Company he accepted the position of mechanical engineer and in 1916 was appointed chief engineer for this company, which position he held at the time of his election above noted. In April, 1917, he was granted a leave of absence and served as an officer in the United States Navy on the battleships Ohio and Indiana. He entered service with the First New York Naval Militia, which was the first body of armed troops to move after the declaration of war with Germany.

Mr. Oatley is a recognized authority on superheating, and has been an active factor in its development. He is in a large measure responsible for putting superheater design upon a practical operating and manufacturing basis in locomotive, marine and stationary practice, and without sacrifice of efficiency has developed uniformity of sizes and design.

Charles H. True has been elected vice-president of the Superheater Company in charge of production, with offices at East Chicago, Indiana. Mr. True was born in Boston, Massachusetts. He was educated at the public schools of Schuyler, Nebraska, and the University of Nebraska, graduating in 1898 with the degree of electrical engineer. Immediately upon graduation he entered the service of the Union Pacific Railway at Omaha and served in both the locomotive and car shops. In 1902 he became roundhouse foreman at Grand Island, Nebraska, and in 1903 resigned from the Union Pacific to take a similar position at Trenton, Missouri, with the Chicago, Rock Island and Pacific Railway. In October of the same year he was transferred to the Silvis shops as assistant superintendent of shops. In 1905 he accepted the position of mechanical engineer with the Railway Materials Company at Chicago and was engaged in the design of metallurgical furnaces for blacksmith shops and boiler shops. In 1910 he refitted and took charge of the Phoenixville (Pennsylvania) plant of this company. In 1912 he resigned his position with the Railway Materials Company to become works manager of the Locomotive Superheater Company at East Chicago, Indiana, which position he held at the time of his recent election to the vice-presidency as above noted.

During the time he was works manager he was actively associated in the mechanical development of superheaters

Charles H. True, vice-president in charge of production, The Superheater Company

"JOHN CRANE" FLEXIBLE METALLIC

THE selection of an anti-friction packing which would prevent leaks without scoring or harming the piston rod has always been a vexatious problem to the engineer. "John Crane" flexible metallic packing manufactured by the Crane Packing Company of Chicago is claimed to be the last word in an all-around packing for valve or rod stuffing boxes. This packing prevents "high spots" which are common to many packings and the absence of smoothness in the operation of plunger pumps, compressors, centrifugal pumps, etc., causes scoring of rods and loss of power with attendant leaks and other inconveniences in the power plant.

"John Crane" metallic packing is a smooth babbitt foil packing which conforms to the shape of any stuffing box. This packing is made of a thin babbitt sheet wrapped spirally around itself from the center with a high-grade lubricant and graphite wrapped between every layer. Figure 1 in our illustration shows a coil of the Crane packing. Rings may be cut from the coil with a knife as shown in Figure 2. Figure 3 shows the packing placed in a stuffing box and it will be seen that it is an easy matter for the laminations of the packing to slide one on the other and assume any ordinary shape as shown without injuring the strength or packing qualities in the least.

"John Crane" metallic packing. Coil, ring and section showing packing in place in gland

It is claimed by the manufacturers that this packing, being smooth, will never harm the piston rod. Instead, this packing gives the rods a high polish and as times goes on less horsepower is absorbed by the stuffing boxes.

"John Crane" packing has been used successfully with salt and fresh water, steam, ammonia, acids, oils, distillates, air, gases, vapors, vacuums, lyes, etc. Some of the installations on outside packed plunger pumps, accumulators, compressors have the original Crane packing which has been used for over six years and doing as good work as when first installed.

The following is a list showing the length of services which have been packed with "Joh Crane" packing:

Lye, months	11
Sulphuric acid, months	11
Gasoline, months	16
Crude oil and distillates, months	27
Boiler feed pumps, years	6½
Steam, years	6½
Ammonia, months	23

It will be understood tha these installations are still packed with the original packing. I is claimed that this packing need never be renewed in the ordinary sense as it is all metallic and does not require repacking—the addition of another ring will tighten a stuffing box after long usage.

The Pacific Mill & Mine Supply Company, with sales offices and stock rooms in Los Angeles, San Francisco, Portland and Seattle, are sales agents for "John Crane" packing and their experience with this material has shown that engineers have been quick to realize the advantages in such a packing in preventing shut-downs, loss of power, etc.

CITY GAS FOR STEEL CUTTING

IN the readjustment period which we are now undergoing, shipyard and industrial plant executives are considering every item of cost which enters into shipbuilding, and wherever possible a reduction of production costs is being made. The keen competition which the American shipbuilder is now facing makes imperative the necessity of economizing in every branch of the industry.

The Victor Oxy-Acetylene Equipment Company during the past year has been co-operating with shipyard managers to reduce the cost of cutting steel plates, rivets, etc., and development work along these lines has shown the economy of piping oxygen and ordinary illuminating gas direct to the job in place of the old method of using tank oxygen and tank acetylene or hydrogen with the attendant labor cost and delays in handling the cylinders on the ship and about the yard with trucks, cranes and shipyard-handling equipment, and the necessity of removing the empty cylinders, etc.

The cutting torch for the use of ordinary city gas with oxygen must be especially designed, and the Victor Oxy-Acetylene Equipment Company of San Francisco, as a result of their development of these cutting torches, has shown several of the local shipyards the economy of piping the city gas and oxygen to the job, and using these special cutting torches for steel cutting. For preheating and brazing the same butt of the torch is used, and a preheating tip is substituted for the cutting tip. The use of city gas for cutting makes necessary the employment of a compressor to put the city gas under a pressure of from 15 to 25 pounds. It will be seen that it is only in large plants where a great amount of cutting is done that it is practical to pipe the city gas and oxygen to the ship. At the Moore Shipbuilding Company and also at the Union Construction Company, this practice has been standardized in their cutting. Other shipyard executives are watching this development with keen interest, with view of reducing costs of fabricating ships.

Recent tests in cutting steel with city gas show that half-inch steel plate may be cut at the rate of 32 inches per minute, and one and one-quarter inch steel plate averages ten inches per minute. It is true that a smaller quantity of acetylene or hydrogen is used for the preheating flame in cutting processes, and also less oxygen consumption, but the very low cost of city gas shows a marked over-all economy of this fuel with the additional advantage of permitting the piping of the same under pressure throughout the plant. Another advantage of piping oxygen for cutting purposes is the matter of regulating the pressure to a uniform standard. The old method of using individual oxygen pressure regulators with each operator regulating the consumption of oxygen to suit his whim has been superseded by the installation of a main oxygen supply station where a master regulator is used, and thus a uniform pressure is maintained for cutting throughout the plant.

Technical Purchasing Service

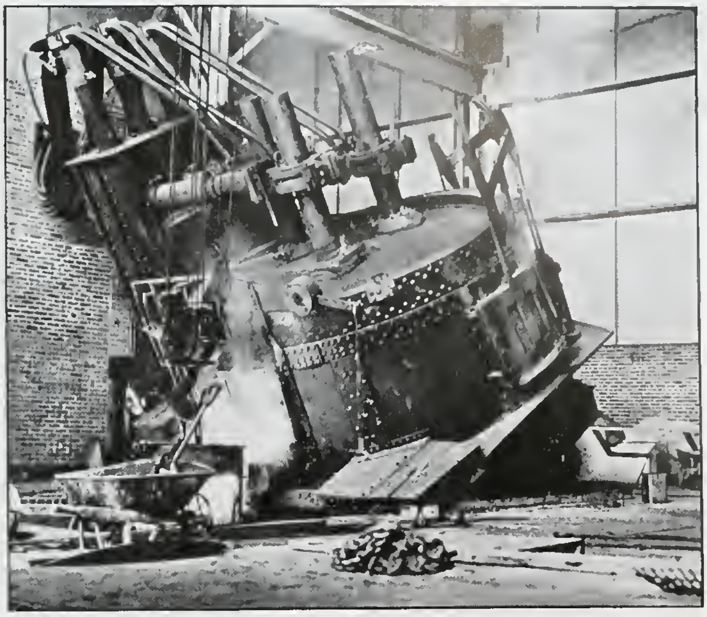
SEABURY & DE ZAFRA, Inc., 150 Nassau Street, New York City, have recently established a technical purchasing service which has proven of great benefit to their clients.

In several instances substantial economies both in time and money have been effected in negotiations for the purchase of marine equipment and supplies. This has been of inestimable value to steamship, shipping and shipbuiding companies as well as export houses which do not regularly maintain a special technical purchasing department. Life-long experience and a thorough technical knowledge and familiarity with what is available in the marine market, as well as of the sources of supply, make it possible for them to offer a technical purchasing service such as assures complete satisfaction.

Among the recent purchases to the advantage of their clients may be enumerated two 450 horsepower compound marine engines, a 240 horsepower fuel oil engine, a fuel oil operated cargo winch, a 50 horsepower four-cylinder medium duty gasoline motor, large quantities of sheathing metal, sheathing felt and ships' fastenings two Scotch boilers, a direct-connected gasoline air compressor outfit, propeller wheels, technical books, automobile acessories and boiler tube cleaners, as well as repair parts for marine engines and auxiliaries of all types.

The diversified character of the purchases is indicative of the completeness of the service offered.

"NACO" CAST STEEL ANCHOR CHAIN CABLE



Electric furnace of 15 tons' capacity for melting the steel used in the production of of "Naco" anchor chain

FROM a very early period in the iron age, man has made chain by the blacksmithing process, and the chainsmith has always held a very high place in the ranks of metal workers. This has been particularly true of the smiths who made anchor chains for naval and merchant ships. For this purpose, it has, until recently, been considered that a very high quality of wrought iron or mild steel was necessary, and no other materials have been considered in connection with anchor chains.

However, within the past few years, a new and better type of anchor chain cable has come into general use, and the story of its development, which follows, is one of the most interesting as well as remarkable industrial achievements of the world war period.

When in August, 1917, it became apparent that the chain makers would not be able to supply the immense tonnage of anchor chain cable which would be required by our large shipbuilding program, the Shipping Board appealed to the engineering committee of the Council of National Defense to investigate and advise the most rapid and economical method of producing anchor chain cable in large quantities. Accordingly a subcommittee was appointed, consisting of representatives of the chain manufacturers, Navy Department, classification societies, United States Steamboat Inspection Service and the Emergency Fleet Corporation, with Mr. W. L. Merrill of the General Electric Company acting as chairman.

The early investigations of this committee developed that if anchor chain cable was to be produced in sufficient quantities to take care of our shipbuilding program, it would be necessary to develop a much speedier process than the old laborious hand-forging method. After trying out several possible methods of manufacture, including straight electric welding; drop forging of alternating links; electric welding of connecting links; and the casting process, it was found that the most promising possibility was that of making anchor chain cable from electric cast steel by the latter process. The National Malleable Castings Company, being one of the largest manufacturers of steel castings, was accordingly invited to participate in the experiments.

When the National Malleable Castings Company began its experiments they immediately saw the resemblance between the problems of the anchor chain and of the car coupler knuckles, which they had been producing with great success for a number of years.

In railroad service, no other piece of car equipment is subjected to more severe or frequent shocks than the car coupler knuckle. It must absorb shocks of great suddenness and intensity, both jerks and buffs due to the surging of trains, the running in and out of slack during application and release of brakes and in coupling by impact.

With an anchor chain cable, the service conditions are very similar, as it must possess great strength and shock-resisting properties. It will therefore be seen that the National Malleable Castings Company, having already developed a suitable metal, was in a position to proceed with their experiments at a point which would otherwise have required years of development to attain.

The material used in car coupler knuckles, which had been developed after years of research, was a special electric steel characterized by a high tensile strength and elastic limit. The elastic limit of this metal which is known as "Naco" steel is so much in excess of the ultimate strength of lower grade steels and ordinary wrought iron that it can resist without distortion, shocks which rupture such metals. "Naco" steel was used in preparing samples of 1⅜-inch, 2-inch, 2¼-inch and 2⅞-inch stud link chain. These samples with the common and special links and shackles used in the end combinations were tested February 28, March 1, and March 2, 1918, at the Sharon, Pennsylvania, plant of the National Malleable Castings Co.

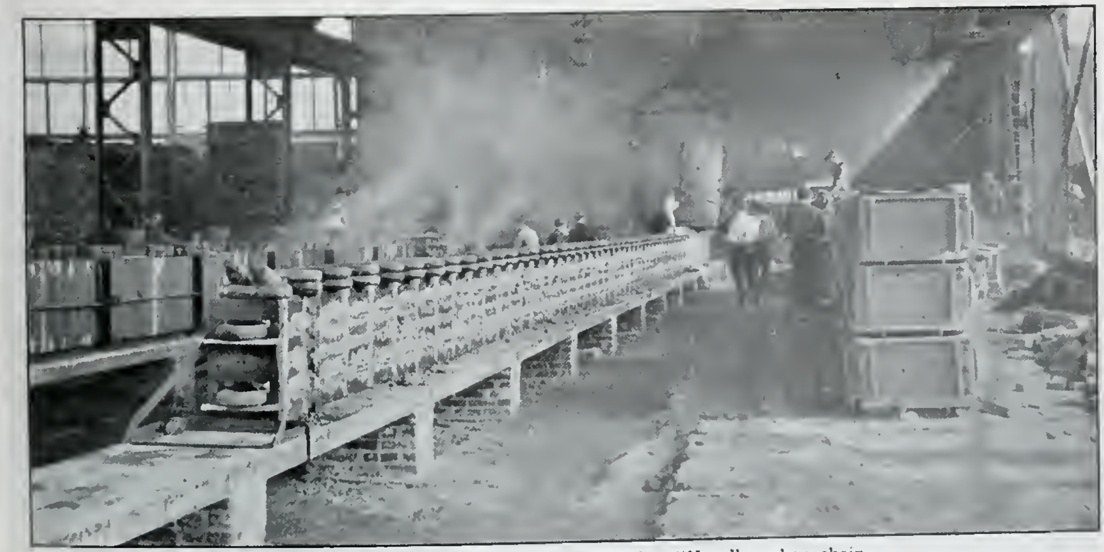
The tests were both static and dynamic, the static tests covering all the sizes of chain above mentioned. The dynamic tests, which were run for the purpose of determining whether the cast steel chain would withstand suddenly applied shock stresses better than wrought iron chains of corresponding size, were made on the 2-inch chain only, samples of commercial wrought iron chain, United States Navy standard wrought iron chain, and "Naco" cast steel chain being used.

The static tests developed astonishing results; the four different sizes of "Naco" chain tested showing an average breaking load of 78 per cent in excess of the specified breaking load of the commercial wrought iron chain.

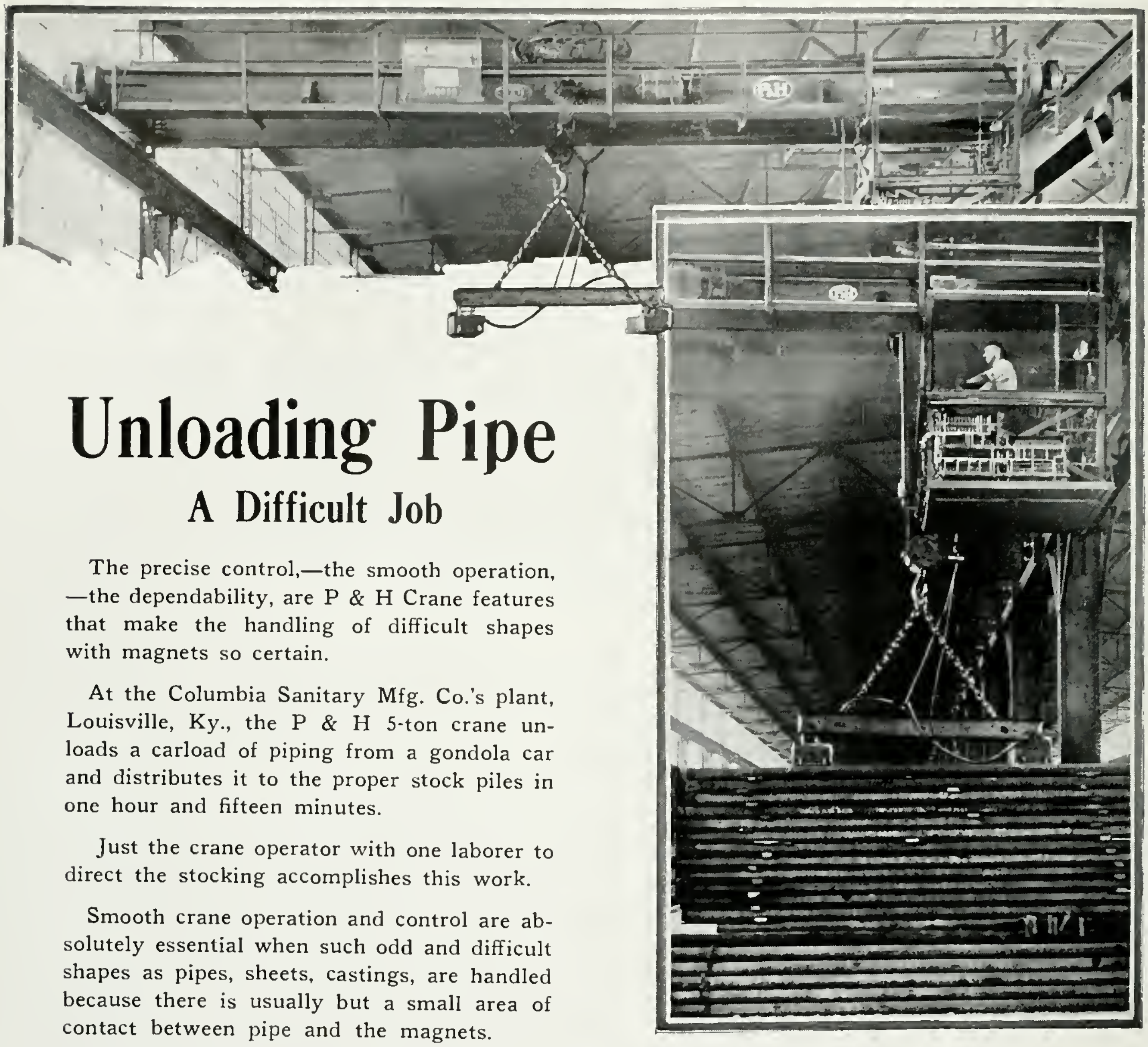
In the dynamic tests the 2-inch commercial wrought iron chain in three tests averaged 142,680 foot pounds; the Navy Yard chain 623,200 foot pounds in two tests; and the "Naco" cast steel chain 1,902,400 foot pounds in three tests, developing a capacity for resisting jerk shocks equal to 13.2 times that of the commercial wrought iron chain. As the same equipment and method of testing was used on all three types of chain, the tests clearly demonstrate the comparative shock-resisting properties of the different kinds of chain used.

Other dynamic tests were made including the transverse bend test with results so satisfactory that the committees of Lloyds Register and the American Bureau of Shipping who attended the tests, immediately sanctioned the use of this chain on their classed vessels and prepared specifications of requirements and tests for all sizes of electric cast steel chain from 1⅜ inch up. "Naco" chain has since been approved by the Bureau Veritas and is now furnished to the specifications of any one of the three classification societies.

As weight is an important factor to be considered, in determining the size of anchor chain for any given capacity of vessel, it was not thought advisable to reduce the established diameters, in drawing up specifications for "Naco" chain.



View in foundry showing method of pouring "Naco" anchor chain



Unloading Pipe

A Difficult Job

The precise control,—the smooth operation,—the dependability, are P & H Crane features that make the handling of difficult shapes with magnets so certain.

At the Columbia Sanitary Mfg. Co.'s plant, Louisville, Ky., the P & H 5-ton crane unloads a carload of piping from a gondola car and distributes it to the proper stock piles in one hour and fifteen minutes.

Just the crane operator with one laborer to direct the stocking accomplishes this work.

Smooth crane operation and control are absolutely essential when such odd and difficult shapes as pipes, sheets, castings, are handled because there is usually but a small area of contact between pipe and the magnets.

Although cautious, the operator with his P & H Crane has the confidence in his P & H Crane necessary to perform the work with speed and accuracy.

For any handling work,, big or small, you will benefit if you install P & H Cranes and Hoists.

We'll send you a catalog for your files for reference use if you wish.

CRANE AND HOIST DIVISION

PAWLING & HARNISCHFEGER CO.

New York: 50 Church St.
Philadelphia: Stephen Girard Bldg.
Pittsburgh: Fidelity Bldg.
Chicago: Monadnock Block

New Orleans: Whitney Central Bldg.
San Francisco: Monadnock Bldg.
Los Angeles: Central Bldg.
Seattle: L. C. Smith Bldg.
Landes & Co., Salt Lake City & Denver

Portland: Yeon Bldg.
C.B. Davis Engineering Co., Birmingham
Blackman-Hill-McKee Mchr'y Co., St. Louis

In Wilwaukee, Wis., Since 1884

P&H CRANES
ELECTRIC TRAVELING

However, advantage was taken of its excessive strength, by increasing the test specifications — the proof load on "Naco" cable being set at the specified break test for commercial wrought cable, 40 per cent being added to this load to arrive at a suitable breaking test for "Naco" chain. In view of this, the use of "Naco" chain supplies to the chain user a factor of safety of 40 per cent according to specifications and approximating 70 per cent when the ultimate strength of "Naco" chain is considered, over and above the safety afforded by the use of commercial wrought iron chain.

The first problem which required attention, in the manufacture of cast steel chain, was the working out of a practical foundry method for producing chain links in sand molds and uniting them into continuous lengths of chain. A number of entirely successful equipequipments were prepared to accomplish this result. Connecting the links was accomplished either by the continuous process, in which the entire chain is poured from one heat into united molds by filling one interlinked mold impression after another, or by the pre-cast link process, in which half the links are cast separately, shaken out, cleaned, inspected and made ready, then placed in mold cavities and coupled up into continuous chain by pouring the connecting links. The pre-cast link process was found to be the most suitable for actual foundry practice.

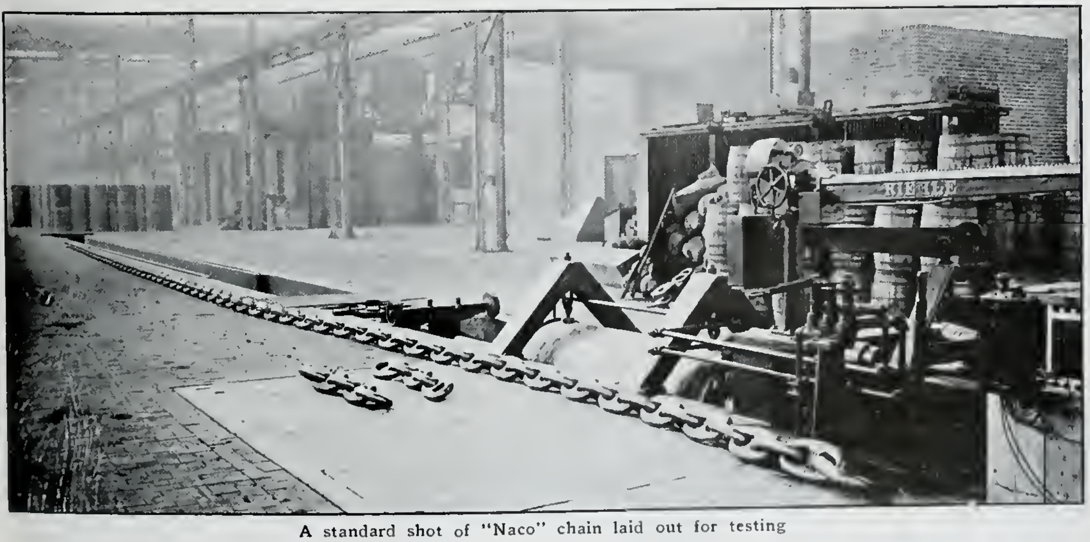
"Naco" anchor chain—a 15-fathom shot of the finished product

An important step in the process of manufacture of "Naco" chain is that of annealing in special electric heat treating furnaces. In annealing this chain, the links of a shot are subjected to heat treatment similar to that given "Naco" car coupler knuckles. The shots are first drawn on a traveler into the heating furnace in which automatic control of temperature is assured by special contracting pyrometers. At the discharge end of this furnace, the chain is passed through a quenching tank, and then transferred to a drawing furnace and brought to the proper drawing temperature.

In use, "Naco" chain has developed several secondary advantages in addition to its great strength and shock-resisting qualities. It has been found that on account of the uniformity in size of links and shackles made possible by accurate machine molding, that the "Naco" chains handle more readily over the wildcats of the windlass, both in paying out and heaving in, and that the wildcat design may be reduced to a standard for the size required without allowing for chain tolerance as is required with wrought iron chain. The stud being cast integral with the link, not only increases the strength, but also eliminates the possibility of the chain kinking because of loose or lost studs.

"Naco" cast steel chain has been supplied commercially in large quantities and is in use on the Seven Seas and Great Lakes. Installations have also been made on four United States battleships.

This is certainly one instance where a product of our war emergency has proved to be of great value and much superior to the material formerly used for the same purpose.



A standard shot of "Naco" chain laid out for testing

ATLAS VALVE ABSORBS "IDEAL" GOVERNOR

ANNOUNCEMENT is made by the Atlas Valve Company, Newark, New Jersey, that in rounding out their line of high-grade valves—reducing valves, pump governors, pressure regulators, hot water regulators, control valves, damper regulators, etc.—they have now added the "Ideal" automatic pump governor, having acquired sole patents and rights to manufacture by purchasing from the Ideal Automatic Manufacturing Company. This pump governor has been approved by the United States Navy and by the National Board of Supervising Inspectors of Steam Vessels for controlling certain exacting operations.

The "Ideal" automatic governor is an oil-controlled, piston-actuated, pressure-controlling valve for governing pumps for fresh water and salt water, oil, ammonia, air, gas, etc. It is extremely sensitive, with the patented exclusive feature of an oil body in the hydraulic pressure cylinder against the lower head of the hydraulic-pressure-actuated piston which operates the valve in the power line to the pump. This body of oil prevents the liquid being pumped from reaching the hydraulic pressure cylinder, and thus prevents any sticking of the piston from corrosion or because of grit or sediment in the liquid being pumped. An oil trap provides for settling of solids and for retaining a sufficient amount of oil in the cylinder to constantly lubricate the cylinder walls, piston, and packing. The material used in constructing governors for high duty service is Navy composition bronze or steel; for less exacting service steel composition or cast iron.

"Ideal" automatic governors are constructed either to maintain a constant pressure or to permit of variation of the pressure as desired. They are used for controlling automatic fire sprinkling system pumps; elevator pumps; turbine step-bearing pumps; hydraulic pumps; ammonia, gas and air compressors; and any other apparatus requiring sensitive, reliable automatic pressure control of water, steam or pneumatic power.

Special adaptations of this governor have been made for a variety of purposes.

With the up-to-date facilities of the Atlas Valve Company, complete governors and governor parts can be furnished on short notice.

Complete information will be furnished by the manufacturers upon request if the reader will mention this publication.

WANTED:—TO get in touch with party or concern interested in the conversion of large gasoline or distillate engines to crude oil and able to finance two experienced engineers with special knowledge of such application. Reply Box 50, Pacific Marine Review.

BOOK REVIEWS

(Continued from page 234)

British in combating the unrestricted submarine warfare which was instituted by the central powers in February, 1917. These included the introduction and working out of the world-wide convoy system, the audacious and often successful active anti-submarine measures, the effect of the entry of the United States into the war, the product of the work of the Admiralty, and the splendid work of those merchant marine auxiliaries to Great Britain's naval program, the patrol craft, minesweepers and commercial freight and passanger vessels.

An interesting feature of this book to Americans lies in the fact that it substantiates practically all the charges made by Admiral Sims as to the unpreparedness for war of the United States Navy Department.

The Life of Admiral Mahan, Naval Philosopher. By Charles Carlisle Taylor. 360 pages, 21 illustrations. Published by George H. Doran Company. Price $6 net.

Charles Carlisle Taylor, the author of this splendid biography, served as British Vice-Consul in the City of New York. In his introduction he states that "this work is the overflow of an English heart full of admiration for an American who by force of character overcame wellnigh insuperable obstacles, and, as the result of skillful application of his superb mental powers, earned for himself in the eyes of the world the highest distinction yet accorded a naval philosopher."

It is perhaps fitting that Admiral Mahan should have for his Boswell an Englishman, as he himself wrote "the one authoritative, accurate and adequate biography of the great British naval hero." The present work is written in a very appreciative strain and is in the nature of a complete biography of the man Mahan as well as an analysis of the effect of his naval philosophy upon world events and particularly upon the great war. "The British Navy," says the author, "taught the central military powers that the seas could be held long enough to enable Anglo-Saxondom to create armies larger and more powerful than their own, but it was the American admiral, Alfred Thayer Mahan, who taught twentieth century Britain the priceless lesson of the paramount necessity of an adequate margin of naval strength."

This book was written in London in 1920, and from the closing paragraphs it is very apparent that Mahan, like many another American, is more appreciated abroad than he is at home. He died in December, 1914. The only tribute yet made to his memory in his native land was the naming for him of one of the new American destroyers. No monument has been erected nor has his family received any recognition of his services from the Federal government.

The American Red Cross Work Among the French People. By Fisher Ames, Jr. 178 pages, 8 illustrations. Published by MacMillan Company, New York, 1921. Price $2 net.

This is another of a uniform series of books describing the work of the American Red Cross during the late great war, and this volume concludes the series.

Early in the war a large number of societies for relief work with outlets in France were formed in the States, and many volunteers crossed the Atlantic to fight or work in these organizations. As a result a great deal of material went astray, and the American ambassador, Myron T. Herrick, formed an organization called the American Relief Clearing House, with headquarters at Paris. This clearing house brought order out of a "tangle of good intent" and was the first organization of American relief work on French soil. When the Red Cross came to France with its civilian organization, the clearing house turned over to the Red Cross all of its supplies, personnel and assets without a single debt, and to this action the Red Cross Commission attributes a large part of its success in handling French relief measures.

The French Red Cross work started with a personnel of about twenty, but by January, 1919, there were over six thousand men and women working for the American Red Cross in France. Two thousand Red Cross cars were in operation, and even this personnel and transportation facilities were not sufficient to take care of many of the emergency calls that came to the work.

The details of the achievements of this huge machine are told by Fisher Ames, Jr., the author, with a very engaging, straightforward simplicity, and those who have been contributing to the work of the Red Cross will find this volume of absorbing interest.

In the Plate Trade.

That efficiency "follows the flag" is well demonstrated in a sixty-eight page booklet just published by the Buenos Aires office of the American Express Company, entitled "In the Plate Trade." The booklet contains a summary of the laws, regulations, tariffs and general practice of shipping operations in Argentine ports and presents in a compact form much detailed and important information regarding the ordinances and practices, which concern shipping operations in the River Plate ports. Owners of vessels, operators, captains, officers and shippers generally will find this booklet a most up-to-date authority on prevailing conditions affecting their various interests.

While, generally speaking, the shipping laws and practices of Argentine do not differ materially in principle from those governing operations in other parts of the world, there are important differences in detail, which are only to be ascertained by experience, and from a close study of a vast number of official publications in the Spanish language.

In the preparation of this booklet, the American Express Company has rendered valuable service to shipping in general and especially to the fast growing Argentine trade. One hundred and five subjects are dealt with in such a way as to be absolutely clear in meaning to the inexperienced shipper and at the same time covering every detail necessary to the trade.

The booklet contains a map of the Rio de la Plata, panoramic views of the port of Buenos Aires and a plan of that port showing the arrangements of the docks. The cost of handling different kinds of cargo is worked out in detail, port charges, lighterage, consular fees, dockage charges, pilotage, stevedoring and the rest of the one hundred and five subjects are fully covered.

A limited number of these booklets have been received by the home office of the American Express Company at 65 Broadway, New York, for distribution to firms interested in the Argentine trade. A copy will be mailed on request free of charge by the foreign traffic department of the American Express Company at 65 Broadway, New York.

"CODEM"—A MARINE INSURANCE CODE

It is estimated that $300,000 yearly is spent in cabling by the insurance interests of America and that a minimum of 75 per cent of this amount can be saved by the use of "Codem," a marine insurance code now in the hands of the printer and soon to be placed on the market.

"Codem" covers the field of marine insurance and covers it well, and its compiler, Mr. T. C. Wilwerth, is entitled to great credit for his persistence and patience in bringing such a stupendous undertaking to its triumphant completion, particularly as he has proceeded upon his own initiative without any assurance of reward for his labors. It has taken him nearly three years to complete the code.

"Codem" contains 100,000 numbered five-letter code words with two-letter differences and a simple mutilation detector by the use of which errors may be localized and the proper word readily discovered. The code words are constructed in strict compliance with the rules as to pronunciability prescribed by the International Telegraphic Convention, and also comply with the requirements of the American telegraph and cable companies and are being submitted for a certificate of approval to one of the signatories to the convention. Moreover, transpositions have been avoided in the construction of these words; that is, no code word can be obtained from another by the transposition of two contiguous letters, a grave fault of a number of existing codes.

Of the 100,000 code words, 40,000 are assigned to phrases, covering particularly marine insurance expressions relating to hull, cargo, disbursements, freight, builders' risks, port risks, etc., all from the standpoints of the broker, underwriter, adjuster, assured, reinsurer, and the accounting and executive departments. The saving in cable expenses resulting from the ability to use one code word to express a characteristic insurance phrase can readily be appreciated.

About 6000 code words are used for insurable interests (cargo), names of commodities being combined when practicable with the usual methods of packing and shipping, and the insurance terms. There is a full list of hull, disbursements, freight, builders' risks, port risks, etc., the interest separate and also combined with the insurance terms, and in the case of annual lines combined also with the trading limits.

For ports, places, geographical names and voyages, about 7500 code words are used, giving a greater range than any list previously published.

A full list of parts of ships and terms relating thereto and technical expressions frequently used by builders and surveyors forms an important feature of the code; and there are also carefully selected lists of marine and fire insurance companies, of shipbuilding yards and docks, of shipowners, banks and international merchants.

TRADE LITERATURE

otographic Impressions of the World's Largest Shipyard—New York Shipbuilding Corporation, Camden, New Jersey.

This brochure of 40 pages ntains many very wonderful amples of the application of e photographic art to the porayal of shipbuilding scenes. ie plant of the New York ipbuilding Corporation at mden, New Jersey, has built is now building a fleet of 4 ships, comprising all classes om canal barges to the larg- t naval dreadnoughts afloat. ieir shops are equipped to ke care of the building of achinery of all types for ese ships, and they may very stly lay claim to being the rgest self-contained shipilding plant in the world.

They have recently laid the el of the new battle cruiser aratoga, a ship 874 feet long ith a displacement tonnage 43,500, to be electrically iven with power furnished turbo generators developing 0,000 horse power. When e say that the hull of this ssel is to be erected under e roof of an enclosed shipilding way, which is equipd with four overhead cranes 10 to 15 tons capacity and also served by a 100-ton ane, we give but a faint idea the tremendous capacity of is enormous plant.

A history of the develop- ent of this enterprise is given complete form elsewhere in is issue of Pacific Marine Re- ew.

---

he Cooling of Quenching Oil in the Heat Treatment of Steel. By Kenneth B. Millet. Published by the Griscom-Russell Company, 90 West Street, New York.

A 30-page pamphlet, the first elve pages of which are devoted to a theoretical consideration of the heat treatment of steel and its alloys and to the cooling systems used in keeping the quenching oil bath at the proper temperature for best conditions of the treated steel. The balance of the book shows the manner in which Griscom-Russell multi-whirl oil coolers measure up to the duties imposed upon them in cooling the quenching bath, with two diagrams showing typical installations of these coolers and of the Griscom-Russell Strainers in industrial plants.

Smooth-On Instruction Book No. 18. Published by the Smooth-On Manufacturing Company, Jersey City, New Jersey.

This is a handy pocket size catalog of 150 pages showing the manifold applications of Smooth-On iron cements, Smooth-On iron paints and Smooth-On corrugated iron gaskets in foundries, engine building plants, boiler shops, condensers, evaporators, ice plants, oxygen plants and many other industries, including ship repairing, roof repairing, powerhouse floors, tanks of various sorts and automobile and tractor repairs.

Needless Ruin. Foamite Firefoam Company, 200 Fifth Avenue, New York City.

A very striking brochure showing as its cover subject the red fire demon devouring a ship at sea. The booklet sets forth the menace of fire at sea and the control of that menace by the use of the Firefoam system. There is not the slightest doubt that Firefoam as applied under the direction of the experts of the Foamite Firefoam Company is the most prompt method of smothering fire. Notwithstanding the fact that there is an ocean of water around them, vessels with certain cargoes are absolutely helpless as far as subduing flames with water is concerned. The comparatively moderate cost of installing a proper Firefoam system on a vessel is more than offset by the freedom from risk and worry and the lower insurance rates.

De Laval Centrifugal Pumps for Sugar House Service. De Laval Steam Turbine Company, Trenton, New Jersey.

An eight-page booklet giving specifications and illustrations of the various types of De Laval electric motor and steam turbine driven centrifugal pumps for the various uses adaptable to sugar refineries.

Chicago Pneumatic Oil Engine Driven Compressors—Bulletin No. 607. Chicago Pneumatic Tool Company.

Thirty-two pages describing the Chicago pneumatic air compressor driven directly by heavy oil engines. These machines are of the horizontal straight line, direct connected type with gas engine power cylinder and air cylinder in tandem on a common piston rod, the two cylinders being jointed by a tandem piece affording access to the stuffing boxes of both cylinders. The power cylinder is of the valveless two-cycle low compression type and the air cylinder of the double acting type with flat disk inlet and discharge valves. The power cylinder is guaranteed to operate on any petroleum distillate from 28 degrees Baume up, provided that distillate does not contain more than 25 per cent asphalt. Many oils of considerably lower than 28 degrees Baume scale can be satisfactorily used in these engines. Oil is injected into the power cylinder through a steel ball check valve and injection nozzle. The oil is injected as the piston approaches the end of the compression stroke, it is broken up into a fine spray and distributed over the surface of the cylinder liner, the heat of this liner being depended upon for ignition.

A small independent air-cooled air compressor driven by a small gasoline engine is used to provide air for air starting of the main compressor and engine.

These direct connected oil engine compressors were designed primarily for the use of contractors and manufacturing enterprises whose work is located where electric power is not available and where it would not be practicable or economical to install a steam driven compressor. It has been found in practice, however, that throughout the United States manufacturing interests are buying these units even though steam and electricity are available and convenient. This condition has come about because contractors have learned that with these engines fuel oil power could be developed very much more economically than steam or electric power could be bought.

The single tandem fuel oil driven compressors are built in horsepowers up to 102 for pressures up to 100 pounds and in horsepowers up to 77 for pressures up to 50 pounds.

What We Did to a German War Prize. Published by the Baltimore Dry Docks and Shipbuilding Company.

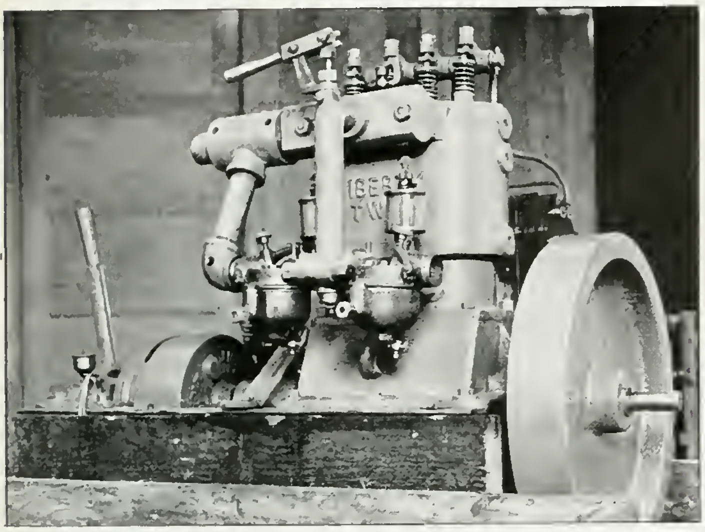
A beautifully illustrated art brochure of 25 pages setting forth the story of the rejuvenation of the Grosser Kerfurst, now the steamship Aeolus,

S. L. KREIDER
SHIPPING

Gen'l Agent
TOYO KISEN KAISHA
WILLIAMS S. S. CO., INC.

At Los Angeles
375 Pacific Electric Building
At San Diego
239 Spreckels Building

Liberty Twin Engines



Liberty Twin medium duty four cycle valves in the head motors equipped with Liberty dual carburetor system burns either gasoline or kerosene. Liberty Engines slow down on kerosene from 850 r. p. m. (normal speed) to 200 r. p. m.

Liberty engines increase the average speed and efficiency of small boats with lower fuel cost. Hundreds of these sturdy engines are in daily use on fishing boats, small pleasure craft, life boats, etc.

A. G. HEBGEN
MANUFACTURER
Agents Wanted Send for Catalogues
440 MARKET STREET, SAN FRANCISCO

S K F INDUSTRIES
OF CALIFORNIA
Incorporated
Representing
Atlas Ball Works
S. K. F. Ball Bearing Works
Hess-Bright Ball Bearing Works
Now located at
115 NEW MONTGOMERY ST.
Phone Sutter 4196 SAN FRANCISCO

PACIFIC MARINE REVIEW
Does bring Results
ASK AN ADVERTISER

which was transformed and refitted after war service as a transport into a modern, beautifully finished passenger liner, a work which consumed many months of labor for hundreds of workmen and cost a little upward of $3,000,000.

The Tec Truck. Publication R-229 of the Terminal Engineering Company, Incorporated, New York.

A six-page pamphlet describing and illustrating the Tec truck model 1102. This is a four-wheel drive truck with motors on each wheel and four-wheel steer. The truck has an over-all length of 10 feet with a clearance radius when turning corners of only 6 feet 6 inches. It has a loaded capacity of 5000 pounds, with an extra large battery capacity giving it adequate current for power and travel and is designed and equipped for street driving as well as for interior use.

There are five motors on the truck, four of them mounted one on each wheel, and one mounted on the body of the truck and used for elevating the truck floor through screw jacks. The motors work from the battery on 60-volt current, the battery consisting of 34-cell iron-clad Exide or 59-cell Edison.

The Trackless Train. Specification catalogue No. 103. Mercury Manufacturing Company, Chicago.

A handsome catalogue of 33 pages describing the Mercury tractor of various types and trailers built by the Mercury Manufacturing Company for use with that tractor. This booklet contains a great deal of information which should prove valuable to industrial managers.

Scovill Seamless Tubing. Scovill Manufacturing Company, Waterbury, Connecticut.

A four-page illustrated folder setting forth the advantages of Scovill brass, copper, Muntz metal and admiralty bronze seamless tubing in condenser sizes and in ordinary iron pipe size.

Getting Down to Brass Facts. Scovill Manufacturing Company, Waterbury, Connecticut.

An attractive little booklet proclaiming the desire of the Scovill Manufacturing Company to assist steam engineers in their troubles with brass and brass alloy tubing.

Instructions for the Use of Thermit Welding in Railroad Shops. The Metal and Thermit Corporation, 120 Broadway, New York.

A 43-page cloth-covered, well arranged and completely indexed booklet showing by diagram and text the methods of applying thermit welding to various emergencies which might arise in the repair jobs on locomotives and cars which are constantly being brought into railroad shops. This booklet should be of great interest to foremen and superintendents in such shops.

Bakelite Micarta-D Gears and Pinions—C. 1579-A. Westinghouse Electric and Manufacturing Company.

A bulletin of technical information giving descriptions and specifications on Bakelite Micarta-D non-metallic material for gears and pinions. Bakelite is composed of a special heavy duck of uniform weave, thickness and tensile strength bonded together with bakelite by heating while under an enormous pressure. Gears manufactured from this material are silent in operation, the material is self-supporting, is not affected by water or oil, can be kept in storage indefinitely, is not attacked by rodents, and is not affected by a great number of acid or alkali solutions. When properly applied and lubricated it often shows better wearing qualities than cast iron and brass. Directions are given for design of gears for the use of this material and for the cutting of blanks, for installation and lubrication.

Baily Electric Furnaces—Booklet 9-B. Electric Furnace Company, Alliance, Ohio.

A 33-page booklet describing the Baily resistance type electric furnace for melting nonferrous metals and for annealing and heat treating. This very efficient furnace is of simple design and has many advantages, among which might be mentioned the large hearth capacity for any given heat input and the consequent slow and uniform heating of the metal and avoidance of burning. The large area of incandescent carbon used as a heat source in these furnaces produces a reducing atmosphere in the furnace which, together with the slow and uniform heating, results in the lowest possible loss of metal. The metal produced in this type of furnace has every quality of crucible metal with the added advantage of freedom from occluded gases, closer analysis and closer temperature control.

The melting furnaces are made in three sizes of hand tilting 50, 75 and 105 kilowatt capacity, and also in the 105-kilowatt size a nose tilting type is built.

A number of varieties of the resistant type furnace for heat treating and annealing are described, from the hearth type with a capacity of three tons per 24 hours up to the continuous recuperative car type with a capacity of 72 tons per day.

Thermit Carbon-Free Metals. Metal and Thermit Corporation, New York.

The value of aluminum as a reducing agent has been recognized by metallurgists for a long time. Many experiments were carried out by metallurgical chemists but owing to the fact that reduction takes place only at a high temperature and that at this temperature with aluminum as the agent the reaction proceeds with explosive violence, not much progress was made until Dr. Hans Goldschmidt evolved the Goldschmidt aluminothermic process for the production of carbon-free metals and also for the production of thermits for welding iron and steel. Aluminum in this process is mixed with metallic compounds in a finely divided state. These mixtures are known as thermits and when ignited they react, the high affinity of aluminum for oxygen causing it to unite with the oxygen of the surrounding metallic compounds, thus setting the metals free, the value of this reaction depending upon the fact that it proceeds without the addition of heat or power from any external source. No carbon fuel being used in the reduction, no carbon is found in the metals produced.

These carbon-free metals are chiefly valuable in making high grade metallic alloys. Among the carbon-free metals so far produced are carbon-free chromium, ferro-chromium, manganese, cobalt, ferro-titanium, ferro-vanadium, molybdenum, tungsten powder, ferro-tungsten. The book describes the uses of these carbon-free metals in practical metallurgy and details the properties and uses of the various alloys into which they are compounded.

Thermit Mill and Foundry Practice. Metal and Thermit Corporation, New York.

A 96-page attractively bound and illustrated book describing the use of thermits in the welding process for the repair of large wrought iron, steel and cast iron parts of large dimensions. Particularly interesting is the recommendation for the use of this process in steel foundry practice for simplifying the casting of long steel sections by casting shorter sections and welding them together by the thermit process.

Meco. Marine Electric Company, San Francisco.

A 50-page book catalog covering the watertight marine electrical fittings, fixtures and electrical supplies manufactured and distributed by the Marine Electric Company. The machine and armature shops of this company are among the finest on the Pacific Coast and are equipped to repair motors and electric apparatus with great dispatch and guaranteed satisfaction. They invite correspondence, their service department being ready at all times to assist in designing special units to meet any unusual demand.

Welin Quadrant Davits. American Balsa Company, Incorporated, New York.

The davits described in this booklet are based upon the mechanical principle of a moving pivotal point which is so disposed that the thrust in the operating mechanism caused by the weight supporting the boat is practically nothing in the inboard position with the ship on an even keel and increases as the boat is swung outboard through the launching operation. This principle reduces to a minimum the power required to swing out the boat.

The moving pivotal point is obtained by means of a quadrant which forms the bottom of the davit arm, this quadrant being fitted with teeth which mesh with the teeth of a rack on the davit frame. Under ordinary conditions a fully loaded lifeboat supported by Welin quadrant davits can be launched by two men, one at each handle, and the boat be under full control from the time of leaving the chocks until she is afloat.

Lundin Decked Lifeboats. American Balsa Company, Incorporated, New York.

A four-page booklet describing the design and construction of Lundin decked lifeboat. These lifeboats are of the scow type with spoon-shaped bow and stern. They are made in four sizes: 24-foot, 26-foot, 28-foot and 30-foot, having a respective rated capacity for 40, 50, 60 and 70 persons. They are made from galvanized steel and have a well deck above the load water line. Between the bottom and the deck the space is divided by transverse bulkheads into eight water-tight compartments, each provided with a manhole for inspection and painting. These compartments furnish ample accommodation for the stowage of food supply. Large scuppers with automatic self-closing valves are provided to drain effectively. Seats are laid on angle iron gunwales, and high folding weather boards are hinged to these seats. These boards at sides and ends, when raised, automatically lock into position and form a high side for the boat. When the boards are folded down, the boats nest into each other very nicely. Fenders of balsa are provided to prevent any damage to the steel sides of the boat on launching.

MACHINE TOOLS
Guaranteed to be in A1 condition, on hand for inspection and immediate delivery
No. 0 Giddings & Lewis Horizontal Boring, Drilling and Milling Machine
No. 3A Warner & Swasey Universal Hollow-Hexagon Turret Lathe for bar or chuck work, fully tooled
No. 3 Ingersoll Vertical Slab Milling Machine
36x36x12 Cleveland Open Side Planer
48x48x18 Cleveland Open Side Planer
2500-Pound Chambersburg Steam Hammer
CALIFORNIA MACHINERY COMPANY
67 BEALE STREET SAN FRANCISCO

MOLUKKEN VEEM, LTD.
MAKASSAR (Celebes—D. E. I.)
Warehousing & Warrant Coy
General Shipping & Insurance Agents
FORWARDING—STEVEDORING
SHIPS' SUPPLIES
Code: A. B. C. 5th Ed.
Telegrams: MOLUKVEEM-MAKASSAR

YNCHAUSTI
Long Fiber Manila Rope
Since 1854
Rope made from long fiber pure Manila hemp is superior to any other rope where strength and durability are required.
Ynchausti & Company, established in 1854, operate a modernly equipped hard fiber cordage factory, the most efficient in the Orient.
Specify Ynchausti rope and you obtain long fiber Manila rope which has been made at the source of supply. If better rope could be made Ynchausti would make it.
Complete stocks of Ynchausti rope are carried on the Pacific Coast for immediate delivery.
GUY T. SLAUGHTER & CO.
Selling Agents for U. S. A.
405 SANSOME STREET, SAN FRANCISCO
39 CORTLANDT STREET, NEW YORK

Riveters — Catalogue No. 4. Hanna Engineering Works, Chicago.

A 65-page attractively bound booklet describing and illustrating the Hanna type of compression yoke riveters. The sizes range from 4 inches to 21 feet in reach of gap with capacities from 10 to 150 tons. Over 2500 Hanna type riveters are in operation at the present time.

The Hanna type is worked through a special combination of toggle and lever movements by a pneumatic ram. This type of riveter requires no accumulator, and air is supplied to it by ordinary air piping for 100 pounds pressure. With this type there is no danger of damage from freezing and exhaust may be made directly into the atmosphere, thus eliminating the necessity for installation of discharge piping. Its chief advantage in riveting, however, is that it closes the gap at high speed and squeezes the rivet at slow speed.

Electrolabs. The Electrolabs Company, Pittsburgh, Pennsylvania.

A 15-page loose-leaf style booklet describing the Levin electrolytic cell as manufactured and distributed by the Electrolabs Company of Pittsburgh, who have the exclusive right of manufacture and sale of this oxy-hydrogen cell in the United States.

In connection with the use of this cell and its manufacture the Electrolabs Company have retained in a supervisory capacity the Electrolytic Oxy-hydrogen Laboratories, Incorporated, this service being engaged in research and for technical advice to the clients of the Electrolabs Company.

Levin cells are of the unit type, each cell consisting of three compartments, oxygen being generated in the two outer compartments and hydrogen in the center. The separating medium is composed of sheet metal frame supporting an absolutely pure asbestos diaphragm. The electrodes are separated from and securely fixed within the casing by specially designed asbestos blocks. All sheet metal is pure iron. Each compartment in the cell has an independent water feed. The cell is delivered welded and completely and rigidly assembled. It is claimed that this type of cell is lighter in weight for its capacity than any cell made. The fact that each cell is completely welded is distinctive to this type and is a very excellent feature in that it eliminates all packed joints so that there is no expense for replacement and maintenance of packing materials, no bolts to insulate and no leaks to remedy.

In addition to the cells, the Electrolabs Company offer complete plants for the distribution, compression and utilization of oxygen and hydrogen gases. Such plants have been in satisfactory operation in many of the great industrial centers of the United States for a sufficient length of time to demonstrate their practicability and economy of operation.

Mono. An illustrated bulletin describing a new combustion control device recently issued by the Mono Corporation of America, 25 West Broadway, New York City.

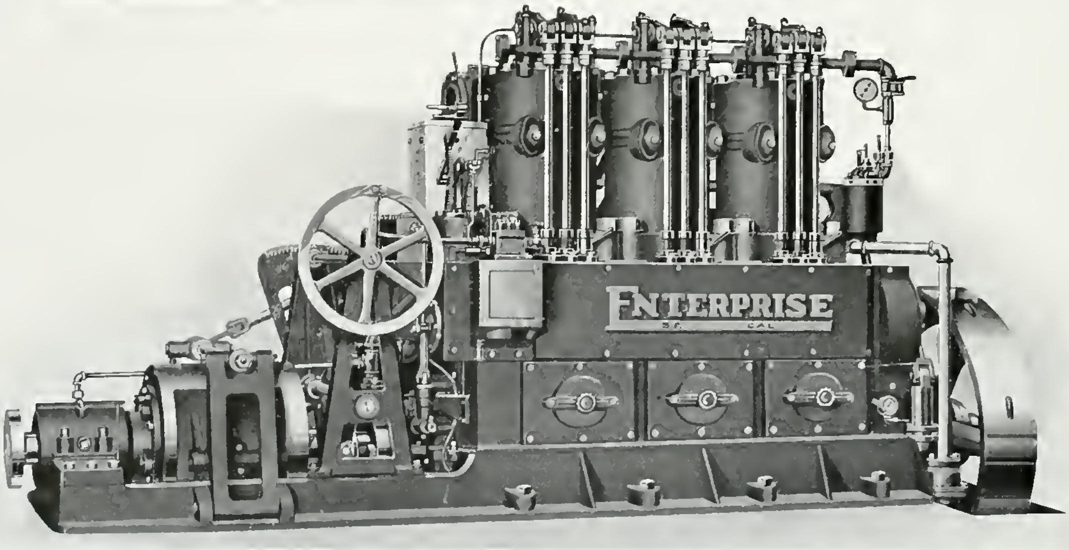
The duplex mono, as this device is called, is unique in that it automatically analyzes and records the combined percentages of three combustible gases (CO, CH4 and H2) during all such times as any or all of these appear in the flue, while it also produces a continuous accurate record of the percentage of CO2. Both records are on one and the same chart. This is of a new type and very clear and easy to read.

The bulletin emphasizes the serious losses which frequently occur in boiler plant furnaces on account of the escape of unconsumed combustible gases. This may occur at any time, but happens especially when high CO2 records are attempted under the guidance of flue gas analyzing instruments recording CO2 only, even when supplemented by an occasional snap test for CO.

With the duplex mono as a guide, the fireman soon learns to regulate his fires and drafts to avoid the escape of combustible gases while holding CO2 at the highest possible percentage at all times. Should combustible gases appear when the percentage of CO2 is less than the allowable percentage at which experience with the particular furnace in question has proven it possible to operate under any set of conditions, he knows there is something wrong requiring immediate attention.

The plant executive is given a permanent record which gives him the data necessary to compute the degree of efficiency attained in firing, and offers him every opportunity to intelligently select his fuel, make alterations or repairs and supervise the efforts of the firemen.

ENTERPRISE
MARINE AND STATIONARY ENGINES



Solid Injection, Full Diesel Marine Engines
ENTERPRISE ENGINE COMPANY
BUILDERS OF THE WELL KNOWN ENTERPRISE GASOLINE, DISTILLATE & KEROSENE ENGINES
Office---20-24 Steuart St. *Factory*---18th & Alabama Sts.
SAN FRANCISCO, CALIFORNIA

KEEPING BUNKER OIL LIQUID

THE RanD System for bunker oil provides a highly effective method of reliquidizing oil in ships' inner bottoms without any of the disadvantages that attend the use of heating coils.

This system applies forced circulation to the bunker oil by means of a central heater located in the boiler or engine room connected to a circulating pump (usually the transfer pump) and with discharge and suction connections at the deep tank and inner bottoms. Each hot oil discharge connection consists of a nozzle constructed so as to slowly rotate in a horizontal plane, thereby causing agitation in every direction throughout the mass of cold oil in the tank compartment. These nozzles are installed through an opening cut in the tank top and in the case of vessels already built, this can be done and the entire system installed without removal of oil from the inner-bottom tanks. The deep tank connection is used to start the system and where the vessel is not fitted with deep tank or settling tank, a specially designed bulkhead connection is furnished to provide an auxiliary for temporary use in starting.

So effective is the RanD System in assuring complete circulation and effective reliquidizing of the oil that an inner-bottom tank 90 feet long has been handled with two discharge nozzles, one at each end of the tank. The exact number and location of the nozzles as well as the determination of the capacity and arrangement of the system, are matters of special engineering for each installation and are decided after a thorough investigation of the plans and fuel requirements of the vessel considered.

The principal advantages of the RanD System are as follows:

1. Circulation and effective reliquidizing of the oil are assured by the constant inflow of hot oil through the rotating nozzles and the constant withdrawal of cold oil to the heater.

2. The temperature of the oil can be positively controlled either manually or thermostatically, so as to prevent overheating and partial destructive distillation with loss in fuel value of the oil.

3. The system provides a flexible control of the oil temperature to meet changing conditions of sea water, weather, or grade of oil used. The circulation can be increased or decreased by changing the pressure of the oil at the nozzles and the temperature of the oil can be increased or decreased by changing the steam pressure in the heater.

4. A uniform temperature is maintained throughout each tank compartment, preventing any strata of congealed oil from diminishing the effective tank capacity.

5. There are no heating coils or other equipment in the tank compartments to reduce tank capacity, contaminate oil through leakage, increase maintenance cost through rapid wear and difficulty of repair, or overheat the oil.

6. The entire system (except the discharge nozzles) is outside of the tank compartment, in plain view, and readily accessible.

7. The system makes use of existing pipe connections and pump and can be installed at comparatively small cost and without removing oil from the ship's inner bottom. Repairs and replacements are normally few and readily made.

8. There need be no guesswork as to elements of design or arrangement of the system, because the circulation of oil which it produces is known to be positive and governed by definite calculations.

Row & Davis, Engineers, Inc., are the sole agents for the RanD System in the United States, and any further information and description can be secured by communicating with them.

COAST EQUIPMENT REORGANIZES

THE Coast Equipment Company of San Francisco, for some time past doing business under the management of L. A. Somers, announces a reorganization unuder the control of L. A. Somers, H. S. Tittle, Alfred H. Potbury and Robert Dalziel, Jr.

L. A. Somers will be, as formerly, the manager of the company. Alfred H. Potbury will be the engineer for the company.

The offices of the company have been removed to 766 Folsom Street, San Francisco, where within a shot time a warehouse stock of meters, motors, transformers and other equipment will be carried.

The Coast Equipment Company specializes on electrical apparatus, turbo-generators, Diesel engines, Corliss engines, Uniflow engines, mining and refrigerating machinery, cranes of all types, and complete industrial power plants.

$6000 Saved on One Hull

At a Pacific Coast shipbuilding plant two hulls of the same size have been completed. Oxy-Acetylene cutting and pre-heating were used on the first hull and city gas and oxygen with VICTOR CITY GAS TORCHES were used on the second hull. A careful record kept by the shipbuilder showed a saving of six thousand dollars on the hull with city gas in place of acetylene.

WHY? Note the factors of economy. Acetylene at twenty-eight dollars or Hydrogen at eight dollars per M cu. ft. compared with city gas at 75 cents per M cu. ft.—here is a big saving. But of greater importance is the saving made by the elimination of handling costs of acetylene and oxygen cylinders and the removal of empties.

Pipe the oxygen and city gas to the job and control the oxygen pressure with a master pressure regulator instead of the wasteful method of permitting each operator to handle individual regulators.

Besides cutting equipment for city gas the Victor line includes the proper apparatus for every class of operation in cutting and welding, within the limits of the process.

Victor Oxy-Acetylene Equipment Co.
884-886 Folsom St. SAN FRANCISCO
10 North Jefferson St. CHICAGO

JQG
JOHNSON
QUALITY GEARS
are good gears
Johnson Gear Company
Berkeley, Calif.

The United States Transport Co.

Incorporated

CONGRESS LINE

New York Philadelphia Baltimore Mobile	*to*	Los Angeles Harbor San Francisco Portland Seattle

Regular Bi-monthly sailings

FRANK K. HITCHING
General Agent
244 California Street
San Francisco

"*Sloane*" Furnishings Will Distinguish Your Ship

OUR experience, facilities and immense stocks assure the shipbuilder or owner the utmost in Ship-Furnishings at moderate cost.

Sketches, plans and estimates submitted

W. & J. Sloane
216-228 Sutter Street
San Francisco

Pacific Marine Review

The National Magazine of Shipping

MAY
1921

25
CENTS

Pacific Marine Review, Vol. 18, No. 5. Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $5.00 a year.

When you want it
Where you want it
As much as you want

PREST-O-LITE Dissolved Acetylene and Prest-O-Lite Service have made the oxy-acetylene process indispensable in ship-yards.

Prest-O-Lite
DISSOLVED ACETYLENE

provides ship builders with the purest cutting and welding gas in easily portable, instantly accessible and highly convenient cylinders.

Without such a supply of uniformly high grade gas always at hand, cutters and welders would find impossible many applications of the oxy-acetylene process now in common use.

And Prest-O-Lite Service, operating through forty plants and warehouses, places Prest-O-Lite Dissolved Acetylene at the command of ship-yards anywhere, at any time and in any desired quantity.

THE PREST-O-LITE COMPANY, Inc.
General Offices: Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco
In Canada: Prest-O-Lite Co. of Canada, Limited, Toronto

PW-513-21

Pacific Marine Review

CONTENTS

MAY, 1921

A Greater San Francisco Program, by Dr. B. M. Rastall 261
Editorial 264
Four Miles of Destroyers 268
Commercial Watersheds and the Shipping Board, by George B. Carpenter 270
American Shipping 272
The Cuban Situation 273
Oil Engines and Motorships 275
The Kennecott, an American Motorship; Motor Shipbuilding in Europe; Diesel Electric Ferries for the Golden Gate Ferry Company, by D. W. and R. Z. Dickie.
Bethlehem-Frear Combination Steamers for Coal and Ore 281
Attention to Detail Brings Success, by Sea Flame 283
Stabilizing the Shipbuilding Industry, I—Some Notes on Efficiency in Pacific Coast Shipyards, by Letson Balliet, M. E. 285
Self-trimming Vessels, by John R. F. Dettmer 287
European Marine Developments 290
New Orleans Ship Canal 291
The Great Lakes Ore Traffic, by W. A. Chapman, Manager of the Western Department, Fireman's Fund Insurance Company 293
The Yangtse Steamer Anning 295
The Reconditioned S. S. San Lorenzo 297
Mount Carroll's Power Plant 298
Marine Insurance 299
Full Speed Ahead 303
Pacific Machinery 324

Craftsmanship—What It Means

One of the oldest and noblest of human ideals is the ideal of the Craftsman—the code which bids the workman take pride in the skill of his hands, and employ that skill in none but worthy and useful ends.

Good intentions in shipbuilding would have little value unless expressed through skill in performance of each and all the complex tasks involved in the construction of a modern ship.

In the 19,000 men on our payroll, we have for twenty years and more been building up, primarily, an organization of CRAFTSMEN.

NEW YORK SHIPBUILDING CORPORATION
Camden, N.J.

Pacific Marine Review
The National Magazine of Shipping
May, 1921

Copyright, 1921, by J. S. Hines

THE GREATER SAN FRANCISCO

An Industrial Program for the Upbuilding of the City's Commercial Life

By DR. B. M. RASTALL*

SAN FRANCISCO'S natural advantages are unapproached by any other western American city. The ability of this city is also unquestionable, for the citizenship that rebuilt a great city and put on a world's exposition within five years of the greatest civic catastrophe of modern times, can achieve any possible accomplishment when stimulated to its highest effort. These advantages and ability will not avail, however, in a supreme contest, without the other two esentials of top condition and strongest team play. The San Francisco Program is an endeavor to learn and provide the essentials for putting this city in the best possible condition, and for the development of the strongest team activities for its championship contest. Six features only are involved: (1) good city structure and facilities; (2) the best condition of living; (3) energetic business development; (4) securing new population and industries; (5) good government; and (6) providing the greater San Francisco.

FOREWORD

The citizens of San Francisco can afford to give as much time and effort to the progress of their city, as to their own private affairs. This is most literally true, because the greatest opportunities for all lie in the city's advancement. Even the largest enterprise, with national markets, is vitally dependent upon its community, because as previously noted, the community sets its stamp upon the people who serve industry, and largely determine their efficiency, molding them to its general levels of vigor, intelligence and integrity.

It is true then that the business man is even more interested in the growth and efficiency of his city than in the effectiveness of his own organization, for the larger possibilities of growth in his business lie in the growth and progress of the city. What is true for the business man is equally true for the professional man, for the executive and even more true for the workman who is more completely dependent upon the community for the conditions under which he lives and for opportunity of advancement.

The San Francisco Program offers a movement in which all citizens can unite, both from the motives of self-interest just outlined, and from the broadest motives of humanitarianism, civic pride and patriotism.

City Structure and Facilities

It is universally recognized that the factory which tries to operate with a poor location, bad transportation facilities, a ramshackle building, run-down machinery and shiftless workmen, is dooming itself to failure. It must be equally apparent that the city which enters a great contest with a bad city plan, its residential areas undeveloped, poor street system, lack of parks and bad housing conditions is building the same failure for itself, because the effects in waste and lack of drive are exactly the same.

The outstanding physical facts regarding San Francisco are its peninsular location and hill areas. The Twin Peaks Range bisects the city north to south and a series of ridges practically connect this range with the bay, cutting the city into a number of strongly isolated districts. This situation and other conditions such as the checkerboard plan of street layout regardless of grades, and the twenty-five foot lot, create certain situations of structure that must be corrected before this city can possibly achieve a great advance movement. San Francisco, to give itself a fair chance in the industrial and mercantile competition of the Pacific Coast, must adequately care for certain necessities in physical structure and facilities.

To realize the actual problem one should climb Bernal Heights on a clear day and carefully inspect the features which are clearly set forth in the view from the summit. On the northern side the city is solidly compact, one house crowding against the other. On the south are great stretches of grazing lands on low rolling hills. The hill areas offer opportunities for residential district planning unsurpassed for beauty and convenience in America. But the imposing of the checkerboard plan of streets regardless of hills or grades; the adoption of the twenty-five foot lot; and early boom periods giving widely scattered ownership, put serious work ahead of the city before it can be in a position to capitalize its natural physical advantages. This situation will be found entering into practically every recommendation following.

1. Wholesale Loft Industry Sections

The district south of Market street offers an ideal location, with certain improvements, for a great wholesale, loft industry, light manufacturing, section. It is located between the mercantile center and the natural industrial sections of the city, at the point of shortest average delivery distance to sub-centers, near the waterfront, in a district tapped by lines of all three transcontinental systems. Opportunity for development of this district, however, rests upon the following:

---

* Abstract of address delivered before annual dinner of the San Francisco Chamber of Commerce April 14, 1921.

A—Removal of Rincon Hill. This small, high hill now cuts off the district from its natural waterfront, makes a large area unoccupiable and of meager value, and prevents the free development of rail facilities required. Its removal is necessary for proper mercantile growth.

While a work of apparently high cost, the removal of Rincon Hill will be in the nature of an investment which will pay extraordinary dividends to the city. The immediate increase in real estate values of the hill area itself will probably immediately balance the total cost, while increases in values to the south of Market sections as a whole will unquestionably be many times the total cost. Business advantages and savings in operation and results from the larger business development in the area will therefore be in the nature of net profits to the city.

B—China Basin Terminal. This basin channel offers an unusual opportunity for the development of a modern wholesale produce terminal, combining central location with direct rail and water facilities. Completion of the improvements started here is important in the commercial future of the city.

C—Diagonal. A new street running diagonally from the waterfront at lower Rincon Hill to Market Street in the neighborhood of the Civic Center. This will relieve the congestion of Market Street, open a new direct route connecting the section with the city's main delivery streets, cut down delivery distances, open a badly depressed district for business development, and complete the facilities required by a modern wholesale section.

2. Islais Creek Industrial District

The Islais Creek mud flats, Bernal Heights, and, with a short intervening gap, the Twin Peaks range, form a chain which cut the city squarely in two in the center. The only direct route across this barrier to the southern industrial districts is a single street along the bay front.

An absolute necessity for free industrial development of the city lies in the reclaiming and replatting for industrial purposes of the Islais Creek flats. An industrial section of many hundreds of acres most advantageously located and with the best of facilities would be produced. But more important would be the opening of direct through routes and transportation facilities between the city and the natural industrial districts immediately to the south. The complete result in growth of manufacturing industries within the city proper could be made very large. It is possible to secure this improvement and to turn the district into an industrial tract of modern plan and facilities with comparatively small cost of co-operation between the state, city and a syndicate of the land owners.

3. Hunters Point Industrial Terminal

The Hunters Point area offers a perfect opportunity for the development of a great industrial section of the Bush Terminal type. With modern development it offers direct deep water frontage, direct facilities of three transcontinental railroads, a broad, level area for industries, a short distance by direct level routes (with Islais Creek improved) to the wholesale and business centers of a great city, contiguous hill areas ideal for the best industrial home districts, and nearness to the largest present home sections for workmen. Such industrial terminals form the principal bid for manufacturing expansion of the great harbor cities the world over at the present time. Other cities are now securing large projects of this type.

The replanning, opening and development of this area is a prime essential to a great industrial future for San Francisco. The chief obstacle is the widespread and long time of ownership in the property involved. The San Francisco plan requires the most vigorous effort for securing action by property owners, under some form, of syndicate or in failure of this method, its development under public authority.

4. Harbor Development

San Francisco's great landlocked harbor is universally recognized as its greatest asset. The development of the harbor frontage and its facilities is basic to the future greatness of the city visioned in this program. Each of the projects put forward so far in this section carries with it the development of a new section of the harbor front. Other improvements, corresponding provision of facilities, and progressive harbor management must go hand in hand. San Francisco must also continue to be active in seeking national legislation permitting the establishment of free ports, and take immediate action for establishing such a port when permitted.

5. Unoccupied Home Areas

Several of the isolated districts previously noted form the natural sites for the growth of residential districts, but they remain unoccupied because of lack of direct through route streets connecting with the center of the city, and street car transportation. These districts, laid out on the checkerboard plan, regardless of contour, and in twenty-five-foot lots, require replanning for modern home district development if they are to compete successfully with other districts and also for the ultimate attractiveness of the city.

The Sunset area is the most glaring example of the result of these lacks. The recent development of the west of Twin Peaks area bears sufficient testimony to the results of direct connection and replanning.

Proper growth in population and homes of the city requires the opening up, under favorable conditions, of these isolated districts. Certain through streets and street car extensions must be secured, also an enabling act which will permit the city to replan unoccupied areas for modern home section development.

6. Public Utilities

A—Street Cars. The comfort of the business employes of the city and proper development of its residential districts are alike dependent upon street car service. Every traffic expert that has examined the situation in San Francisco has found this city ten years behind in the extension of street car lines required for the best city growth. Such extensions cannot be financed under the present dual system. Unification of the lines under single ownership, and the financing of immediate extensions are vital to the city's chances for growth in population and residences. An adequate system of rapid transit to Peninsula points is of particular importance.

B—Water. A certain abundance of water for domestic purposes is essential to the free growth of a city. Larger amounts of water are also requisite to securing the location of many types of industries, which, regardless of other advantages, will be compelled, so long as present water conditions continue, to avoid San Francisco. Acquirement by the city of its complete water system at the earliest possible moment, and vigorous movement toward availability of larger supplies in the near future, are important steps in the city's program.

7. Zoning

The best development of residential, mercantile and industrial districts alike requires special treatment and the free growth of facilities of special types. The mixed growth resulting from entire freedom of individual action prevents good conditions from being established for either industries or homes, and makes the growth of the district, to its greatest values, impossible.

It is important that basic zones be established in San Francisco that will assure districts of being saved for the purposes to which they are naturally suited, and that will give necessary freedom within such zones for the provision of the best facilities.

8. Through Route Streets

The hill structure of San Francisco has created isolated areas and prevented the natural development of many districts because of the failure to provide direct through street routes connecting these sections with the business and industrial centers of the city. Both the future home growth of the city and business efficiency require the completion of the more important of these natural through routes.

A—Wholesale District Diagonal. This is the new diagonal required for the future south of Market wholesale district already noted. This street would relieve Market Street congestion, give a section of the waterfront the main connecting artery now lacking, connect the section with principal through routes and shorten delivery distances from the whole region.

B—Southeastern Trunk Highway. The cutting in two of the city by Islais Creek, Bernal Heights and the Twin Peaks range has already been noted. The only artery connecting the business and Mission sections of the city with its southeastern areas is Mission Street, which cuts across this break between Bernal Heights and the Twin Peaks. Mission Street is already badly congested at rush hours.

An additional southeastern artery is needed now and is essential to proper future development. Such a thoroughfare has already been planned and partly provided in the plans of the city, by running through Bernal cut on the old Southern Pacific line, and connecting on the south with San Jose Avenue. This new route can inexpensively also be run north until it taps the south of Market wholesale district, and the main business section.

C—Cross Town Route. Van Ness Avenue gives the only broad straight cross-town route of easy grades, but at the present time it comes to a dead end in the middle of a block on Market Street. All traffic going through must turn on Market, traverse Market for half a block, turn again and cross, and then turn again on makes a large arear unoccupiable and of meager value, Mission or the other street chosen, involving three stoppages of traffic and increasing the congestion of Market Street. A continuation of Van Ness Avenue for one block across unimproved property would connect it with Mission Street on practically a straight line, and in two blocks would connect with Howard Street and Capp Street, thus giving very valuable through routes across town.

D—Islais Creek Through Route. Full development of the Islais Creek industrial section requires the building of a through route street up Islais Creek Valley connecting with present and future workmen's home areas. This may easily follow the abandoned line of the Ocean Shore Railroad, to Mission Street, where it should be continued, curving to the left to furnish a direct route for the district bordering Twin Peaks, which entirely lacks a main avenue at present. This route is a very important one for future development of the southern industrial districts. It will connect not only present home areas, but a great range of hill areas, offering ideal sites for future home development. The future improvement of Silver Avenue will give the Hunters Point district a through route to these same sections.

E—Montgomery Avenue Extension. Montgomery (Columbus) Avenue should be completed to the waterfront by widening one of its narrow connecting streets for the necessary few blocks. This would give a wide through route of the lowest available grades from the waterfront and wholesale districts to the northeastern sections of the city.

9. Park and Boulevard System

An attractive and properly distributed park system, with connecting boulevards, is one of the greatest assets a city can possess, both in value of attractive appearance to visitors and in the efficiency that grows from recreation and health.

San Francisco has a splendid system of parks in its northern portion, but the southern half of the city is almost entirely lacking in park facilities. This is serious, because the southern area is the present and future home district of population of smaller incomes which is most dependent upon parks for recreation. The future efficiency of its citizens requires that San Francisco speedily secure Bernal Heights and other areas in the southern district that are naturally suited for parks and can still be secured at comparatively small cost.

Some of the great business men of this city have an opportunity to secure extraordinary monuments to themselves and the thanks of future generations, by presenting some of these areas to the city for park purposes.

Extension of the parked boulevard system is also important, especially for connecting the larger parks into a complete system. Capp Street should be widened and parked, connecting Bernal Heights with the Civic Center, and the panhandle of Golden Gate Park extended to the Civic Center. This would give San Francisco one of the finest civic center parks connected groups in the world.

San Francisco is fortunate in being a young city so that the street and park improvements required for the best future development can still be provided at comparatively low cost. Such cities as New York and Boston have recently found it necessary to provide new direct streets and parks through the most congested and valuable real estate districts that they possess. The result, for example, is that in acquiring one single block for a park in a congested east side district New York has paid more than the total original cost of enormous Central Park, and figures for the extension of Seventh Avenue have run into staggering amounts.

Even under the most expensive treatment parks and boulevards have been found to actually pay financially in addition to the great value in reputation and attractive conditions of living which they bring.

Pacific Marine Review
The National Magazine of Shipping

576 Sacramento Street
SAN FRANCISCO, CALIFORNIA U. S. A.

Official Organ of the Pacific American Steamship Association

Subscription Price, per year (Domestic) $2.00
(Foreign) $3.00
Single Copies . . . . 25 cts

J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor

NEW YORK OFFICE
339 at 30 Church Street
M. B. STEWART, Manager

Pacific Marine Review is sold at all leading News Stands
Entered as second class mail matter at Postoffice
San Francisco, California

Published on the First of Each Month. Copyright
1921 in the United States by J. S. HINES

AN AMERICAN MESSAGE FOR AMERICAN SHIPPERS

LAST month in the editorial columns of Pacific Marine Review we stressed the idea that it was necessary for American shippers to specify shipment in American bottoms in order to keep the American merchant marine upon the seas. This idea has been given tremendously added impetus in that part of President Harding's message to Congress which deals with our merchant marine problems. We herewith reproduce in full President Harding's ideas on the subject:

"It is not possible, on this occasion, to suggest to Congress the additional legislation needful to meet the aspirations of our people for a merchant marine. In the emergency of war, we have constructed a tonnage equaling our largest expectations. Its war cost must be discounted to the actual values of peace, and the large difference charged to the war emergency, and the pressing task is to turn our assets in tonnage to an agency of commerce.

"**It is not necessary to say to Congress, but I have thought this to be a fitting occasion to give notice, that the United States means to establish and maintain a great merchant marine.**

"Our differences of opinion as to a policy of upbuilding have been removed by the outstanding fact of our having builded. If the intelligent and efficient administration under the existing laws makes established service impossible, the executive will promptly report to you. **Manifestly, if our laws governing American activities on the seas are such as to give advantage to those who compete with us for the carrying of our own cargo and those which ought naturally to come in American bottoms through trade exchanges, then the spirit of American fair play will assert itself to give American carriers their equality of opportunity.**

"This republic can never realize its righteous aspirations in commerce, can never be worthy the traditions of the early days of the expanding republic, until the millions of tons of shipping which we now possess are co-ordinated with our inland transportation and our shipping has government encouragement, not government operation in carrying our cargoes under our flag over regularly operated routes to every market in the world agreeable to American exchanges.

"It will strengthen American genius and management to have it understood that ours is an abiding determination, because carrying is second only to production in establishing and maintaining the flow of commerce to which we rightfully aspire."

It will be noted in all of the remarks of the Chief Pilot of the Ship of State that he is very sympathetic toward the policy of the absorption by the people of the United States of such parts of the capitalization and operating charges as is necessary to put our merchant marine upon an equal footing with the merchant marines of our competitors.

We are glad that President Harding is of this mind. Glad also that he is taking plenty of time to find the right men for the working out of the problems which confront the United States Shipping Board, and we feel that better days are ahead for American freight ships and American traders in overseas traffic.

It must be obvious to anyone who has given this subject the slightest consideration that no matter how many ships a firm may own, that firm would be powerless to operate those ships at a profit without the co-operation of the shipping public. It is to point out the desirability and the necessity of such co-operation that we are stressing the slogan, "American freight for American ships."

THE SHIPPER'S SHARE

AMERICAN citizens or firms belonging to the classes coming under the general names of shippers, exporters, importers and forwarders, are the responsible parties to whom we must look for aid in building up the overseas freight business of the American merchant marine insofar as that business can be built up by the direct or indirect influence of those having to do with the routing of freight shipments.

There is no doubt in the mind of anyone who is at all acquainted with the European systems of merchant marine practice that European shippers are constantly on the qui vive to influence the shipment of goods consigned to themselves or consigned by them in ships belonging to their own nationals, and there can be no doubt in anyone's mind that such practice is good business, even when a slight edge has to be given to these ships in the payment of freight rates.

Great Britain has been especially zealous in this regard, and the British firms resident in the United States are particularly active in, wherever possible, shipping goods in British bottoms. America has built up during the war a tremendous tonnage in ships especially designed for the carriage of miscellaneous cargo. More than one-half of this tonnage is now temporarily out of business laid up on berths in various harbors of America on account of lack of freight. While the same condition is true to a slightly lesser degree with the ships of our British competitors, we are calling attention to the condition of the American merchant marine to emphasize the need of co-operation between American shippers and American shipowners in order that the American merchant marine may be kept alive.

A San Francisco merchant should very readily acknowledge that it is better business for him to patronize a ship whose home port is San Francisco than a ship whose home port is Liverpool or any other foreign port. The ship whose home port is San Francisco maintains offices in San Francisco, buys supplies in San Francisco, has repairs effected in San Francisco, and in every way is a traveling advertisement for San Francisco and an asset to the business of the city. The ship whose home port is in a foreign land spends as little money as possible for repairs, stores, etc., in San Francisco, purchasing here only what she absolutely has to have to take her home. The home ship by maintaining industries supplies a market for the wares of the merchant which would otherwise be lacking, and the merchant, bearing this consideration in mind, should be willing to prescribe consignment of imported goods in American bottoms so as to maintain the ship and the market which she creates.

It is on this matter of return cargoes that the merchant marine most needs the co-operation of the American importer. Were there no outbound cargoes for American ships, no American ship would venture into foreign trading operations, but given an outbound cargo, it is up to the American importer to see to it that she has a little better than an even break in securing return cargoes. This is particularly easy of accomplishment in those countries with which we have foreign trade relations and which are not themselves in any large sense marine carriers, as, for instance, with China, Russia, and the countries of South America, Central America, and Mexico.

Much good could be accomplished along these lines by some sort of a co-operative organization between shippers and shipowners for the study of the requirements of these foreign trading zones and for the study of correct packing methods and care of cargo en route. Proper co-operation along these lines would secure for America a very much stronger foreign trading position than she has been able to achieve up to the present time, and such study is absolutely necessary if she is to hold her present foreign trading position against the active, aggressive competition of European nationals.

AMERICAN INSURANCE FOR AMERICAN SHIPS

THE shipowners of America, who are largely dependent upon American business for the filling of the holds of their ships, should bear well in mind that it is a poor policy which does not fit both sides of the problem and should go a little more than half way in placing their insurance business with American companies, in classifying their ships under the American Bureau, and in purchasing all of their supplies and equipment through American firms in American ports. We may be absolutely sure that our competitors are following this policy to its farthest practical limits, and it is a policy which is bound to react for the benefit of all and the upbuilding of a stronger merchant marine.

BARE BOAT CHARTER AND SHIP PRICES

ACCORDING to news appearing in the public press, the Shipping Board has begun chartering its freighters on the bare boat charter plan, several Lake type freighters having been placed during the last month at the basis price of fifty cents per deadweight ton per month, owner to carry insurance, all other expenses to be up to charterer, including repairs. It is interesting, in the light of this basis charter rate, to analyze the selling price at which the Shipping Board is holding these vessels.

Take, for convenient figuring, a freighter of the Lake type of a deadweight capacity of 3500 tons. This vessel at the published price is held on the Shipping Board books at $165 per deadweight ton, or a total of $577,500, and on the bare boat charter plan she will bring in at fifty cents per deadweight ton per month $21,000 per year. From this sum under any rational method of bookkeeping known to conservative operating companies there must be deducted a suitable allowance for depreciation and insurance, which would under any ordinary circumstances amount to between ten and eleven per cent of the book value of the vessel. Calling these two items 10 per cent, which is a very low estimate, we would have chargeable against the $21,000, $57,750 or a net loss on one ship to the Shipping Board under this plan of $36,750 per year, without allowing anything for the overhead and office expenses of the board.

Some time ago it was suggested to the Shipping Board by Shipping Commissioner Goff that $57.50 per ton was a proper price at that time, considering prewar cost of building and present market value of ships. Carrying out the same example at this lower valuation, let us see how fifty cents per deadweight ton per month will pay in net revenue.

At $57.50 per deadweight ton the 3500 ton Lake freighter would figure $201,250, 10 per cent of which is $20,125, leaving a balance in favor of the ship of $875 out of which to pay dividends, office expenses, overhead and possible repairs on machinery and hull. This $875, presuming that there were no other charges against the operating revenue in addition to depreciation and insurance, would amount to a little over .004 of 1 per cent. It is plainly evident from these figures that even Commissioner Goff's $57.50 per deadweight ton is far too high a valuation to place upon our emergency fleet of freighters under the present operating conditions, and if we apply these figures to the whole fleet and consider the fact that one-third of the fleet must necessarily under present conditions be idle for a greater portion of the time and the additional fact that our Shipping Board has a yearly salary budget of $5,000,000, to say nothing of office and incidental expenses, we soon begin to realize a few of the reasons why it is necessary for the Federal government to put up money for current expenses of the Shipping Board and to understand the necessity for ridding the government as promptly as possible of the ownership of ships which are at the present time simply a burden on the taxpayers and also ridding the American merchant marine of the burdensome entanglements of government control.

As we have pointed out in different ways in previous issues, no American operator who is willing really to face the facts could afford to pay the Shipping Board prices for ships, even if that operator were guaranteed by the government that his labor and fuel would cost him nothing.

FOREIGN TRADE CONVENTION

ON May 4, 5, 6 and 7 at Cleveland, Ohio, will be held the Eighth National Foreign Trade Convention under the auspices of the National Foreign Trade Council. A splendid program has been prepared, the general convention theme being, "American Foreign Trade and Its Present Problems."

The discussion of this theme certainly opens up tremendous possibilities, and undoubtedly there will be a liberal education in this convention for the exporters and importers of the Middle West and for the delegates from other parts of the country.

The sessions, as usual, are divided into general and group sessions, the group sessions affording the only opportunities for discussion. Group 1 will consider "Commercial Education for Foreign Trade;" Group 2, "Foreign Credits;" Group 3, "Problems of the Export Manager;" Group 4, "The Motion Picture in Foreign Trade." These four groups will occupy the first evening session, being held simultaneously in different rooms of the auditorium. On the afternoon of the second day four other groups will meet simultaneously—Group 5 on "Special Export Problems of the Manufacturer;" Group 6 on "Foreign Trade Advertising;" Group 7, "Inter-American Trade Relations;" Group 8, "Interest of Agriculture in Foreign Trade." On the afternoon of the third day there will be three group sessions: Group 9 on "Banking Service to Foreign Trade;" Group 10, "Service of the Export Commission House;" Group 11, "Trade Relations with the Far East." At each of these group sessions two or three short addresses on very vital topics prepared by experts in the various lines will be delivered and an opportunity given for brief, snappy discussion of the subjects of the addresses.

Three general sessions will be devoted to addresses by experts on topics which might be all grouped under the general head of "Financing and Extension of Credits in Foreign Trade." A fourth general session is of particular interest in marine affairs, containing four addresses, the first by James A. Farrell, chairman of the National Foreign Trade Council, on "American Maritime Policy." The other three in the proposed program are on the subjects, "Marine Insurance," "Operating Problems," and "Inland Waterways."

The convention should have a very beneficial effect on the interest taken by the citizens of our great Middle West in the merchant marine problem and in American foreign trade.

MOTORSHIP SUGGESTION

IT must be very evident to anyone who has followed the history of the application of the Diesel engine in America that every effort made to show the advantages of this wonderful prime mover has met a very strong and well organized opposition, and it seems to us high time that the American manufacturers of Diesel engines of the various types should unite in an organization to promote the knowledge of Diesel engine economies in the mind of the American people.

Such an organization has been functioning with much success for several years in Great Britain, and there is no doubt that the wonderful boom in motor shipbuilding in that country is largely due to the efforts directed toward intelligent propaganda on the subject. Much of the work now being done in this country for the Diesel engine spasmodically and intermittently by individual firms and by certain publications is too much on the circus poster order. There are quite a number of American Diesel-engined motorships making splendid records for economy and reliability, and an association such as that suggested could without stretching the truth in any way spread the knowledge of the performance of such motorships through the public press in such a way that it would soon be impressed upon the public mind that in the interests of the conservation of fuel oil it is almost an economic crime to allow oil to be burned under a steam boiler.

All of the opponents of the Diesel engine, particularly as applied in marine propulsion, advance as their stock argument the unreliability of the Diesel in maneuvering. In this connection we invite our readers' attention to the articles recently published in Pacific Marine Review concerning the maneuvering qualities of the Standard Oil motor tanker Charlie Watson and to the article on another page in this issue showing the maneuvering qualities of the motor freighter Kennecott. The fact of the matter is, from a theoretical standpoint, which is apparently well borne out in practice, a properly built and installed Diesel engine responds to maneuvering orders far more quickly than does any steam engine, and when it comes to the matter of starting from cold in an emergency, a properly kept Diesel engine room should be ready to start in twenty minutes or less while a steam boiler steam engine equipment might take from one and a half to two hours.

The time seems ripe for an American Diesel Engine Manufacturers' Association to provide methods and means for the spread of intelligent Diesel publicity.

YACHTING

FOR a number of years interest in the pastime of yachting has waned around San Francisco Bay. The yacht clubs, recognizing this fact, have been making rather serious attempts of late to encourage the interest of the public in this sport.

Pursuing this policy, the San Francisco Yacht Club proposes to hold on May 15 a race just off the Golden Gate which will be staged in plain sight of the public on the beach and headlands around the Cliff House. The course laid out is a triangular one, starting at the red buoy which lies off the beach end of Golden Gate Park, turning at the buoy off Point Bonita, and again at the nine-fathom buoy. It is proposed to run a number of races around this course, the larger boats being required to make the round twice, which will be approximately twenty miles, and the smaller boats once, making ten miles. This entire course would be visible from any of the beaches or headlands on the ocean side north or south of the Golden Gate. The committee which has this matter in charge is offering some handsome cups.

Among the larger boats which would be available for such a race are: J. R. Hanify's Martha and Westward, Captain Barneson's Invader, Mr. Lowe's Seaward, Mr. Van Bergen's Ketedna, Mr. Norris' Shawnee, Mr. Miller's Athene, and Mr. Dinning's Mah Pe. If all or the majority of these boats can be induced to compete, there certainly should be a splendid race that would greatly stimulate local interest in the yachting game.

Comparative Statement of Engineers' Wages, 1914-1921

IN view of the insistence of the Marine Engineers' Beneficial Association that no consideration be given to the request of the American Steamship Owners' Association for any reduction of wages at this time, it is pertinent to present a comparison of the pay of marine engineers in American seagoing vessels before the great war with the present rate of pay and with the rate when reduced as the Shipowners' Association has recommended, to meet the competition of foreign steamers.

First, a comparison of the pay of chief and first and second assistant engineers on Class C American steamers — freighters of moderate to large size — in July, 1914, and the pay of these officers at the present time:

Wages per Month—Class C

Eng. Dept.	1914	1921
Chief engineer	$150.00	$332.50
First ass't eng.	100.00	228.75
Second ass't eng.	90.00	200.00
Total	$340.00	$761.25

It will be noted that the pay of American marine engineers in these representative freight steamers has more than doubled during the war period.

Nearly one-half of the steel steamers of the United States Shipping Board are now laid up in idleness, while probably about one-fourth of the privately-owned tonnage of American ocean companies is also unemployed. This is due in part to world-wide financial and trade conditions affecting every maritime country, and in part to the difficulty met by American ships in competition with more cheaply manned vessels of other nations in a time of stress like this, when a few cents per ton in operating costs may determine whether an American vessel or a foreign vessel secures a given cargo.

It is under these circumstances that American shipowners, after all other possible economies have been attempted, have asked the Marine Engineers' Beneficial Association to agree to a substantial reduction from their wartime rates of pay, to help keep American ships on the high seas. The engineers at a conference recently with the shipowners' committee refused to consider any wage reduction whatever at this time.

Pay now given to the engineers of a Class C steamer under the American flag — a representative freighter of 8800 tons deadweight capacity—and to the engineers of a like steamer under the British flag, is as follows:

Wages per Month—Class C

Eng. Dept.	American	British
Chief engineer	$332.50	$189.54
First ass't eng.	228.75	145.80
Second ass't eng.	200.00	114.21
Third ass't eng.	176.25	97.20
Total	$937.50	$546.75

This comparison is based on the pre-war exchange rate of $4.86 per pound sterling. At the present actual rate of $3.92, the comparison would be as follows:

Wages per Month—Class C

Eng. Dept.	American	British
Chief engineer	$332.50	$152.88
First ass't eng.	228.75	113.68
Second ass't eng.	200.00	92.12
Third ass't eng.	176.25	78.40
Total	$937.50	$437.08

If the new rates of pay proposed by the American shipowners were put into effect, American and British engineer wages on Class C ships would compare as follows:

Wages per Month—Class C

Eng. Dept.	American	British
Chief engineer	$250.00	$152.88
First ass't eng.	170.00	113.68
Second ass't eng.	150.00	92.12
Third ass't eng.	130.00	78.40
Total	$700.00	$437.08

These figures speak more loudly than words of the reasons why American shipowners have had to ask their engineers—and not only the engineers, but the sailors, firemen and stewards—to co-operate in a movement to reduce costs of operation. American shipping in overseas trade is aided and protected in no way by the government. It must compete with foreign ships on free trade terms. It is the one great American industry faced with that kind of competition.

FACTS IN THE CASE

In order that our readers may understand the situation now developing between the American Steamship Owners' Association and the Marine Engineers' Beneficial Association, the following statement of facts is submitted:

Employes on shipboard for American steamship operators have been working under two separate agreements, one covering the Atlantic and Gulf Coasts, which expires May 1; one covering the Pacific Coast, which expired January 1 and was continued by mutual consent to be abrogated by either side on thirty days' notice.

During the first three months of 1921 all American steamship companies gave to the various unions and associations covering their employes a written notice of abrogation of present working agreements and calling on the various unions for a conference. The Pacific Coast unions absolutely refused to enter into any conference with regard to reduction of wages.

Joint conferences were held on the Atlantic Coast, the owners asking the unions to make some reduction. This the unions refused to consider. Conferences held by steamship owners of both the Atlantic and Pacific Coasts during the past two weeks have called representatives of the various unions into their discussions and have met with flat refusal to consider any reduction in wages.

The owners thereupon published a reduced scale to become effective May 1, 1921.

Admiral Benson has called representatives of both parties to this discussion to Washington in an endeavor to bring about some basis of settlement. Up to the time of writing no such basis has been reached.

FOUR MILES OF DESTROYERS

Built by the Union Plant of the Bethlehem Shipbuilding Corporation

One of the great single programs of destroyer construction for the United States Navy is approaching an end. About May 31 the Union Works of the Bethlehem Shipbuilding Corporation, San Francisco, will deliver the last of sixty-six vessels. Inasmuch as the entire destroyer fleet of the Navy, actual and provided for, numbers 331 craft, the Union Works alone will have constructed one-fifth in number and considerably more than one-fifth in displacement tonnage. All the sixty-six vessels are of the latest and largest type, having an over-all length, in common with practically all the first-line vessels of 314 feet 4½ inches and a maximum loaded displacement of about 1308 tons.

20,000 Feet of Ships

These sixty-six vessels, if moored end to end, without a fraction of an inch between the stem of one vessel and the stern of another, would stretch 20,749 feet, or almost four miles. That statement may enable the reader to visualize the magnitude of the yard's construction.

Three contracts were let by the Navy Department to Bethlehem embracing twenty-six destroyers. The keel of the first, the McKee, was laid October 29, 1917. Following the letting of the three contracts came the fourth, which covered no less than forty destroyers, the last of which will be completed and delivered within a few weeks..

145 Vessels in Four Years

The first deliveries were of the McKee and Schley in September, 1918. Another was delivered in October and three in November. Thereafter one and two were delivered monthly until December, 1920, during which four were completed. Two followed in January, 1921; four in February and four in March, a rate that soon would suffice for the construction of the entire fleet of American destroyers as it was in 1917. And this large program has been pushed to completion despite the extensive building of other vessels by the Bethlehem yard, which delivered 109 vessels between January, 1918, and March 1, 1921, and still had thirty-six under construction. Twelve of the total of 145 were S-class submarines, six were R-class; sixty-six, as said, were destroyers, and the remainder were merchantmen, predominatingly tankers.

All of the sixty-six destroyers have the following dimensions: 314 feet 4½ inches over-all, 310 between perpendiculars; 30 feet 11½ inches in beam; 9 feet 4 inches mean loaded draft; 35 knots speed; 1308 tons full-load displacement; turbine engines developing 27,000 indicated horsepower and four Yarrows watertube boilers. It is interesting to note that the names of some of the latter destroyers are those borne by old torpedo-boats and early destroyers, such as Chauncey, Macdonough and Hull. In fact, up to July 1, 1920, the names of fifty-five old vessels had been re-bestowed upon newer craft. This accounts for the recurrence of the familiar names of Cushing, Ericsson, Porter, Farragut, Wilkes, Bainbridge, Worden, Paul Jones and many others.

Bethlehem Destroyer List

The following table shows the complete program of sixty-six vessels with the dates of keel-layings, launchings and deliveries up to the middle of April:

Name	Keel Laid	Launched	Delivered
McKee, No. 87	Oct. 29, 1917	Mar. 23, 1918	Sept. 7, 1918
Robinson, No. 88	Oct. 31, 1917	Mar. 28, 1918	Oct. 19, 1918
Ringgold, No. 89	Dec. 20, 1917	Apr. 14, 1918	Nov. 14, 1918
McKean, No. 90	Feb. 12, 1918	July 4, 1918	Feb. 25, 1919
Harding, No. 91	Feb. 12, 1918	July 4, 1918	Jan. 24, 1919
Gridley, No. 92	Apr. 1, 1918	July 4, 1918	Mar. 8, 1919
Schley, 103	Oct. 29, 1917	Mar. 28, 1918	Sept. 20, 1918
Champion, 104	Oct. 31, 1917	Apr. 7, 1918	Nov. 11, 1918
Mugford, 105	Dec. 20, 1917	Apr. 14, 1918	Nov. 26, 1918
Chew, 106	Jan. 2, 1918	May 26, 1918	Dec. 12, 1918
Hazelwood, 107	Dec. 24, 1917	June 22, 1918	Feb. 20, 1919
Williams, 108	Mar. 25, 1918	July 4, 1918	Mar. 1, 1919
Crane, 109	Jan. 7, 1918	July 4, 1918	Apr. 18, 1919
Hart, 110	Jan. 8, 1918	July 4, 1918	May 26, 1919
Ingraham, 111	Jan. 12, 1918	July 4, 1918	May 15, 1919
Ludlow, 112	Jan. 7, 1918	June 9, 1918	Dec. 23, 1918
Burns, 171	Apr. 15, 1918	July 4, 1918	Aug. 7, 1919
Anthony, 172	Apr. 18, 1918	Aug. 10, 1918	June 19, 1919
Sproston, 173	Apr. 20, 1918	Aug. 10, 1918	July 11, 1919
Rizal, 174	June 26, 1918	Sept. 21, 1918	May 28, 1919
Mackenzie, 175	July 4, 1918	Sept. 29, 1918	July 25, 1919
Renshaw, 176	May 8, 1918	Sept. 21, 1918	July 31, 1919
Obannon, 177	Nov. 12, 1918	Feb. 28, 1919	Aug. 27, 1919
Hogan, 178	Nov. 25, 1918	Apr. 12, 1919	Sept. 30, 1919
Howard, 179	Dec. 9, 1918	Apr. 26, 1919	Jan. 28, 1920
Standbury, 180	Dec. 9, 1918	May 16, 1919	Jan. 8, 1920
Chauncey, 296	June 17, 1918	Sept. 29, 1918	June 25, 1919
Fuller, 297	July 4, 1918	Dec. 5, 1918	Feb. 28, 1920
Percival, 298	July 4, 1918	Dec. 5, 1918	May 31, 1920
John Francis Burns, 299	July 4, 1918	Nov. 10, 1918	May 1, 1920
Farragut, 300	July 4, 1918	Nov. 21, 1918	June 4, 1920
Somers, 301	July 4, 1918	Dec. 28, 1918	June 23, 1920
Stoddard, 302	July 4, 1918	Jan. 8, 1919	June 30, 1920
Reno, 303	July 4, 1918	Jan. 22, 1919	July 23, 1920
Farquhar, 304	Aug. 13, 1918	Jan. 18, 1919	July 31, 1920
Thompson, 305	Aug. 14, 1918	Jan. 15, 1919	Aug. 16, 1920
Kennedy, 306	Sept. 25, 1918	Feb. 15, 1919	Aug. 28, 1920
Paul Hamilton, 307	Sept. 25, 1918	Feb. 21, 1919	Sept. 24, 1920
Wm. Jones, 308	Oct. 2, 1918	Apr. 9, 1919	Sept. 30, 1920
Woodbury, 309	Oct. 3, 1918	Feb. 6, 1919	Oct. 20, 1920
S. P. Lee, 310	Dec. 31, 1918	Apr. 22, 1919	Oct. 30, 1920
Nicholas, 311	Jan. 11, 1919	May 1, 1919	Nov. 23, 1920
Young, 312	Jan. 28, 1919	May 8, 1919	Nov. 29, 1920
Zeilin, 313	Feb. 20, 1919	May 28, 1919	Dec. 9, 1920
Yarborough, 314	Feb. 27, 1919	June 20, 1919	Dec. 31, 1920
La Vallette, 315	Apr. 14, 1919	July 15, 1919	Dec. 24, 1920
Sloat, 316	Jan. 18, 1919	May 14, 1919	Dec. 30, 1920
Wood, 317	Jan. 23, 1919	May 28, 1919	Jan. 18, 1921
Shirk, 318	Feb. 13, 1919	June 20, 1919	Jan. 25, 1921
Kidder, 319	Mar. 5, 1919	July 10, 1919	Feb. 7, 1921
Selfridge, 320	Apr. 28, 1919	July 25, 1919	Feb. 17, 1921
Marcus, 321	May 20, 1919	Aug. 22, 1919	Feb. 23, 1921
Mervine, 322	Apr. 28, 1919	Aug. 11, 1919	Feb. 28, 1921
Chase, 323	May 5, 1919	Sept. 2, 1919	Mar. 10, 1921
Robert Smith, 324	May 13, 1919	Sept. 19, 1919	Mar. 17, 1921
Mullany, 325	June 3, 1919	July 9, 1920	Mar. 29, 1921
Coghlan, 326	June 25, 1919	June 16, 1920	Mar. 31, 1921
Preston, 327	July 19, 1919	Aug. 7, 1920	
Lamson, 328	Aug. 13, 1919	Aug. 31, 1920	
Bruce, 329	July 30, 1919	May 20, 1920	Sept. 29, 1920
Hull, 330	Sept. 13, 1920	Feb. 18, 1921	
Macdonough, 331	May 24, 1920	Dec. 15, 1920	
Farenholt, 332	Sept. 13, 1920	Mar. 9, 1921	
Sumner, 333	Aug. 27, 1919	Nov. 24, 1920	
Corry, 334	Sept. 15, 1920	Mar. 28, 1921	
Melvin, 335	Sept. 15, 1920	Apr. 11, 1921	

Submarines Constructed

The following table shows the submarine construction of the Bethlehem Union plant:

Name	Keel Laid	Launched	Delivered
R-15	Apr. 28, 1917	Dec. 15, 1917	Aug. 5, 1918
R-16	Apr. 26, 1917	Dec. 15, 1917	Aug. 5, 1918
R-17	May 5, 1917	Dec. 24, 1917	Aug. 17, 1918
R-18	June 15, 1917	Jan. 8, 1918	Sept. 11, 1918
R-19	June 22, 1917	Jan. 28, 1918	Oct. 7, 1918
R-20	June 4, 1917	Jan. 21, 1918	Oct. 26, 1918
S-30	Apr. 1, 1918	Nov. 21, 1918	Oct. 29, 1920
S-31	Apr. 3, 1918	Dec. 28, 1918	
S-32	Apr. 12, 1918	Jan. 11, 1919	
S-33	June 14, 1918	Dec. 5, 1918	
S-34	May 28, 1918	Feb. 13, 1919	
S-35	May 29, 1918	Feb. 27, 1919	
S-36	Dec. 10, 1918	June 3, 1919	
S-37	Dec. 12, 1918	June 20, 1919	
S-38	Jan. 15, 1919	June 17, 1919	
S-39	Jan. 14, 1919	July 2, 1919	
S-40	Mar. 5, 1919	Jan. 5, 1921	
S-41	Apr. 17, 1919	Feb. 21, 1921	

Naval Expansion of the United States

Bethlehem's destroyer construction is only one phase, although a remarkable one, of the naval expansion of the United States since 1917. When the submarine campaign of Germany reached an acute state and appeared to be on the verge of success, two distinct demands arose for new vessels. On the one hand there was urgent necessity for the immediate replacement of merchant tonnage lost as a result of submarine campaigns and other enemy activities; on the other there was need no less urgent for submarine-fighting naval craft, such as Eagle boats, sub-chasers and especially destroyers, which, as allied experience had demonstrated conclusively, were best adapted for protecting both merchantmen and the larger vessels of the navies.

The response to the demand for new merchant tonnage was, on the part of the United States, one of the most spectacular single features of the war, ranking in the public mind then and now with the major offensive of the Argonne. Less attention was paid to the destroyer program, largely because of the necessary secrecy that surrounded naval work. That program was worth a great deal of attention, however; it was, in fact, the necessary complement to the mercantile program, for building new cargo-carriers was not more necessary than protecting them once they were afloat and bound to waters of the war-zone. One immediate result of the urgent need for destroyers was the practical abandonment of construction of capital ships, such as dreadnoughts and the six great battle-cruisers of the 1916 program, and the concentration of effort of American shipyards on merchantmen and destroyers.

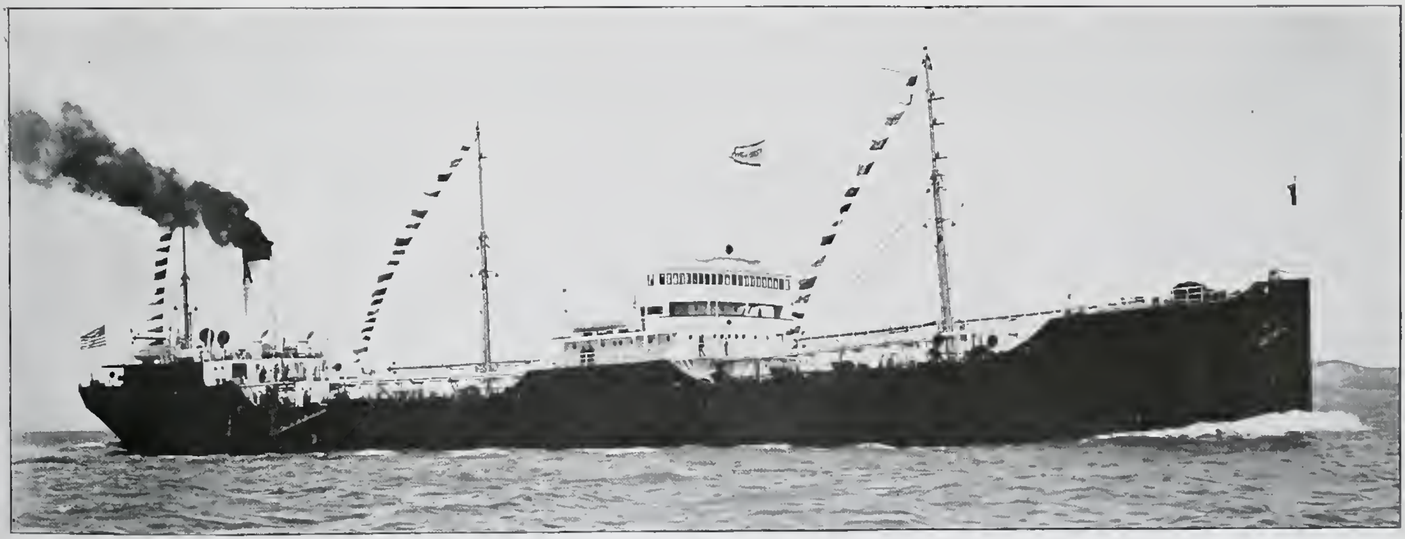
Growth of the Navy

The extent of the growth of the destroyer forces of the United States Navy may be gathered from the following table showing the numbers of torpedo craft, submarines not included, at the ends of fiscal years:

Year	Destroyers	Coast Torpedo Vessels	Torpedo Boats	Total
1914	34	16	19	69
1915	37	16	19	72
1916	47	16	18	81
1917	52	16	17	85
1918	65	15	17	97
1919	159	15	12	186
1920	214	21	14	249

The 1920 list classifies the vessels as destroyers, first line; destroyers, second line; and light mine-layers. In addition to the 1920 vessels listed above, there are to be added 70 first-line destroyers building on July 1 and 12 authorized but not contracted for, the grand total being 331.

A NEW TANKER RECORD



Associated Oil Company's 10,200 deadweight ton tanker Frank G. Drum recently completed at the Alameda Works of the Union Plant of the Bethlehem Shipbuilding Corporation

When the Alameda works of the Union plant of the Bethlehem Shipbuilding Corporation, San Francisco, delivered the tanker Frank G. Drum, 10,200 tons deadweight, to the Associated Oil Company March 26, a new record of 107½ working days was set for peace-time construction.

The keel of the Frank G. Drum was laid in the late afternoon of November 5, 1920; she was launched February 18 and delivered in the late afternoon of March 26, or 141 elapsed days after the laying of the keel. From the 141 days, however, are to be deducted Saturday half-holidays, Sundays and four full holidays, in all 33½ days, the net being 107½.

This new tanker will replace the J. A. Chanslor of the Associated fleet, which was lost two years ago. The Drum is 453 feet long overall, 435 between perpendiculars, has a beam of 56 feet and a depth of hold molded to the upper deck of 33 feet 6 inches. She is powered with reciprocating engines of 2700 indicated horsepower and three Scotch boilers 15 feet by 11 feet 9 inches, and has a loaded speed of 11 knots.

COMMERCIAL WATERSHEDS AND THE SHIPPING BOARD

By GEORGE B. CARPENTER,
Foreign Trade Adviser, Merchants National Bank of Los Angeles; President, World Traders of Los Angeles.

THE conquest of the world could probably be chronicled from no single source as effectively as from the pages of Time's maritime log. The lure of the high seas has ever been a potent factor in the development of every nation bordering the diversified ways of a trackless ocean, and the enlightenment resulting from the world's maritime accomplishments to date has not materially lessened the spirit of adventure with which we today weigh our merchant anchors to venture out over the same paths first broken by the prows of more ancient mariners and again left all uncharted by the ripples closing behind their bird-like craft.

Land of the Incas

Then every breeze from across the water carried a message of undiscovered lands, each offering a different reward in trade or conquest to him who would first brave its hazards. Nor was any part of the unknown world too remote to be heard from. For when the outlawed Pizarro, fully as venturesome, though far less commendable in his methods than the more chivalrous Cortez, came to Panama in the early fifteen twenties, his ambition was in no sense satisfied, but rather additionally fired by the stories that reached him on every hand concerning a marvelously rich country which lay further to the southward — a country where the last of the Incas, Atahualpa, governed some 35,000,000 people to whom iron as a metal was unknown and who therefore substituted for their metallic needs the more common and consequently little valued gold which their lands supplied so abundantly. These stories of fabulous wealth naturally grew as they traveled, and I assure you that in passing on his account of all this fabled wealth to his king, Pizarro lost no opportunity to embellish all he had heard.

And now today I wish we might rob ourselves of all conflicting or prejudiced knowledge which we may have concerning these lands, and as commercial adventurers report to our kings of commerce the message of promise which lies in these same republics, as rich today in the gold of trade as Pizarro found them in the metal itself.

The West Coast

On this basis we would find from Panama to Cape Horn a strip of land some 5000 miles long presenting uniformly a coast line apparently so barren, so sterile and even formidable as to make almost incredible the facts covering its population and trade. The only signs of habitation are strung so intermitttently along in a few spots rather inappropriately called ports, as to be almost lost against the bleakness of mountain and sand waste, only possible in a location such as this where rain is unknown. Yet tucked away among the hills of this 200-hundred-mile width rising so rapidly from the coast line is a population as great as that of our own United States west of the Mississippi River—a population which purchased during one of our recent war years 176,000,000 dollars' worth of imports or nine dollars per capita—some twenty times the purchasing power of the Orient, including India. Even more important is the fact that wilthin this same narrow strip of coastal plateau, rising within its narrowness from sea-level to an average of 17,000 feet elevation and sharing throughout its length the multiplied difficulties of swamp, desert and alitude hazard, this same hidden populace produced for export some 356,000,000 dollars worth of commodities, or twenty odd millions more than was exported from the entire Pacific frontage of our own United States, with some 3000 miles of fertile prairie and active manufacturing area upon which to draw for a wide variety of cargoes. Therefore does the trade of this uninspiring area become immediately a factor in world commerce, a factor far exceeding the impression naturally derived from the inadequacy of its ports.

Foreign Trade Renders a National Service

Seventeen percent of our total commerce is FOREIGN TRADE.

What then is the source of so much commerce? If one were to leave his vessel lying off-shore, and aboard one of the launches or row boats of the lighterage company, go dancing through the breakers to the safety of the dock, he would find each one of these shore-line habitations but the terminus of a miniature railroad system, threading its way back through the intervening sand-wastes to some oil pool, mine or agricultural oasis, upon which the port is dependent for its existence. Or, to reverse the picture, it might equally well be said that the port is the key to the situation, as without it, the isolated interior development would have neither outlet for its production nor inlet for the necessities which its own activities do not supply. Entirely insufficient unto themselves or to each other, port and interior form an inseparable unit regularly contributing to the off-shore trade of the country in which they lie, thus evidencing the world-wide interdependence of coast and back country not always so easily recognized in a land of widespread agricultural, manufacturing and railroad development. If, therefore, under such conditions of climate and mountain fastness there can be produced the commercial achievements evidenced by the figures above cited, what should be the possibilities of a country as wonderfully endowed with agricultural, manufacturing and shipping facilities as is our own United States?

An Andean Excursion

And if, to continue my simile even further by making the case more specific, you would go with me from one of these ports, that of Mollendo, Peru, past Titicaca and on toward the old city of Cuzco some 12,000 feet above sea level, and 200 miles inland, and from there we would follow the trail leading over the last ridge of the Andes, we would finally arrive at the Aricoma Pass a little more than 17,000 feet in elevation. All around us would still rise the higher summits between which the perpetual glaciers reach their ice-fingers down to the very roadside. Along the trail side at this point, the sloughing-off of one of these glacier noses forms a tiny lake, not a hundred feet long by half as wide, from which, as you stand there on the tip of the world, you can see the water trickling off in two directions, the one stream gong 300 miles to the Pacific and the other 3000 miles to the Atlantic, and both originating in a lake so small, so shallow, as to be practically unknown as a contributor to the world's greatest water shed.

Similarly strung along these high altitudes are other lakes; and if, figuratively speaking, a giant of engineering genius possessed of seven-league boots could step from lake to lake along these ridges, he could, by a twist of his heel, close at will either outlet of these little pools, and this divert their offerings across an entire continent.

Commercial Water Shed

And now to apply this picture to the purpose of this argument, I would say that there are **commercial** water sheds just as real and just as definite as the hydragraphic ones I have just mentioned. Their origins are in the interior and not on the coast. Similarly do they begin in the smaller producing centers, gather strength as they converge to the coast, and finally pour the massed volume of their richness through a single outlet commercially known as a port. Without them the ports cannot exist; and, conversely, without such an outlet as a port supplies, their waters become stagnant. The trade ruts they groove for themselves are deep and difficult to master when attacked in volume near tide water; at the points of origin a deft touch is sufficient to divert their entire course. It is that touch of personal interest and wise direction of port service and world outlet that in my estimation should be a first object of our international traffic masters to whom are entrusted the tariffs and trade routes by which our foreign and domestic commerce is to be developed.

As I understand it, these bodies were conceived and formulated for the purpose of most effectively regulating our commerce, both by land and sea. Despite the political favor evidenced in some of the appointments, they are still supposedly composed of men qualified to manage and direct the functions under their jurisdiction. Particularly should the Shipping Board, I believe, be considered as a managing committee expertly appointed to intensively study the needs of the country as a whole, to determine what are its true commercial water sheds, and upon that determination, to so improve our lesser harbors, or construct new ones if need be, as to advantageously handle the flow of our national trade unbiased by present export centers and disadvantageous trade-ruts.

Bottle Necks

Why should we persistently attempt the impossible by trying to squeeze through the Port of New York about three-quarters of all our foreign shipping, when by so doing we not only produce a congestion greatly increasing the cost of this movement, but at the same time allow to fall into disuse at ports of lesser degree facilities and machinery already provided, which would meantime handle the traffic faster, more advantageously, and at lesser expense? Yet that is exactly what we are doing, not only at the cost of time and money as stated, but in the face of the undisputed fact that the resultant delays and other annoyances are robbing us of the very markets which our congested docks are trying to supply.

Many of our foreign markets are today closed to us by reason of unfavorable exchange rates, except as we can show ability to excel our long established competitors in some other feature of trade facility. The excellence of our goods cannot be denied; we are learning the lessons of sales and preparation in a way directly gratifying to our foreign buyers; yet what does all this profit us if our merchandise is subject to fatal delays by being forced to move over deviating lines to seaboard points arbitrarily established during very different trade epochs, and now materially out of line with the direct haul a national readjustment would make possible? Even at tide water, the congestion referred to produces a further delay in getting prompt action from the water-carriers, and the result is a three or four months foreign delivery that should have been accomplished in as many weeks, and which would have done much to overcome the handicap of exchange first above mentioned.

Trade Channels

At the cost of appearing radical, I would go even further. I have already said that I believe the Shipping Board should be considered as national managers of our off-shore trade, and it naturally follows upon this premise that, to them, we, as stockholders in a nation's merchantry, should leave the decision of rates necessary to produce the desired distribution of port service. If, in their opinion, a certain harbor is considered more advantageous for the movement of certain merchandise now traveling through other channels, I believe it should be within their power to name a rate enough lower in comparison to that already established, as to virtually compel cargoes to move that way in preference to older channels. This would not necessarily mean a permanent favor, as in most cases trade-routes are only trade-ruts, and the proper encouragement wisely directed will in time stabilize a commercial distribution from which traffic will not again depart so long as reasonable service is rendered.

Naturally such an arbitrary power would be fought by private and civic interests now enjoying a traffic majority which would thereby be imperiled. But the Commerce Commission and the Shipping Board are representatives of the **nation** and not of private interests, and only as they serve the nation as a whole do they fulfill their obligation. The United States can no longer pursue a policy of selfish indifference and self-assurance; rather must the nation's business be considered but one phase of a world activity—a phase that will grow only as it appreciates its individual weakness and accordingly seeks its true place in the cosmic flow. This can be appreciated by the individual; but its enactment must be left to the power vested in just such national traffic committees as the two under discussion. Just as the manager of any private corporation misuses his power when he favors the private interest of the minority stockholders to the detriment of the majority, so do I feel that the Interstate Commerce Commission and the Shipping Board should be considered as favoring private interests should they continue to allow international commerce to arrive and depart over certain routes and through certain ports possibly developed as a result of circumstances not necessarily pertinent today. To them must be charged the duty of aggressively and impartially improving our land and water facilities irrespective of how grotesque the necessary displacements may appear.

This idea was fostered several years ago by the Providence Chamber of Commerce and led to a resolution asking for just such action on the Atlantic Coast as I now suggest for our entire seaboard. The movement at that time was strongly supported by a large number of organizations, both coastal and midcontinental, the only difference that I can see being that at that time the resolution admitted that the Department of Commerce did not have jurisdiction to compel the movement of carriers to certain named ports of destination.

It seems to me that now this situation has somewhat changed. The United States has built a large merchant marine. This tonnage is governmentally owned and its direction is vested in the hands of a board created for the purpose. Possibly never again will a more fitting time offer for the correction of long-standing traffic evils; in fact, a sale of our ships and a consequent reversion to private control might at any time even intensify the evils of the present situation. A correct analysis of our commercial watersheds, and the proper enforcement of such remedies as that analysis dictated, must be nationally directed; and might do more toward establishing the United States as an international factor by the proper equalization of **traffic costs** and **time in transit** than any amount of wrangling over preferential tariffs in favor of a few established distributing centers. For the United States has passed the crest of individual pre-eminence which it enjoyed throughout the war and must now take its place as but a component part of the international trade of the world, in which we will execute our true function, or cease to exist commercially.

So late as March 10 Mr. Hoover has stated that "if we would improve our national efficiency and our foreign trade we must consider our transportation, both railway and marine, as one system directed to serve the nation." We must further consider "the development of certain trade routes through our mercantile marine as the real extension of our inland transportation." This is the new viewpoint which America must take of her possibilities for international commerce, as any other basis will result in a disjointed relation holding little hope of future success.

I appreciate that all this may appear radical and immediately suggest a myriad of questions and problems which traffic experts would be very reluctant to approach. The present web of freight rates applying throughout the country has long since become too intricate to disentangle. Many believe it indefensible, and that the only way to simplify it would lie in complete abolition and the substitution of a rate per ton mile of haul, to be determined by the cost of operation, possibly aided by a sinking fund which would from time to time liquidate such losses as certain traffic might entail. On this I would not make bold to venture an opinion; though I refuse to believe a solution to the question cannot be found if it is properly approached and analyzed. I only offer my argument herein contained as a basis for remedial discussion regarding the difficulties involved. From the standpoint of international service, a new analysis of our production, an unprejudiced definition of our commercial watersheds, and an extended authority to the commissioners whose deft touch should predetermine cargo movements at the point of origin rather than at tidewater—all of these things appear to me unavoidable if our international commerce is to grow in a truly enlightened way. Certainly are they steps in the right direction, and, if accomplished, their results would be immediately felt in world trade facilities and a basic domestic development never before achieved.

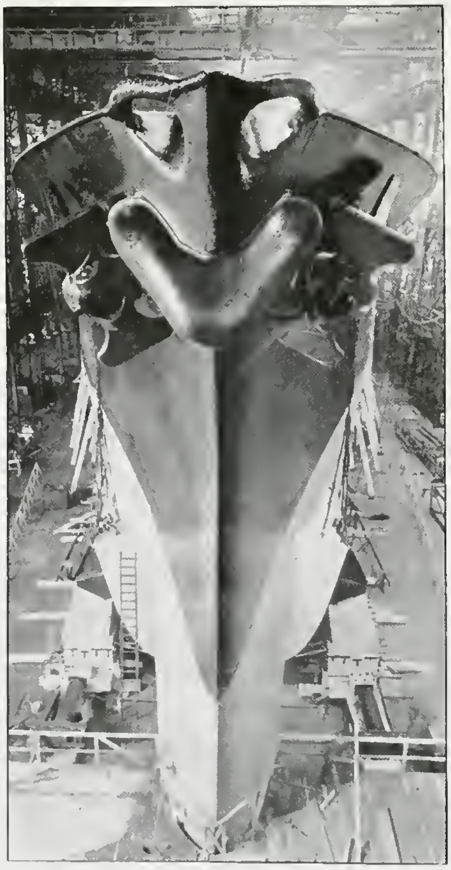
AMERICAN SHIPPING

FOR many years since the decline of the American Merchant Marine when steel steamships supplanted the wooden clipper ship, American manufacturers have been at the mercy of foreign ship owners. Hundreds of millions of dollars annually were sent out of the United States to foreign countries as freight charges, American shippers were discriminated against and were at the mercy of other maritime countries. It has been estimated the freight money paid British ships for carrying American goods more than paid for Great Britain's merchant marine engaged in foreign commerce. During all this time those interested in exporting from this country have been clamoring without result to have Congress pass such laws as would encourage the building and operating of American ships.

Suddenly, almost overnight, the United States became the possessor of the second largest merchant marine in the world, practically fulfilling the desires so long expressed. Now that this undreamed of merchant navy has been produced and an opportunity afforded American foreign commerce to expand and prosper, the very people most interested in having it maintained are not only not helping to keep it operating, but are actually helping to put it out of business by shipping their goods in foreign ships thereby driving American ships—their own ships—off the seas to be tied up and allowed to rot while foreign lines are increasing their fleets.

How long will low ocean rates exist when our ships have been driven from the sea? Will our competitors who have eliminated our delivery wagons help us in sending our goods abroad or will they try and throttle our commerce as well? So long as American ships are tied up, and not only earning nothing, but costing large sums for care taking, just so long will we have to pay taxes for that purpose and just so long as American exporters patronize foreign ships instead of "their own ships" this condition will gradually grow worse.

A MAN OF WAR



Bow of the U. S. S. Colorado taken just before launching at the yard of the New York Shipbuilding Corporation. We'll say that this new guardian of our merchant marine fleet puts up a brave front to the camera.

Copyright by New York Shipbuilding Corp.

With the inauguration of trans-Pacific services by U. S. Shipping Board vessels the carrying trade of the Pacific Ocean has been revolutionized and they mark a new era in American overseas opportunities as great as that made when steam supplanted sail. The Philippine Islands are brought closer to this country by reducing the steaming time to twenty-two days and Calcutta to thirty-nine. Acting as Managing Agents for the Shipping Board the Pacific Mail Steamship Company has installed services on the Pacific that the most optimistic never expected to see in their time. The express services operating the most modern ships afloat, equipped with every known device for both passengers and freight and making over fourteen knots an hour (equal to sixteen statute miles) ply between San Francisco and Manila direct, thence calling at Saigon, Singapore, Colombo, and Calcutta.

No European country ever offered such facilities to the Far East to their merchants and American manufacturers can no longer claim lack of shipping will deprive them of business. Whether this modern all-American system of ocean transportation is to be maintained and improved or be allowed to dwindle and fade away depends entirely upon the American merchants themselves. If they continue to patronize foreign ships operating in competition with their own, then it will not be long until they are once more at the mercy of their foreign competitors and the glory of the American flag will again practically vanish from the Pacific probably never to return. Business foresight eliminating patriotism should influence American merchants and manufacturers to "Ship American Goods in American Ships".

THE CUBAN SITUATION

A Timely Analysis of the Debacle at Havana by an Interested American Shipper

SAN FRANCISCO importers and exporters who have recently returned from Havana have brought back some interesting observations on things as they are. The composite ideas of men qualified to analyze such situations would be of interest to American shippers and steamship operators who are probably speculating as to how long a time must elapse before trading can be resumed. Suppliers at primary markets in the Orient and those of Hongkong and other rice-exporting centers may be more interested and perhaps may be brought to understand something of the situation in which American factors found themselves entangled in the Cuban trade.

International merchants of every port in America and Eastern Asia are, of course, familiar, too familiar, with the Cuban debacle.

Havana Docks Clear

The story of the congestion in Havana harbor grew most monotonous month after month and even more monotonous was the reiterated story of repudiation of contracts. These tales need not be repeated. In the present situation, however, in terms of American analysis of the causes of the breakdown, there may be points of interest to both the American and the Oriental merchants.

Conditions of Havana harbor today may be described as normal. At any rate, the docks are clear.

During the terrible congestion which came in the second quarter of last year a commission was dispatched from the United States Department of Commerce to serve in an advisory capacity with the Cuban customs authorities, and a plan was evolved to transfer the merchandise from the docks to an open tract ten acres in extent in the heart of Havana, the old Spanish cemetery.

The new year found this plot piled twenty feet high in places with merchandise that had been abandoned on the docks for the account of American and other exporters. Shortly after the turn of the year Cuban customs ordered the sale of this merchandise in order that they might realize the amount of duties and imposts and in the amazingly short period of thirty days the merchandise in this ten-acre tract was completely cleaned up and the losses to the American exporter are said to have become actual to a sum in excess of $30,000,000, whereas the original importers must be regarded as having bought at these forced sales some of their original importations at the rate of a few cents on the dollar. The incident of closing out American merchandise in the old cemetery, therefore, seems most appropriate.

Stocks Sufficient for Months

Textiles, shoes, foodstuffs and so on through a long list of commodities, have been placed in stock in sufficient volume to last for many months. Stocks of canned goods are very great, although they appear to have deteriorated badly on account of exposure. The stocks of repudiated rice have not even at this late date been anywhere near absorption. Not for eight months, or perhaps longer, will Cuba be a potential market of any consequence. The supply on hand probably exceeds 500,000 bags, which, at the rate of greatest recent average consumption, is sufficient for more than four to five months, basen on most recent calculations. This quantity is sufficient for a much greater period, however, because consumption of rice appears to have declined considerably, due to the use of other cereals, especially wheat flour.

Although the stocks above referred to were purchased in the Orient at about twelve cents, they are being sold in Havana in keeping with primary market price (that is, Hongkong or Saigon) quotations of today, plus handling charges.

In order to facilitate measures adopted for the absorption of these stocks of rice a decree has been promulgated, succeeding the former decree and practically imposing another, which forbids the importation of new crop rice until 80 per cent of the imports of last year have been passed into distributing channels. This new decree became effective on April 1, and is to operate on the principles that the island is entitled to two months rations during the period of transit from primary market to Cuba, 20 per cent of the present stocks being sufficient to last for the period the new grain will be in transit.

No Profiteering Involved

The Hongkong and Saigon merchants will understand from what has been said that there is no question of profiteering involved, but that the rice is being sold at such low prices and naturally must be absorbed before any additional shipments can find a proper market. Those same exporters probably do not yet weigh the factors that made the situation of the American business men extremely difficult. It would appear that the Cuban merchant does not regard the contract as does the Anglo-Saxon. Whereas the latter expects to pay, or, in default of payment, would be compelled to pay, the attitude of the Cuban is that a repudiation is the logical course to pursue in a falling market. It would appear such has been the practice of conduct of business in Cuba, so that the extension of the principle of repudiation to foreign trade was perhaps to have been expected.

Referring back to the article in the November issue of Pacific Marine Review, the Hongkong Telegraph re-asserted its statement that American companies had repudiated on some rice contracts involving purchases from Hongkong merchants. A special inquiry was made and the following facts determined and disclosed conditions that were not particularly complimentary to the Hongkong merchant whose cause the Hongkong Telegraph espoused, though it may be said, in justice, that this merchant is not British.

The True Story

The facts are that the Hongkong exporter contracted to ship a large quantity of rice to Cuba on April/May loading. Instead of loading during April, however, he delayed shipment for the latter part of May. The vessel an which he had contracted the freight failed to arrive during May; in fact, she missed arrival in port five days, let us say, June 5. Notwithstanding this fact, the Hongkong seller somehow procured bills of lading with "preferred dating" and drew against the buyer's letter of credit. Most naturally, when these facts were revealed to the buyer, that the vessel had arrived in harbor five days after the time of shipment provided for in the contract had expired, the American factor refused acceptance on the bills arising under this credit. He most certainly was well within his rights legally and anyone must be bold indeed who would care to defend the conduct of any merchant who would resort to such means to value on a letter of credit.

If, as appears, this case is that on which the Hongkong charge against San Francisco has been built, then the discussion might as well end now.

Island Mad With Wealth

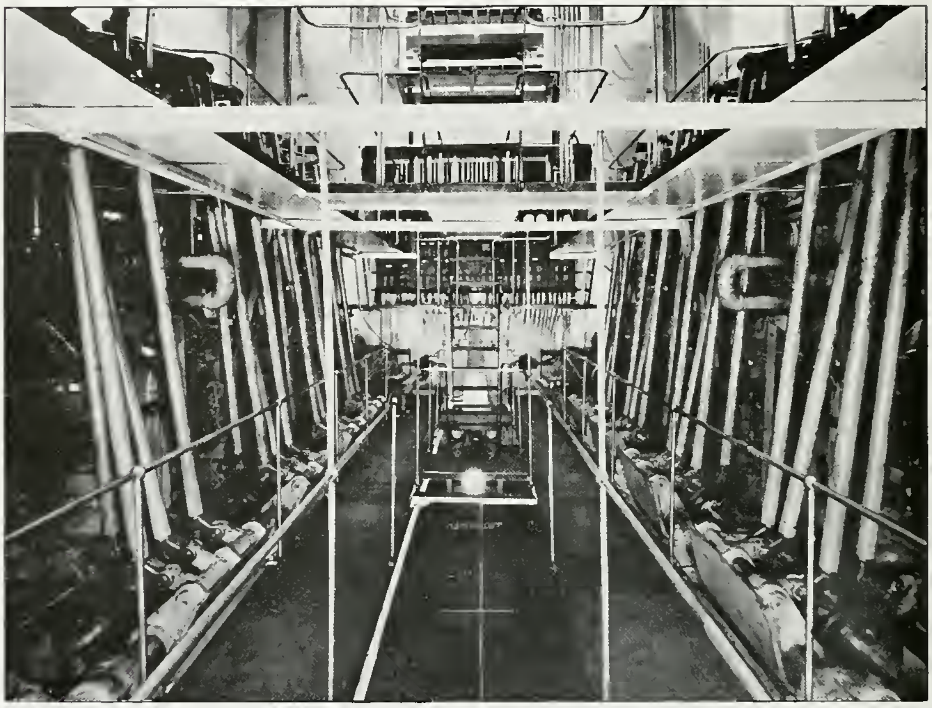
Aside from this, the Oriental merchant doubtless may learn to his own advantage and to the increase of his understanding of the troubles of the American factor of the fundamentals of the Cuban situation. They are to conceive of a community gone mad with wealth, which almost literally rolled in money, which waved away buyers of sugar while it demanded the unprecedented price of 24 cents a pound, suddenly confronted with the fact that the United States had swept the markets of the world and had accumulated such a surplus by importations of Java and Central American canes, that Cuba could be left out of account. Sugar stocks fell and the banks that had lent open-handedly on sugar lands discovered that assets were more than cut in two; repudiations became the rule; moratoriums followed inevitably. The merchant who bore the brunt and suffered more by far was not the Hangkong or Saigon exporter, nor the Cuban importer, but was the American principal who had purchased and delivered his merchandise but was unable to collect his bills on delivery. Nor was the American merchant guilty of wild speculation or profiteering, and it may be stated on good authority in connection with the rice business that all reputable houses have heretofore contracted their business in such manner as to realize a profit of but 2½ per cent, and of the 1920 deliveries of this grain to Cuba 90 per cent of the rice shipped had been contracted for by the Cuban merchants themselves.

Work Out Own Salvation

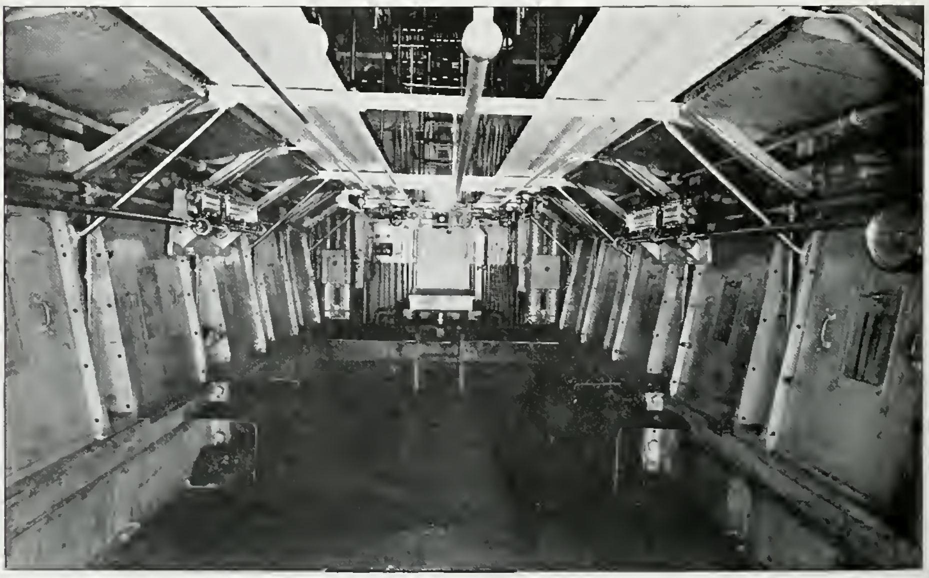
In November of last year a suggestion was made to Secretary of State Colby, and apparently approved by him, that a recommendation be made to the Cuban government that they induct a grain administration such as existed in the United States during the war period, to take over the rejected stocks of rice and engage the distribution of same. The plan was evolved for the protection of American factors, dealers and their bankers and carried with it a direct offer to underwrite a bond issue that would more than cover the amount involved and would permit the Cuban government, by judicious use of these funds with the period of the bond issue, to restore the international credit of Cuba, which obviously must suffer through wholesale repudiations of many importing merchants. This plan, however, was not approved by Under Secretary Davis during the absence of Secretary Colby in South America. American factors, therefore, are working out their salvation to the best of their ability, and are not proposing to measure the actual losses in the year's trading but are giving their fullest support by having their own personal representatives on the ground to hasten the liquidation of distressed stocks of merchandise in an over-flooded market.

Endless and almost insurmountable difficulties have been encountered in dispatching merchandise and in getting the congestion unscrambled. Many disquieting hints of collusion of unscrupulous officials and dishonest merchants are said to have subscribed to further and unnecessary losses. For reason of these circumstances, it has been urged American merchants who were not on the part of some that the American government should, on behalf of the given proper protection abroad, endeavor to collect an indemnity to cover and to reimburse them for such losses as may be proved to have been sustained by failure of the courts to properly function, and the ensuing delay caused deterioration to some semi-perishable foodstuffs. The amount involved is said to be in the neighborhood of $30,000,000.

The recent failure of the government depository, the Banco Nacional, serves further to discredit the financial stability of Cuba and further dishearten the merchant who may be anticipating the return of this market, but regarding business as a continuous performance and realizing that the day of adjustment cannot be inevitably postponed, this situation of today doubtless will be entirely remedied within the year.

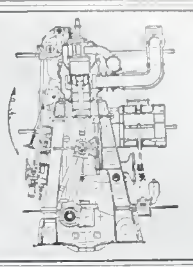


View along the middle platform of the engine room of the motorship Kennecott showing cameshaft and valve push rods of the McIntosh & Seymour engines and looking forward to the electric switchboard and the storage batteries above.



View looking forward on the lower platform amidships of the Kennecott's engine room showing wide free aisle space. Note Richardson-Phenix cylinder lubricating oil pumps.

Oil Engines and Motorships



THE KENNECOTT

An American Motor Freighter

THE maiden voyage of the Alaska Steamship Company's motorship Kennecott adds another link to the chain of evidence proving the reliability and superior economy of Diesel motorships.

The Kennecott is a first-class freighter built on the Isherwood longitudinal system of construction to A-1 classification at the Tacoma plant of the Todd Dry Dock & Construction Corporation. She is 360 feet over-all, 49 feet 6 inches beam, and 22 feet loaded draft. Her engine room is located amidships, power being supplied by twin McIntosh & Seymour six-cylinder directly reversible full Diesel marine oil engines of 1200 I. H. P. each, driving twin screws at 140 R. P. M. All engine room auxiliaries and deck machinery are electrically operated with energy generated by two 75 kilowatt General Electric generators driven by two-cylinder 100-horsepower McIntosh & Seymour full Diesel engines. The air compressors on each auxiliary engine are connected into a compressed air bus-line which can be used to fill the maneuvering bottles or supply the injection air so that with one auxiliary generating set in operation, air for starting can be obtained in a few minutes.

This article is written for the purpose of setting forth a few of the outstanding features of the performance of the motorship Kennecott on her first voyage after delivery to the Alaska Steamship Company by the Todd Dry Dock & Construction Corporation. It is not intended here to present any full detailed description of the ship or of her propelling machinery. We shall in the very near future have an article for that purpose illustrated with plans and arrangement of machinery, all prepared by a competent authority.

Over Twelve Knots on Trial

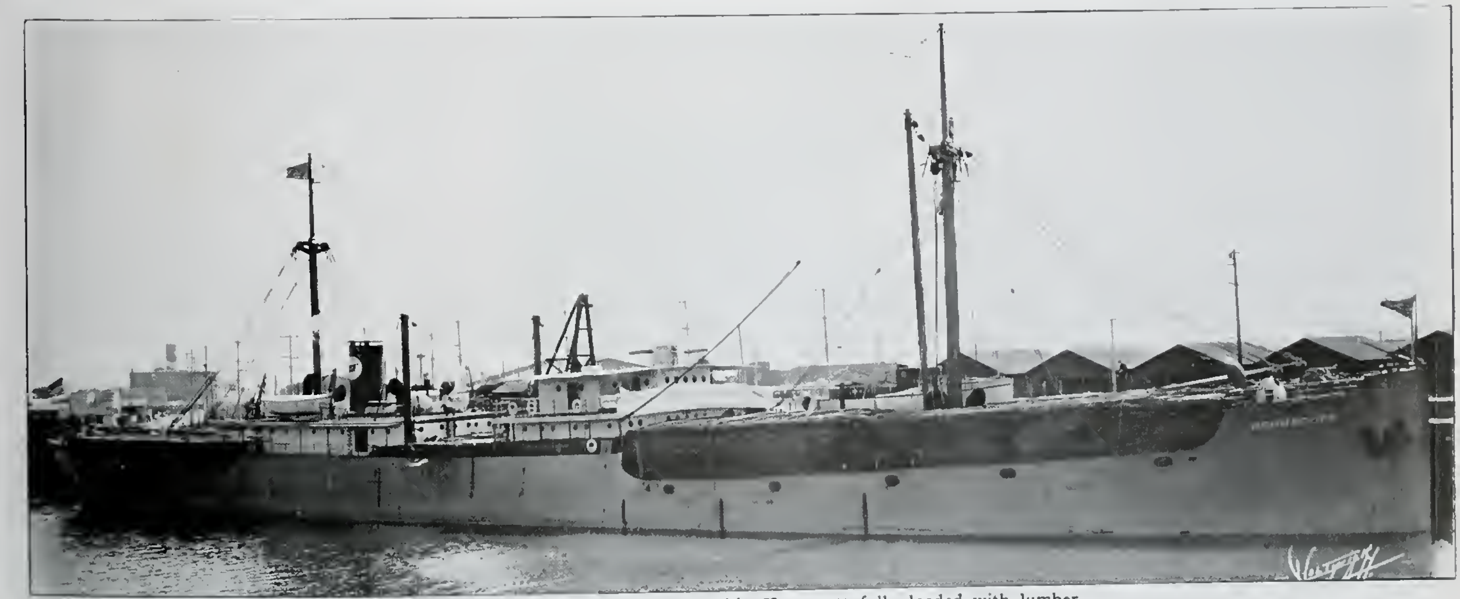
The Kennecott on her official trials easily made 12.8 knots an hour, although contract called for only 11 knots. On her delivery she was loaded with lumber for San Pedro, and we may assume that she took at least 6500 tons deadweight, as her Plimsoll mark was well under water. On the first full day's steaming she logged 292 knots, or an average of better than 12 an hour, on 65 barrels of fuel, using 16 degree Baume oil of the same grade that the Alaska Steamship Company burns under the boilers of its steamers. This oil in the Kennecott is heated to 120 degrees before injection. The heat for this purpose is generated in steam coils by the exhaust gases from the main and auxiliary engines as they pass through the silencers.

572 Ton-Miles per Gallon

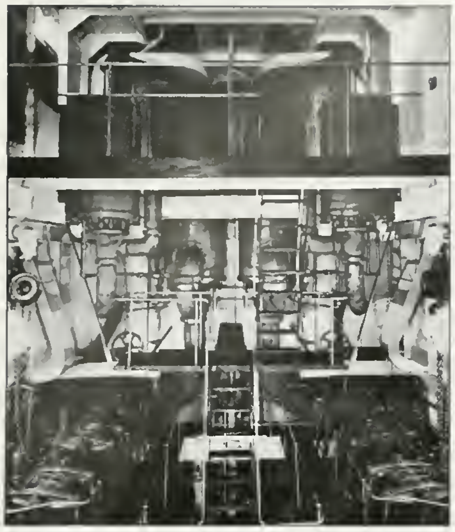
Now, Mr. Steamship Operator, get out your pencil and pad and do some figuring on that data. Sixty-five hundred tons of cargo carried 292 miles on 65 barrels of 16 degree Baume oil at present prices on this coast will give an exceedingly low fuel cost per ton mile. To put it on the ordinary auto truck basis, the Kennecott gets out of her engines 572 ton-miles per gallon of crude oil. True, this day's run was in calm weather. The next day against strong head winds with a high deck load she averaged 10½ knots on about the same consumption of 65 barrels.

Maneuvering Qualities

The engine had been well tested for maneuvering qualities on the trials in Puget Sound, but at San Pedro in the Los Angeles inner harbor a real test awaited. Chief Engineer M. C. Searles,



Alaska Steamship Company's motorship Kennecott fully loaded with lumber



View of the after end of the engine room from the upper platform, showing the cylinder heads of the main engine and silencers.

an experienced steam man, told the writer that they received in the engine room fifty-seven bells in fifty-four minutes, and the engine responded without a slip to each and every call and with greater ease than any steam engine installation he had ever handled. The same testimony comes from Captain H. A. Hyde, who acted as pilot for the Kennecott when she called at San Francisco on the return trip to the Sound. Captain Hyde has handled steamers for twenty years and was at first a little nervous about the motorship, but he declares the Kennecott handles more easily than any steamer, especially in reversing. While at San Francisco the Kennecott ran up to the inner dock at Point Orient to load asphalt, and Captain Hyde had no trouble on an ebb tide in making the landing. This is considered one of the most difficult places in the harbor.

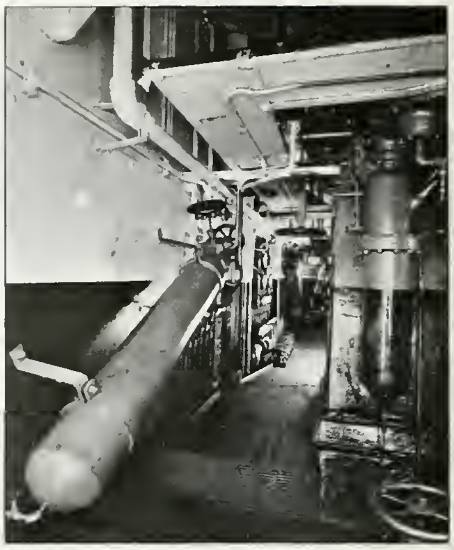
Cargo Handling

The stevedoring companies who handled the cargoes of the Kennecott, both at San Pedro and at San Francisco, are also enthusiastic over her "large hatches, free, open 'tween deck and hold spaces, and electric cargo winches." These latter were manufactured by Allan Cunningham Company of Seattle, as were the electric capstans and the electric windlass. At San Pedro she discharged 3,500,000 feet of lumber from four hatches in 73½ hours.

The design and arrangement both of the hull construction and the machinery lend themselves to quick discharge and loading. The diversified load factor and the Diesel driven generating sets make for economy. Chief Engineer Searles told the writer that they worked all four cargo hatches (eight winches) for 15 hours at San Pedro and provided power for the ship's lights and for all the standby pumps and other auxiliaries on four barrels of oil per 24 hours. Get your pencil out again, Mr. Operator, and figure your oil consumption for that kind of service on a steam job, then add your standby consumption on the main boilers, and then do some Diesel thinking.

"Wonderful Engine-room"

Many shipping men visited the Kennecott during her stay in San Francisco harbor, and the universal judgment was, "a fine job." Of her engine-room this was particularly true. The trim, neat outlines of the main propelling units, the free open platform spaces, and the cleanly appearance of the whole installation brought out much favorable comment. The pictures reproduced herewith give a better idea of these features than could any description.



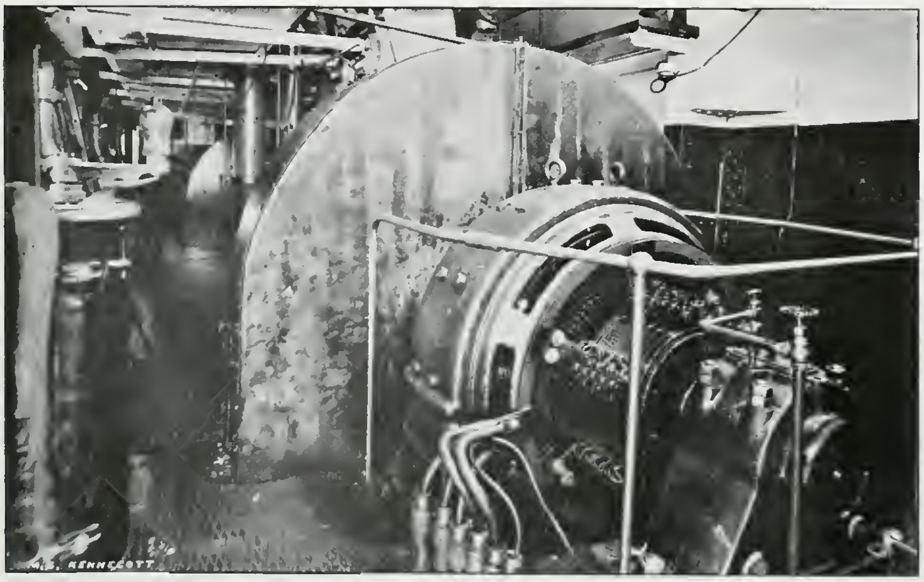
View of cross aisle, lower platform, forward end of Kennecott's engine room.

Spare liners, spare pistons, spare valves, seats and cages, and other engine spares are carried in abundance. A machine shop equipped with lathe, drill press, emery wheel and many small tools, is provided. The switchboard gives convenient control of circuits for lighting and for all the auxiliaries. A special feature noted in the electric wiring arrangement is the provision of junction boxes at convenient points port and starboard wired to the switchboard bus so that shore power can be plugged in for lighting or auxiliaries if for any reason it is desirable to completely shut down the engine-room.

Steam on Defensive

The opponents of the Diesel engine in marine propulsion have never been able to advance any real arguments against the superior fuel economy of the Diesel motorship. They have confined themselves largely to promoting the idea that Diesel engines were not reliable under the stress of emergency and not to be depended upon for maneuvering qualities. American marine engineers have been particularly active in advancing this theory. Notwithstanding the splendid records which have for years been made by large ocean-going motorships from Europe which have been coming into our harbors.

Now, here is a steel motorship built on the Pacific Coast by shipbuilders who had never previously turned out a Diesel-engined vessel, and immediately after the trial she loads cargo and goes about her business, dispatches and loads again, and obeys every signal to the engine room in maneuvering under very adverse conditions without the slightest difficulty and with a saving in fuel in comparison with any steamship which would mean in ordinary operation the difference between profit and loss. It does seem to us that the burden of proof has been shifted and now lies against the steamship to prove its excuse for existence under present operating conditions.



View loking forward on starboard side engine room motorship Kennecott, showing the two McIntosh & Seymour 100 B. H. P. Diesel engines driving 75 K. W. generators

MOTOR SHIPBUILDING IN EUROPE

These notes, gathered for Pacific Marine Review in London by an exclusive correspondent, show the tremendous activity in motor shipbuilding, both in Great Britain and on the Continent, particularly with reference to special freight vessels of the highest class, and more recently extending to passenger service.

It is probable that more interest is being taken in Europe in the development of the Camellaird-Fullagar oil engine than in any other type. Certainly, this design appears to have met with the approval of some of the leading shipbuilding and engineering concerns in the world, which is remarkable in view of the fact that no engines over 500 b. h. p. have hitherto been constructed. It is interesting to learn that John Brown & Company, the famous Clyde shipbuilding firm, is now constructing its first Camellaird-Fullagar engine, which will be a six-cylinder unit of 2500 b. h. p. Prolonged experiments will be carried out in the shops and if these are successful it is the intention of the builders to proceed with much larger sizes suitable for intermediate liners, after which the problem of constructing engines for large and fast trans-Atlantic liners will be approached.

Engineers are of course aware of the principle of operation of this unusual engine with its opposed piston and cross connected crossheads, for which the claim is made that the space occupied, the weight and the cost, are very much lower than with any other design. As a proof of this it may be mentioned that the 2500 b. h. p. six-cylinder engine will have a cylinder diameter of 22 inches and a stroke of 33 inches, whereas the 3200 i. h. p. four-cycle set as standardized by Harland & Wolff and Burmeister & Wain, which develops approximately the same brake horsepower, has eight cylinders nearly 30 inches in diameter. Another comparison may be given in connection with stationary engines, for the Camellaird type has been taken up for this purpose by the English Electric Company, one of the largest mechanical and electrical engineering firms in Europe. The first engine which this concern is building at Willans & Robinsons' works at Rugby is a 750-horsepower six-cylinder type weighing fifty tons. A corresponding four-cycle engine of any standard design weighs approximately eighty-five tons. Admittedly, the cost is not directly proportional to the weight, but it bears some relation to it, and it may be anticipated that the selling price of Camellaird-Fullagar engines will in due course be considerably lower than the four-cycle type.

Among the many other licenses which have recently been taken out for this engine is that of the Kawasaki Dockyard in Japan, another in France, a third in Belgium, while D. Rowan & Company, Ltd., are now building their first 1500 b. h. p. six-cylinder set in their works on the Clyde. Moreover, a representative of Cammell Laird's is now in America, or will shortly be there, with the object of disposing of the rights to manufacture the engine in the United States.

Double-Acting Diesel Engines

It is evident that we have not heard the last of double-acting Diesel machinery and many engineers pin their faith to this design. It is known that in Germany Blohm & Voss, who were responsible for the only double-acting Diesel motorship afloat (now being run by the Ellerman Line in the Mediterranean), are concentrating their activities upon the manufacture of an improved double-acting Diesel engine somewhat similar in design to those installed in the vessel in question. As is well known, one of the difficulties in the construction of double-acting Diesel engines is that two fuel valves are necessary at the bottom of the cylinder in order to get even distribution of fuel, since the piston rod prevents a centrally placed fuel valve being fitted. In order to overcome this fault, Blohm & Voss have now devised an arrangement by which two piston rods are utilized, thus allowing the fuel valve to be placed between them, exactly in the center of the cover. They have also improved the lubricating arrangements which were defective on the first engine, while it is stated that the fuel consumption, which in the old type is not below 0.5 pound per b. h. p. hour, has been somewhat reduced.

It would seem that Germany is about to make a fresh bid for pre-eminence in marine internal combustion engine construction, for the well-known A. E. G. Company in Berlin, in conjunction with its large shipyard at Hamburg, is now producing standard motorships in which engines of the Burmeister & Wain type are being fitted. It is understood that under the arrangements which the German government has made with ship owners, a series of twelve twin-screw standard vessels with machinery of about 2500 horsepower will be built, and owing to the present relatively low labor cost in Germany it is anticipated that these ships will be produced at a very much lower figure than is possible in other countries.

More 13,000-ton Ships

In spite of the shipbuilding depression in Europe a number of motorships have recently been launched, including two 13,000-ton vessels, forming part of the program of six similar craft for the East Asiatic Company. These are the Java and Malaya, both 445 feet in length and equipped with Burmeister & Wain machinery of 4500 i. h. p. on twin screws, giving a speed at sea of twelve knots. From a comparison with the sister ship, the Afrika, which has now been in service nearly a year, it would appear that the fuel consumption is in the neighborhood of twelve tons daily. These two vessels are of course being built in Scandinavia, where two more standard ships have just been completed, namely, the Formosa and Canada. The former has been built by Burmeister & Wain for the Swedish East Asiatic Company—their first motor vessel—and the latter by Gotaverken at Gothenburg for the North Star Company (Johnson Line) of Stockholm, representing the tenth motor vessel owned by this concern. Curiously enough, as showing the ad-

Swedish East Asiatic Company's new 10,000 deadweight ton motorship Formosa

Motorship Canada of the Johnson Line for general trade between San Francisco and Scandinavian ports

vanced degree of standardization which is now being carried out, these ships, although for different owners and built by different firms, are practically identical in every respect, being fitted with machinery of the same type, while the hulls are of the same dimensions. Since they form such a successful class, a few of the details will be of interest to American shipowners. They are approximately 425 feet between the perpendiculars, with a beam of 55 feet, a depth to the awning deck of 38 feet 6 inches, and they have a gross tonnage of 7032, the deadweight carrying capacity being about 10,000 tons.

The machinery installation consists of two 1550 b. h. p. Burmeister & Wain engines developing their power at 115 r. p. m. and having cylinders 630 millimeters in diameter and 960 millimeter stroke. The fuel consumption of the ship is 10 tons per day when maintaining a speed of 11½ knots fully laden. At least a dozen vessels similar to the Canada and the Formosa are now under construction in Scandinavia.

The Motorship Malia

The launch of the motorship Malia marks a new stage in the development of internal combustion engined vessels. She is a 5800-ton craft built for T. & J. Brocklebank for service to the East, having a length of 350 feet and a beam of 50 feet. The main feature of interest lies in the machinery, which comprises a couple of the new Camellaird-Fullagar engines, the first to be installed in a large ocean-going ship. It is, however, somewhat unfortunate that the owners have changed their original plan of fitting two sets of 1000 b. h. p. in this vessel and have instead adopted a couple of engines of 500 b. h. p. each, which will at most only give the vessel a speed of 9½ knots. These motors are four-cylinder sets and will no doubt give perfectly satisfactory results, but engineers are awaiting experience with larger motors of this type. It is said, with some justice, that while almost any type of oil engine can be built without difficulty up to, say, 500 horsepower, defects are only seen when manufactured in much larger sizes. The two sets of 1000 b. h. p. which were originally intended for installation in the Malia are now under construction in Cammell Laird's works and will shortly be tested. Afterwards they will be installed in a hull for the Brocklebank Line, but, owing to the present state of shipping, work has not yet started upon this new ship. It will therefore be presumably several months before the boat will be completed.

Modifications in Vickers Engine

Even the most successful engines teach the builders some lessons, and in the new Vickers motors, which are about to be installed in the motorship Seminole, some slight modifications have been made compared with the plant which was fitted last year into the oil tanker Narragansett for the Anglo-American Oil Company. It will be remembered that these engines are designed to develop 1250 b. h. p. at 118 r. p. m. and that twelve sets were ordered for installation in similar vessels. In the original engine the reversing was carried out by means of a handwheel and the reversing engine, comprising the usual compressed air and oil cylinders, was arranged on the front, giving a somewhat complicated appearance. The handwheel has now given place to a small lever and the reversing engine itself is placed under the top platform between the two groups of three cylinders so that it is not even visible. The result is that the engine has a much simpler appearance, while reversing can be carried out more quickly and can be, in fact, effected from full speed ahead to full speed astern in under ten seconds. The eight remaining engines which are being built by Vickers for installation in four 10,000-ton tankers for the British Tankers, Ltd., for the transport of oil fuel, are now well under way, and it is understood that before the end of the year all these ships will be in commission, thus providing a fleet of six similar Vickers-engined motorships, the operation of which will provide owners with sufficient data to indicate the desirability of installing Diesel machinery in vessels of this class.

The prolonged joiners' strike in the British shipyards is having an unfortunate effect upon motor vessels as well as steamers, and the completion of several interesting craft has been inordinately delayed. Among these is the motor passenger vessel Aba, which has been reconditioning in Harland & Wolff's yard for several months past. She is being converted from a pure cargo ship to a combination vessel with accommodation for a large number of passengers to trade for the Elder Dempster Line between Liverpool and the West Coast of Africa. The machinery comprises 6400-horsepower Harland & Wolff engines, which give her a speed of approximately 14 knots, so that she will represent an ideal intermediate type of passenger liner, very suitable for the trade upon which she will be engaged.

First Motor Liner Approaching Completion

The first motor liner that has been built expressly for the purpose of carrying passengers is now approaching completion on the Clyde. She is the Magvana and has been built for the British India Steam Navigation Company to carry passengers between London and Calcutta, in addition to 10,000 tons of cargo. The Magvana is the first of three sister ships and it says a good deal for the confidence of British shipowners in oil engines that the B. I. S. N. Company placed the order for the machinery of these vessels before a single engine of the type had ever been constructed. The motor is entirely new, being a four-cycle engine with eight cylinders developing 2330 i. h. p. at 96 r. p. m. Two of these engines are installed in the ship and it is anticipated that a speed of 12½ knots will be attained. Passenger accommodation is provided amidships for 150 passengers, and it is claimed that the absence of noise in the boat will render these vessels an ideal class for the ocean traveler, particularly on the Eastern run, where coaling at Suez or Port Said is one of the most unpleasant features on the voyage. The total fuel consumption will be about 13 tons per day as against 40 tons per day for an oil-fired steamer of the same size and about 60 tons for a corresponding steamer fitted with coal-fired boilers.

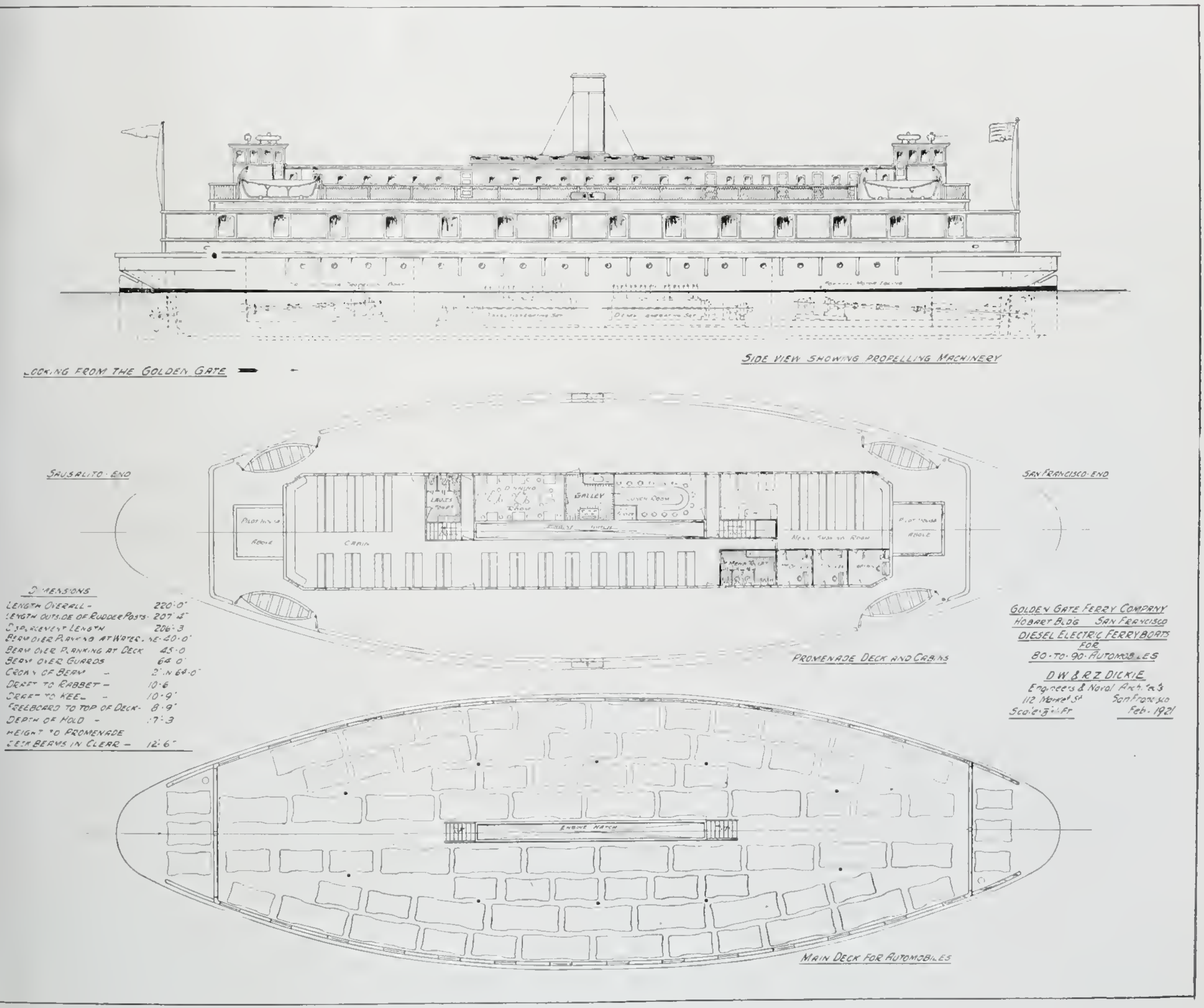
DIESEL ELECTRIC FERRIES FOR THE GOLDEN GATE FERRY COMPANY

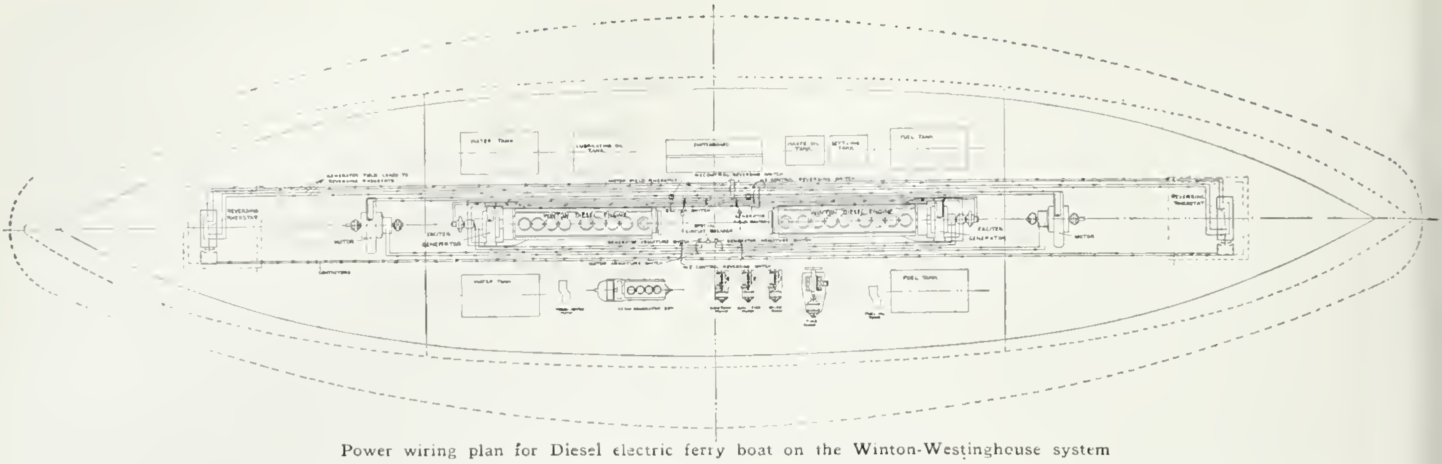
By D. W. and R. Z. DICKIE

THE ferry boats proposed for the Golden Gate Ferry Company's automobile ferry from San Francisco to Marin county present some very interesting features in that these boats are to be double-end screw propeller Diesel electric drives. The Diesel engines are to be supplied by the Winton Engine Works and the electric equipment by the Westinghouse Electric and Manufacturing Company. Mr. Frank G. Bryant, San Francisco representative of the Winton Engine Works, has convinced Mr. Harry E. Speas, president of the Golden Gate Ferry Company, that the adoption of this prime mover would effect a saving of $50,000 a year per boat in fuel alone, as compared with a steam engine-driven vessel making the same speed.

In all double-end screw propeller ferries hitherto the prime mover has been a reciprocating steam engine driving a single shaft with a propeller at each end. It has long been known that the efficiency of this form of installation is very poor, amounting in some cases to only 58 per cent of that obtained in a steamer of the same form and size with the power concentrated at one propeller at the stern. There are operating in San Francisco Bay a number of these steam-driven double-end screw propeller ferries. On one of them, the Edward T. Jeffery, operated by the Western Pacific, there was recently a demonstration of the poor efficiency of the double screw arrangement. A new propeller had to be put on at one end and through an unavoidable delay in getting the propeller the vessel was tried out on the run with only one propeller in operation. With less consumption of power, she made the trip in the same running time, but was not, of course, as efficient in maneuvering at the slip as she had been with both propellers in operation. The exact figures, as far as available, show that with both wheels in operation, one on each end, the maximum speed of 14.77 knots required 3010 I. H. P., while with the forward wheel off the speed was made with 1740 H. P. Granting that under her ordinary running conditions half the power would be delivered to each wheel, we may safely assume that the great bulk of this power is wasted in the case of the forward propeller.

The reason for this low propulsive efficiency is that the hydrostatic pressure of water on the hull of a vessel passing through rises very rapidly to a maximum at a point about five per cent of the vessel's length aft of the


LOOKING FROM THE GOLDEN GATE
SIDE VIEW SHOWING PROPELLING MACHINERY
SAUSALITO END
SAN FRANCISCO END
PILOT HOUSE ABOVE
CABIN
LADIES TOILET
DINING ROOM
GALLEY
LUNCH ROOM
MENS SMOKING ROOM
PILOT HOUSE ABOVE
PROMENADE DECK AND CABINS
DIMENSIONS
LENGTH OVERALL - 220'0"
LENGTH OUTSIDE OF RUDDER POSTS - 207' 4"
DISPLACEMENT LENGTH 206'3
BEAM OVER PLANKING AT WATER LINE - 40'0"
BEAM OVER PLANKING AT DECK 45'0
BEAM OVER GUARDS 64' 0"
CROWN OF BEAM - 2" IN 64'0"
DRAFT TO RABBET - 10'6
DRAFT TO KEEL - 10'9"
FREEBOARD TO TOP OF DECK - 8'9"
DEPTH OF HOLD - 17'3
HEIGHT TO PROMENADE DECK BEAMS IN CLEAR - 12'6"
GOLDEN GATE FERRY COMPANY
HOBART BLDG SAN FRANCISCO
DIESEL ELECTRIC FERRYBOATS
FOR
80-TO-90-AUTOMOBILES
D W & R Z DICKIE
Engineers & Naval Architects
112 Market St San Francisco
Scale
Feb. 1921
ENGINE HATCH
MAIN DECK FOR AUTOMOBILES



Power wiring plan for Diesel electric ferry boat on the Winton-Westinghouse system

bow. This pressure then falls to a minimum at a point amidships, depending upon the shape of the vessel, and rises again to a maxmum at the stern. A propeller forward exerting a powerful pressure upon the water stream augments this hydrostatic pressure at the bow and increases the resistance of the water to the passage of the hull so that energy put into a propeller at this point is very largely lost. It was, therefore, decided in designing the power plants of the ferries for the Golden Gate Ferry Company to arrange the electric control with an independent motor for each propeller so that a very large proportion of the power could be delivered to that propeller whose stream would be in the wake of the ship and only enough delivered to the other propeller to turn it over sufficiently to eliminate skin friction.

The dimensions of the Golden Gate ferries are to be:

Length over all	220 feet 0 inches
Length outside of rudder posts	207 feet 4 inches
Displacement length	206 feet 3 inches
Beam over planking at water line	40 feet 0 inches
Beam over planking at deck	45 feet 0 inches
Beam over guards	64 feet 0 inches
Crown of beam	12 inches
Draft to rabbet	10 feet 6 inches
Draft to keel	10 feet 9 inches
Freeboard to top of deck at guard	8 feet 9 inches
Depth of hold	17 feet 3 inches
Height to promenade deck beams in clear to meet Motor Vehicle Act	12 feet 6 inches
Displacement, approximately	910 tons.

Calculating speed and horse power on a basis of propulsive effort for this hull with a suitable propeller, we arrive at the following table:

Knots Speed	Horse Power
9	411.5
10	558.0
11	736.1
12	931.0
13	1179.0
14	1465.0

Deciding upon 11 knots as a suitable speed, two Winton-Westinghouse Diesel electric generator units would be necessary, giving an available S. H. P. of 821. Theoretical calculations show that with the propeller chosen 58 H. P. would be necessary to turn the wheel over sufficiently to eliminate the surface friction. Allowing 71 H. P., which would be a 22.4 per cent increase and woud take care of all additional surface friction which might be present due to roughness of surface of the propeller blades and hub, we would have available 750 H. P. for propelling the boat with one propeller.

Electrical Features

The electrical features of the installation on these ferries are very simple and yet very ingenious. The generators are 250 volt, separately excited machines, with their armature current flowing in a closed circuit from the armatures of the two generators in series to the armatures of the two motors in parallel. Separate exciters are mounted on the ends of the generator shafts. These are compound wound for 125 volt, direct current, constant potential, one exciter having a capacity for carrying the entire load of the fields of both generators and both motors.

The main driving motors are shunt wound, and the excitation of their fields is governed by a rheostat operated by a contactor controller in such a way that the speed of the motor can be adjusted and set at any rate desired. Speed control of the installation is governed by the excitation of the fields of the generators, the field circuit being extended to rheostats under the pilot house floor, the varying resistances of these rheostats being introduced by a controller operated by the navigator of the vessel in the pilot house, so that the vessel may be carried through any maneuvers from full speed ahead to full speed astern by direct electrical control of the driving motors from the pilot house.

The astern action is attained by reversing the field current so that 750 H. P. would be delivered to the forward propeller in the reverse direction and 71 H. P. to the aft propeller. A separate unit of 35 K. W. capacity supplies power for operating the lights and pumps of the vessel. In case of emergency this separate unit may be used for excitation.

The economy in fuel and the saving of power to be gained by this method of propulsion in double-end screw propeller boats and the absolute control of the power plant from the pilot house will be watched by marine engineers with considerable interest.

ELECTRIC DECK MACHINERY

IN films recently displayed by the International News Service are shown several scenes on the decks of the new intermediate Cunard passenger liners. These ships are fitted with electrical deck machinery, and it certainly would seem to be a great asset to the general appearance and convenience of the deck spaces of passenger vessels to have the steam piping and the ugly outlines of the old-fashioned steam winch eliminated.

In some of these pictures young ladies in white dresses are shown using the electric winches as lounging seats, and the deck is as clean as the best promenade on first-class liners.

BETHLEHEM-FREAR COMBINATION STEAMERS FOR COAL AND ORE

In connection with the description and illustrations of the T. S. S. Marore and T. S. S. Steelore, 20,500-ton deadweight Bethlehem-Frear combination ore and oil steamers, published in the last issue, attention was called to the fact that the Bethlehem Shipbuilding Corporation was constructing four steamers of this type which were similar in all respects except very minor modifications in the quarters aft on account of these vessels being fitted with twin turbine reduction gears, in lieu of twin triple expansion engines as installed on the first two. It was also stated that of the six combination ore steamers under construction by the Bethlehem Company, the last two—namely, the Chilore and Lebore—were combination ore and coal carriers and that a description of the special features connected with their design would follow at an early date.

These two later vessels will be built at the Union plant of the Bethlehem Shipbuilding Corporation at San Francisco and, like their predecessors, will be constructed on the longitudinal system of framing as indicated on the midship section. With the exception of the design and construction of the holes, ballast and fuel tanks, cubic capacities, tonnage measurements, and slight increase in deadweight due to about 100 tons less steel, omission of steam heating coils, and reduced pumping capacity, etc., the description of the Marore and Steelore applies to these vessels and should be referred to if the reader desires a complete description of the quarters, decks, hatches, cargo handling gear, deck and propelling machinery, etc.

Although the holds and tanks are of special design and construction, they are distributed over the same length of the vessel, thereby permitting the two ends to correspond exactly with those of the earlier vessels in details of construction. This resulted in great advantage, as many of the plans were thus common to both types of vessels.

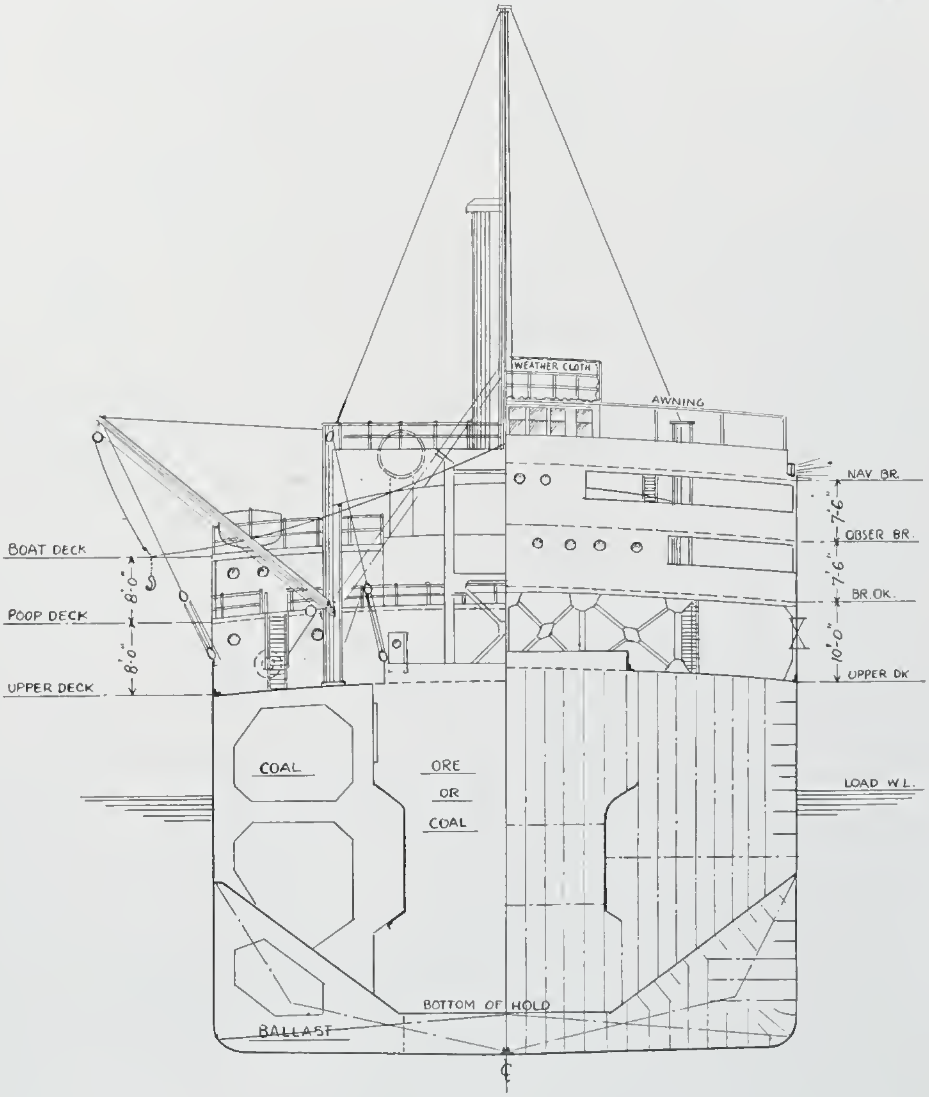
These vessels also are to operate between New York or Baltimore and Cruz Grande, Chile, via the Panama Canal, but will carry coal south and iron ore north. In order to insure the greatest commercial success, it was necessary to evolve a design which would not only provide for a full deadweight cargo of either ore or coal, due consideration being given to the proper stowage of such a large tonnage of ore in an ocean-going steamer, but would permit of the quickest possible tourn-around. To accomplish this, it was of prime importance that all of the ore and coal be loaded and discharged through the same hatches, that while loading both kinds of cargo be self-trimming, that during discharge the cargo carried in the wings would automatically trim to the center under the hatches, that the dense ore cargo would not only be distributed over the greatest possible length of the vessel to reduce the sagging stresses, but so stowed that its center of gravity would be as high as possible to minimize the rolling stresses.

Reference to the midship section and diagrams will perhaps convey a clearer idea than a lengthy description of how these various features were combined to produce what it is believed will prove an ideal combination ore and coal steamer. It will be noted that there are two fore and aft trimming bulkheads spaced so that there is a central ore hold 26 feet wide. The trimming bulkheads extend the full length of the cargo holds so that the ore can both bedistributed over the greatest possible length and also be so confined transversely that its center of gravity will be at a suitable height. Attention is also called to the deep, continuous openings at both the top and bottom of the trimming bulkheads. These openings, in connection with the sloping wing tanks at the bottom, not only allow the coal cargo during loading to freely flow over the top into the wings but also to trim to the center during the operation of discharging.

The trimming bulkheads are very substantially constructed and supported. In fact, they are sufficiently strong to support the full weight of ore cargo on a 90 degree angle of heel, which, it is needless to say, could not be experienced.

The cargo holds are subdivided into five compartments by water-tight transverse bulkheads.

The question of repairs incident to carrying ore improperly stowed both on the Great Lakes and on ocean voyages was given much thought in the design



Half midship section looking aft to poop front and half section at bridge front looking aft—Bethlehem-Frear combination coal and ore steamer

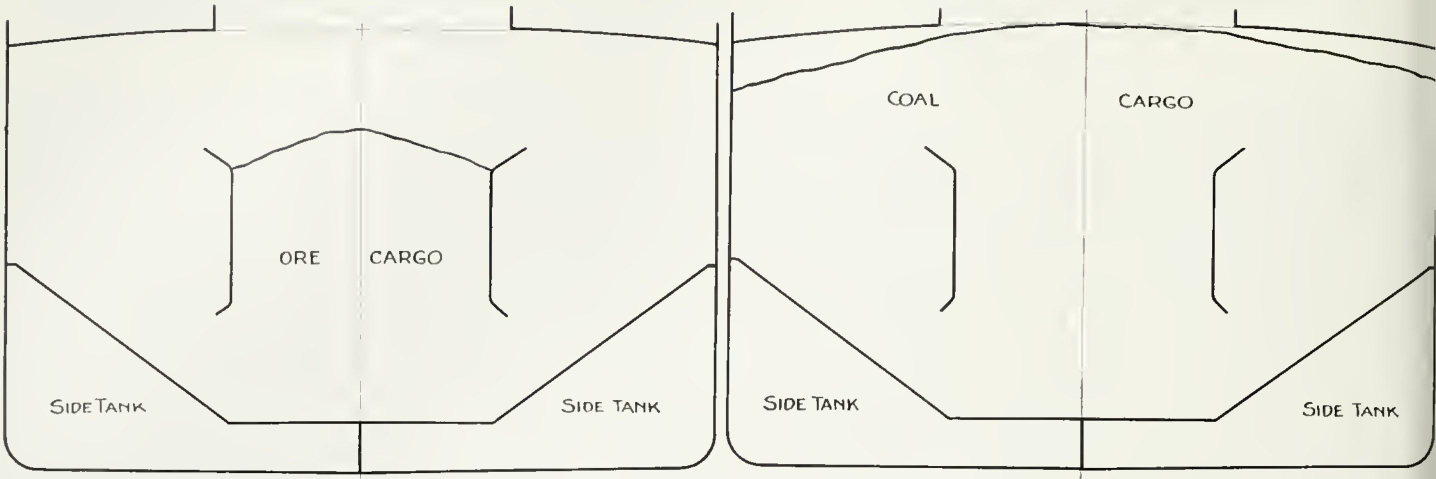
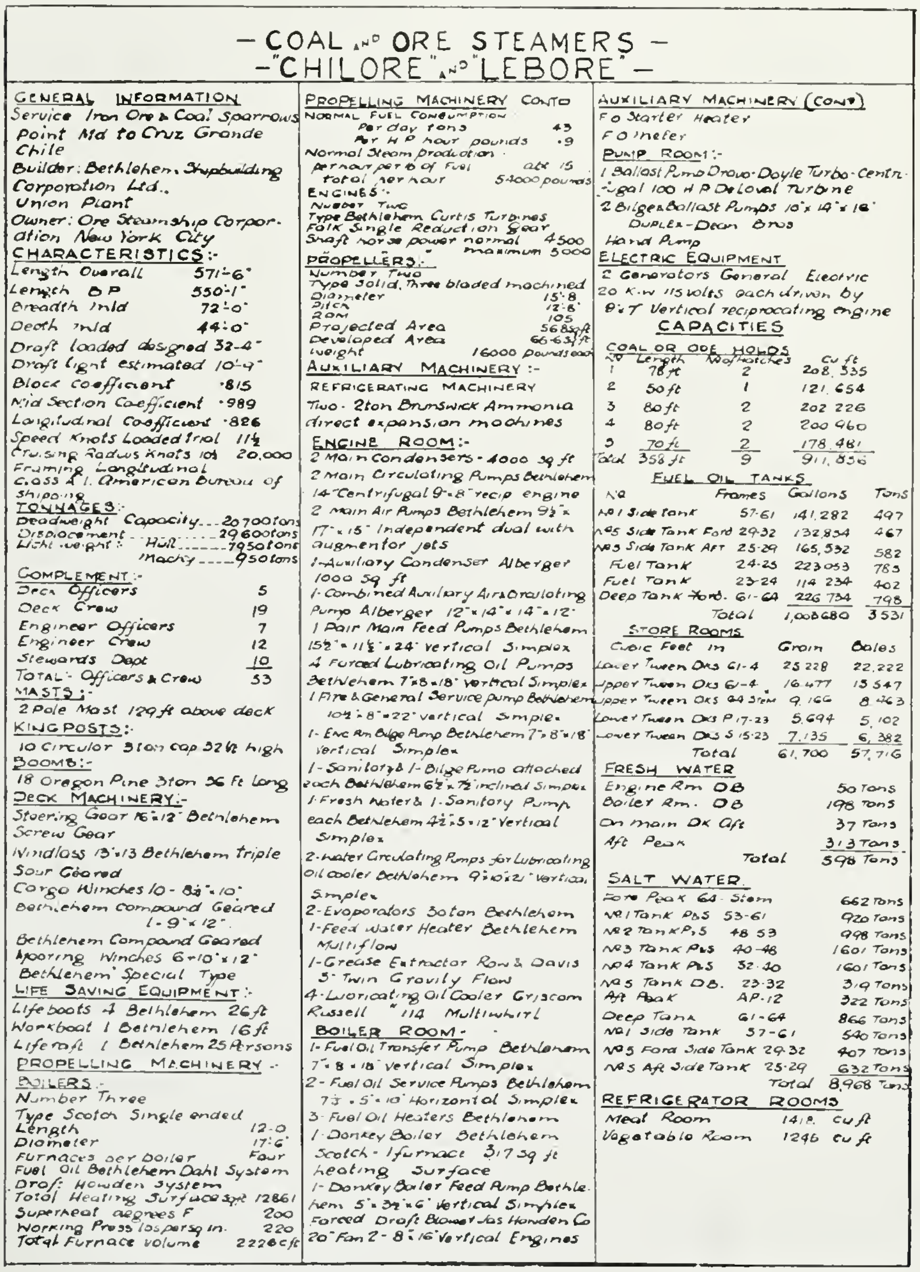


Diagram showing arrangement of cargo in hull, ore at left, coal at right

of both the ore-oil steamers and the ore-coal steamers. Many vessels carrying rails, pig iron and similar cargoes have met with serious damage on account of a reasonable proportion of the heavy cargo not being distributed in the 'tween decks. Many ingenious methods were resorted to, in the early wooden vessels carrying Spanish copper and iron ore, to raise the center of gravity of the cargo. This was accomplished sometimes by carrying empty barrels in the wings. In other cases the center of gravity was raised by fitting a false deck of wood very heavily shored and this was often made more effective by fitting two fore and aft bulkheads of wood spaced about a half breadth from the center on each side and substantially braced. It was found that vessels carrying ore in this manner were subject to no greater stresses or required no more repairs than when carrying general cargoes in the ordinary way.



— COAL AND ORE STEAMERS —
— "CHILORE" AND "LEBORE" —

GENERAL INFORMATION
Service Iron Ore & Coal Sparrows Point Md to Cruz Grande Chile
Builder: Bethlehem Shipbuilding Corporation Ltd., Union Plant
Owner: Ore Steamship Corporation New York City

CHARACTERISTICS:-

Length Overall	571'-6"
Length B P	550'-1"
Breadth mld	72'-0"
Depth mld	44'-0"
Draft loaded designed	32-4"
Draft light estimated	10'-9"
Block Coefficient	·815
Mid Section Coefficient	·989
Longitudinal Coefficient	·826
Speed Knots Loaded Trial	11½
Cruising Radius Knots 10½	20,000

Framing Longitudinal
Class A 1. American Bureau of Shipping

TONNAGES:-
Deadweight Capacity ... 20700 tons
Displacement ... 29600 tons
Light weight: Hull ... 7950 tons
Machy ... 950 tons

COMPLEMENT:-

Deck Officers	5
Deck Crew	19
Engineer Officers	7
Engineer Crew	12
Stewards Dept	10
TOTAL:- Officers & Crew	53

MASTS:-
2 Pole Mast 129 ft above deck

KINGPOSTS:-
10 Circular 3 ton cap 32 ft high

BOOMS:-
18 Oregon Pine 3 ton 56 ft Long

DECK MACHINERY:-
Steering Gear 16"×12" Bethlehem Screw Gear
Windlass 13"×13 Bethlehem triple Spur Geared
Cargo Winches 10 - 8½"×10" Bethlehem Compound Geared
1 - 9"×12" Bethlehem Compound Geared
Mooring Winches 6 - 10"×12" Bethlehem Special Type

LIFE SAVING EQUIPMENT:-
Lifeboats 4 Bethlehem 26 ft
Workboat 1 Bethlehem 16 ft
Liferaft 1 Bethlehem 25 Persons

PROPELLING MACHINERY:-

BOILERS:-

Number	Three
Type Scotch Single ended	
Length	12-0
Diameter	17'-6"
Furnaces per boiler	Four
Fuel Oil Bethlehem Dahl System	
Draft: Howden System	
Total Heating Surface sq ft	12861
Superheat degrees F	200
Working Press lbs per sq in.	220
Total Furnace volume	2226 cft

PROPELLING MACHINERY CONT'D

NORMAL FUEL CONSUMPTION
Per day tons 43
Per H P hour pounds ·9
Normal Steam production
per hour per lb of Fuel abt 15
total per hour 54000 pounds

ENGINES:-
Number Two
Type Bethlehem Curtis Turbines
Falk Single Reduction Gear
Shaft horse power normal 4500
" maximum 5000

PROPELLERS:-

Number	Two
Type Solid, Three bladed machined	
Diameter	15'-8
Pitch	12'-8"
RPM	105
Projected Area	56.8 sq ft
Developed Area	66.63 sq ft
Weight	16000 pounds each

AUXILIARY MACHINERY:-

REFRIGERATING MACHINERY
Two - 2 ton Brunswick Ammonia direct expansion machines

ENGINE ROOM:-
2 Main Condensers - 4000 sq ft
2 Main Circulating Pumps Bethlehem 14" Centrifugal 9"×8" recip engine
2 Main Air Pumps Bethlehem 9½"×17"×15" Independent dual with augmentor jets
1 - Auxiliary Condenser Alberger 1000 sq ft
1 - Combined Auxiliary Air & Circulating Pump Alberger 12"×14"×14"×12"
1 Pair Main Feed Pumps Bethlehem 15½"×11½"×24" vertical Simplex
4 Forced Lubricating Oil Pumps Bethlehem 7"×8×18" vertical Simplex
1 Fire & General Service pump Bethlehem 10½"×8"×22" vertical Simplex
1 - Eng Rm Bilge Pump Bethlehem 7"×8"×18" vertical Simplex
1 - Sanitary & 1 - Bilge Pump attached each Bethlehem 6½"×7½" inclined Simplex
1 - Fresh Water & 1 - Sanitary Pump each Bethlehem 4½"×5×12" Vertical Simplex
2 - Water Circulating Pumps for Lubricating Oil cooler Bethlehem 9"×10"×12" vertical Simplex
2 - Evaporators 30 ton Bethlehem
1 - Feed Water Heater Bethlehem Multiflow
1 - Grease Extractor Ross & Davis 5" Twin Gravity Flow
4 - Lubricating Oil Cooler Griscom Russell "114 Multiwhirl

BOILER ROOM:-
1 - Fuel Oil Transfer Pump Bethlehem 7"×8×18" vertical Simplex
2 - Fuel Oil Service Pumps Bethlehem 7½×5"×10" Horizontal Simplex
3 - Fuel Oil Heaters Bethlehem
1 - Donkey Boiler Bethlehem Scotch - 1 furnace 317 sq ft heating surface
1 - Donkey Boiler Feed Pump Bethlehem 5"×3½"×6" vertical Simplex
Forced Draft Blower Jas Howden Co 20" Fan 2 - 8"×16" Vertical Engines

AUXILIARY MACHINERY (CONT'D)
F O Starter Heater
F O Meter

PUMP ROOM:-
1 Ballast Pump Dravo-Doyle Turbo-Centrifugal 100 H P De Laval Turbine
2 Bilge & Ballast Pumps 10"×14"×18" Duplex - Dean Bros
Hand Pump

ELECTRIC EQUIPMENT
2 Generators General Electric 20 K.W. 115 volts each driven by 8"×7" Vertical reciprocating engine

CAPACITIES

COAL OR ORE HOLDS

No	Length	No of Hatches	Cu ft
1	78 ft	2	208,535
2	50 ft	1	121,654
3	80 ft	2	202 226
4	80 ft	2	200 960
5	70 ft	2	178,481
Total	358 ft	9	911,856

FUEL OIL TANKS

No	Frames	Gallons	Tons
No 1 Side tank	57-61	141,282	497
No 5 Side Tank Ford	29-32	132,854	467
No 5 Side Tank Aft	25-29	165,532	582
Fuel Tank	24-25	223 053	785
Fuel Tank	23-24	114 234	402
Deep Tank Ford.	61-64	226 734	798
Total		1,008680	3531

STORE ROOMS

Cubic Feet in	Grain	Bales
Lower Tween Dks 61-4	25 228	22,222
Upper Tween Dks 61-4	16 477	13 547
Upper Tween Dks 64 Stem	9,166	8 463
Lower Tween Dks P 17-23	5,694	5,102
Lower Tween Dks S 15-23	7,135	6,382
Total	61,700	57,716

FRESH WATER

Engine Rm DB	50 Tons
Boiler Rm. DB	198 Tons
On main Dk Aft	37 Tons
Aft Peak	313 Tons
Total	598 Tons

SALT WATER

Fore Peak	64 - Stem	662 Tons
No 1 Tank P&S	53-61	920 Tons
No 2 Tank P&S	48 53	998 Tons
No 3 Tank P&S	40-48	1601 Tons
No 4 Tank P&S	32-40	1601 Tons
No 5 Tank DB.	23-32	319 Tons
Aft Peak	AP-12	322 Tons
Deep Tank	61-64	866 Tons
No 1 Side Tank	57-61	540 Tons
No 5 Ford Side Tank	29-32	407 Tons
No 5 Aft Side Tank	25-29	632 Tons
Total		8,968 Tons

REFRIGERATOR ROOMS

Meat Room	1418 cu ft
Vegetable Room	1246 cu ft

Data sheet for combination coal and ore steamer, Chilore and Lebore

The six large combination ore carriers are designed on correct principles in this respect, and it is confidently believed that the carriage of iron ore stowed as it is in these vessels will create no greater stresses on the vessels as a whole or locally on any of the members than experienced with general cargoes properly stowed. The wear and tear due to loading and discharging the ore has been provided for by exceptionally heavy plating and framing forming the floor of the holds as compared with lake ore carriers. Notwithstanding the elimination of all the traditional objections connected with the ore carrying trade and a strict compliance with the laws of nature, the stresses affecting the vessels as a whole and every member locally have received a most thorough and exhaustive study. With a view to taking no chances and securing every possible insurance against these vessels being laid up for repairs, an excessive amount of steel has been introduced into their construction.

The deadweight in tons divided by the steel in tons on the ore-oil steamers range from 2.78 to 2.88 and on the ore-coal steamers is 2.95. It is common for tankers to carry from 3.25 tons deadweight and up per ton of steel and freighters often carry from 3.4 tons in some cases as high as 4.3 tons deadweight per ton of steel. When it is considered that there is little control over the stowage in ordinary vessels and that the stowage especially of the iron ore is absolutely and automatically controlled in the combination ore steamers, the advantages of the design become obvious.

The following table giving some particulars of a number of vessels, and the deadweight carried per ton of steel, should prove of interest in connection with the relatively large tonnage of steel used in the construction of these exceptionally strong vessels.

	New Bethore Hull 4211, ore and oil steamer	Steelore Hull 4213, ore and oil steamer	Chilore Hull 5309, ore and coal steamer	Old Bethore Hull 4162, ore and oil type	Cubore Hull 4160, ore and coal steamer	Lake Ore Steamer	Newport News, 20,300 D. W. tanker	San Fernando Tanker	F. W. Weller Hull 5134, tanker	War Knight Hull 5132, freighter	Eclipse Hull 5168, freighter
Length	550	550	550	500	450	580	550	530	500	410	440
Breadth	72	72	72	66	57	58	75	69	68′ 6″	56	56
Depth moulded	44	44	44	42	37	32	43′ 3″	42′ 3″	38	41	38
Draft	32′ 4″	32′ 4″	32′ 4″	31′ 1″	27′ 3″	19′ ″3	30′ 0″	30′ 8¼″	27′ 3″	30′ 6″	28′ 7¾″
Block coefficient	.815	.815	.815	.8065	.795	.868	.80	.805	.80	.799	.797
Displacement	29600	29600	29600	23723	15865	16060	28270	25800	21275	15925	16000
Steel	7300	7100	7000	5200	3273	3929	6025	5666	4663	3082	2800
Deadweight	20320	20500	20700	17200	11669	11451	20300	18550	15000	11823	12000
D.W/Steel	2.78	2.88	2.95	3.3	3.56	2.91	3.36	3.27	3.21	3.83	4.3

due to the elimination of some steel which the builders objected to in the first two hulls and does not in any way detract from the strength.

The Old Bethore, Hull 4162, which is a vessel exactly the same type as the present ore-oil steamers except that one additional deck is fitted shows a much higher efficiency so far as steel to deadweight is concerned. The plans for this vessel were approved by one of the classification societies and it was considered an exceptionally strong vessel; at the same time there is no comparison between the strength of this and the new vessels. It is interesting to compare the Chilore and Cubore, both ore and coal steamers, as this factor jumps from 2.95 in the case of the Chilore to 3.56 for the Cubore, although the block coefficient is .02 less in the case of the latter. The Lake ore steamer has a factor in close agreement with the larger Bethlehem steamers, but this comparison is of no particular value on account of the limited draft of the Lake vessels and the resulting relatively small deadweight. If this vessel was given a permissible freeboard the deadweight carried per ton of steel would be very much higher.

If all the above vessels with the exception of the lake ore steamer were reduced to a common block coefficient, the relative quantity of steel in the Bethlehem ore steamers would appear greater. The difference in deadweight to steel between the New Bethore, Hull 4211, and the Steelore, Hull 4213, is

ATTENTION TO DETAIL BRINGS SUCCESS

By SEA FLAME

Sea Flame is writing for Pacific Marine Review a series of articles which are composed of notes drawn from long experience in engine-room practice at sea. In the present article he calls attention to the personal equation of the chief engineer and its relation to the engine-room staff. He also calls attention to the supreme importance of looking after small details in the engine room. Many a mickle makes a muckle. A small leak means a big loss on a long voyage. If the connecting rod breaks, it has to receive attention. If the packing on an auxiliary pump leaks, much money may be lost to the owner though the ship still runs. Eternal vigilance is the price of success.

IT was once observed by a philosopher that genius was the faculty of taking infinite pains. This being so, a good marine engineer needs must be a genius. For taking pains will insure fair operation of machinery, even if it is not of the best type.

The proper training of a marine engineer should most certainly commence in the plant building marine engines. While it is admitted cases have been known where the regular "trade" has not been learned, it is also better known that the skilled mechanic makes a more efficient engineer.

Still, a man may be a skillful mechanic and also lack those qualities that will make him famous as an executive engineer. The reasons for this are many. Personal equation is a great factor. Quick judgment; inventive bent; resourcefulness; a knowledge of mechanical forces; an ability to reason out cause and effect, and, above all, leadership of men, are a few of the attributes of paramount necessity in the make up of an engineer.

The marine engineer should train himself to first have self-confidence. To be sure he is right, and then knowing he knows, he will many times win out. He must be of a disposition that will enable him to observe the men immediately under him closely. To note how they serve. To give a cheerful word of praise to those who try to do the right thing, and at the same time to correct in a proper manner those who from wilful carelessness or ignorance do the wrong thing.

A good engineer loves the engine under his charge. It has a personality for him. He attends to the slightest ailments of the installation, and they are many and, in some cases, serious. "Look after the little things," is the advice of a successful engineer, "the big things will make you look after them." Truer words were never spoken, or better advice given. Careful attention to the thousands of trivial leaks and disarrangements constantly occurring around a steamboat's machinery will insure a proper operation. And proper operation means, not only smoothness of running, but economy.

A good engineer should make himself an expert in handling all classes of auxiliaries. Descriptive catalogs issued by the manufacturers are of great help in this. Am sorry to say, though, that many engineers refer to these publications as "all bunk." Probably in most of these cases the engineer does not know, and is ashamed to have others know he doesn't know. A chief engineer should be able and ready to explain to his subordinates all the intricate workings of the many appurtenances now in use in modern steamers. He should be able to explain the "reason why" of things. If this explanation is made in the proper manner, without antagonizing the one to be taught, much good will result.

One instance of this may be of interest. On a certain San Francisco steamer was a steam-driven direct expansion ammonia refrigeration plant. The return or low pressure ammonia came back to the crank case, the gas coming up through the piston. Any quick fluctuation of return pressure would result in a foaming of the oil in the crank case. A particularly bright young engineer applied the doctrine of horse sense to this, and found out that if the pressure was slowly brought down, there would be no foaming. His conclusion was arrived at by noting that when a bottle of efferverscing liquid was suddenly opened the contents flew out in a lot of foam. He took the view that atoms of ammonia gas were in between atoms of oil in the crank case. Any sudden lessening of the pressure expanded these atoms of ammonia, resulting in foaming. Careful attention to a slower changing of pressures kept everything all right. Had this chap not used reasoning faculties he would never have solved the problem.

In this simple incident an important lesson is taught. The proper attention to details and the reason why will insure better operation of any machine. Better operation means that the man in charge will sooner or later be noticed. When the number of men looking for jobs exceeds the number of jobs, then the engineer who "knows how" will be chosen. He must though have other qualities, which will be touched upon later.

In this period of reconstruction of the world, the question of cheap transportation is a very vital one. Economical operation of steamships is of great importance. It is a matter though that has not received attention along certain lines. If owners would take cognizance of the little things they would be surprised at the results that could be attained in the way of lower operation costs.

Orders should be issued to engineers and masters regarding wastefulness of unconsidered trifles—trifles though that go to make up a big total. Take, for instance, the waste of electricity. On board steamers no one seems to take the slightest notice of this waste. Lamps are left burning and fans running in rooms while empty. The writer has noticed a third mate go on watch at twelve o'clock, leaving three 40 watt lamps burning and a fan running—no one in the room at all. A second engineer was also in the habit of leaving his lamps all lit while out of his room. This habit is not confined to any particular gang on the ship. All alike transgress, from the master to the scullery man.

Steam is also often called for on deck lines when a little effort would save it. It takes a lot of fuel to warm up a long length of deck steam pipe, and it is wasteful when the only use made of it is to run the fall off a winch drum or bring up a six-inch line from the forepeak.

Refrigeration room doors are opened unnecessarily. This is a waste of fuel, as it takes that much more work to keep the temperatures at the point needed.

WASTEFULNESS AT SEA

Sea Flame burns at a white heat as he observes the tremendous wastes occurring constantly in our merchant marine through ignorance, carelessness, and lavish habit. Some of the materials and energy thus wasted:

PAINT
FRESH WATER
OIL
ELECTRIC LIGHT
STEAM
MAN POWER

Fresh water is also used lavishly. An average of about ten times the quantity allowed by law is in reality used on ships, much of it wasted.

The habit of some shipmasters stopping main engines without notice to the engineer is also a fruitful source of waste. Of course at times it is necessary to make a quick stop, but in almost every instance due notice could be given, making a saving, and also materially lessening repair bills, for these unnotified stops are a source of menace to good operation.

Thought should also be given to time of making ready for sea, and the time set should be adhered to in every possible instance. The writer knows hundreds of instances where the engine has been ordered made ready, and hours have elapsed before it was used. This means a waste.

Wastefulness is many times caused by use of deck washing pumps for long periods. While salt water costs nothing, it takes power to pump it up to the hose, and power means fuel. Instances are common where a heavy stream of water is directed overboard for long periods, it being only used to rinse off where paint is being scrubbed. Economy would be effected if a bucket was used and the pump eased down.

Many engineers do not watch circulating water as they should, with the result that thousands of tons of water are put through the condensers for no useful purpose. In fact, it is more than waste, for the heat units sent overboard with too much injection water are gone for good. And this is waste.

Little leaks around small valves and glands do not attract much attention, but the aggregate of these mounts up in the course of a long voyage, and much fuel could be saved if these minor leaks were stopped. It is not only heat units that are going away doing no work, but it is loss of fresh feed water, which has to be renewed by evaporator running or other methods, causing further fuel losses.

Waste of paint, both in engine rooms and on deck, is also a big source of loss. Especially is this true of the deck department. It is a good idea to have a neat looking ship, but to use a couple of tons of white lead and other colors to "doll up" a freighter, and in two hours after she is docked to have it all spoiled by cargo dirt, seems a waste. There is a proneness on the part of mates to paint right up to arrival time, with the result the paint does not dry, and serves no purpose as a preservative. The same might be said as regards painting at sea in wet and stormy weather. It is often done for no other apparent purpose than to find something for the crew to do. And this again shows that there are as a rule too many men employed on American ships. This is also waste.

On an average turbine driven freighter, carrying seventeen men in engine department and eighteen on deck, a saving of $13,440 per year could easily be effected. Four men less in engine room, three on deck and two in steward's end would still leave plenty of men to work, and no one overburdened.

Something must be done if American ships are to operate in rivalry with foreign-owned vessels. Say what one will, the test of patriotism will not stand paying higher for everyday things, and if the foreigner will carry freights cheaper he will get the job. It behooves all American shipmen, both owners and seafarers, to get together and work together with a view to reducing costs and competing with other nations if we are to use the ships built with our money and labor.

STABILIZING THE SHIPBUILDING INDUSTRY

SOME NOTES ON EFFICIENCY IN PACIFIC COAST SHIP YARDS I

By LETSON BALLIET, M. E.

> **Competition between American shipbuilders and the shipbuilders in foreign countries where labor is cheap will be keen in the future. Cheap foreign labor does not offer the incentive for employers to install engineering efficiencies. Well paid labor requires it. To pay labor high wages without efficiency results in closed plants, while those with cheap labor get the work. With high efficiencies, better work, at lower production cost, means enlarged plants and greater number of well paid workers than ever. The "labor saving" machinery is in reality labor creating machinery, because it builds business.**
>
> **Samuel Gompers' argument to prevent machine work to make men work is a snare and a delusion. If the power printing press had not been brought out, there would be but few printers. If the power loom had not been used, there would have been but few weavers. If the power hoist had not been invented there would be few mines and no high buildings. If the power rock drill had not been invented, there would be few big quarries, few stone cutters, and many mines that could not be worked by hand would be idle. The industry using the greatest number of power tools and the most machinery employs the most men.**
>
> **LETSON BALLIET.**

To perpetuate any business requires the ability to meet competition. To meet competition requires that the business be fully as efficient, if not more efficient, than its competitors.

While it will not be possible to publish in one paper a full text upon efficiencies in shipbuilding, it will be interesting, and possibly helpful, to set forth some of the most successful steps for increased efficiency.

In the first place, it must be remembered that there are but two things that cost money, namely, **matter** and **motion.**

Matter

Matter is anything that occupies space, such as steel, tools, machinery and other material.

The price of matter is practically fixed by the market. There may be a little difference in price, depending upon the quantities purchased, discounts for prompt payment of bills, etc., but it is fair to assume that all competitors can purchase matter at the same price, under the same conditions.

The purchasing agents of all big industrial plants put forth great efforts to purchase matter to the best advantage for quality, delivery and price, and at least see that their employers do not get any the worst of it in their purchases. If all are equally competent, there is room for but little difference in the cost of matter.

Waste Matter

Wasted matter can be salvaged to some extent. On the competency and judgment of the salvage experts much depends in the **material cost** of the finished product. The carelessness of workmen in not cutting or using material to the best advantage makes a big difference in the **material costs.**

The salvage department is merely a valet to many a careless or incompetent foreman, for it seems impossible that all foremen in big industries should be equally competent and careful. Many a man appears to striking advantage merely because his valet knows how to dress him properly, and care for his belongings when he carelessly drops them wherever he last used them.

On the competency, skill and judgment of a properly organized salvage department, which acts as a sieve over the scrap car, to catch every usable piece and send it back into the plant to be somewhere utilized, depends the cost of the material in the finished product. It must be remembered that what may be **scrap** to one department may be as good as new material in some of the other departments. The salvage men must **know** the business, to be able to know **what** can be used, and **where** it can best be used. Generally far better economy is obtained by picking up all idle material and carrying it to the salvage department, where the skilled salvage men sort, handle and send it back to the places where it can be used to the best advantage, than to have it lay around in the way, covered with other material, or attempt to salvage it in the congested working places of the plant.

Duplication of parts is more often caused by a piece of material being covered up, with other material, than because the piece is "lost." With a properly handled salvage department, nothing should be duplicated. If a piece is misplaced, the workman should be able to go to the salvage yard and put his hands on it without loss of time.

The salvage department is one of the most important factors in the item of "material costs" in any industry.

Motion

Motion is anything that changes the place, shape, form, composition or condition of **matter.** A lost or wasted motion can never be salvaged. A useless motion or a lost motion **costs just as much as one that is beneficially used.** Another motion can be made, to take the place of the lost motion, but both have to be paid for, instead of one.

Therefore, it is obvious that the difference in competitive prices, costs or bids must lie largely in **wasted motions,** the **cost of motions,** or both.

Motions are divided into two kinds, **physical** and **chemical.** Both are of extreme importance, and figure heavily in the cost of the finished product.

Physical Motions

Physical motions are those which change the position, the place, the form, the shape, and sometimes the condition and are dependent upon **power** of some kind, which may be man power, steam power, electric power, water power, gasoline power, horse power, compressed air power, or other forms of energy.

Of these, man power is the most expensive, and in observing things that are done by man power I am often ashamed of the engineering profession that permits it. It is almost unbelievable what man power costs. As a matter of illustration, I shall carry out some calculations on man power in just one line of work. Other lines will compute relatively the same.

The average man works most efficiently, and with the least fatigue, when using a "No. 4" shovel that holds 21 pounds. A smaller shovel makes too many "back bends" and is like picking up a hundred pins one at a time. The weight is inconsequential, but it is tiresome to make one hundred stoops when one stoop would have been enough if you picked up all the pins at once. Likewise the bigger shovel with over 21 pounds becomes too heavy and the workman does less work with greater fatigue.

Using this as a basis, we find that a good, strong man shoveling broken rock into a bin with walls four feet high **can** handle one ton in 100 shovels. If he lifts five shovels full a minute into the bin, he requires twenty minutes to raise one ton four feet high; in doing it he performs 8000 - foot pounds of work in twenty minutes. Thirty-three thousand pounds raised one foot in one minute is equal to one horsepower, and is called "33,000-foot pounds." Therefore the man with the shovel has performed almost one-fourth of a horsepower-minute in twenty minutes, or **one-eightieth** of a horsepower. Now if that man with a shovel is paid but 50 cents an hour for one-eightieth of a horsepower, we find that man power costs **forty dollars per horsepower hour**, while electric power costs about **one cent per horsepower hour.** In some foreign countries where labor is paid but 50 cents a day of ten hours, the cost of man power is **four dollars** a horsepower hour. If this illustrates the relative costs of man power and electric power, it is obvious that the industry that uses electric power (without waste) can do faster work at lower cost than the same industry with man power.

Compressed air is the next most expensive power to man power, and is the least considered. It is common to hear some high official say, "Compressed air doesn't cost much — the compressors have to run anyway," or "That's only a little leak—it doesn't amount to anything—the compressors are big enough."

But let us see what compressed air really does cost. Notwithstanding the claims of some manufacturers that their compressors will deliver "six or seven cubic feet of air per minute per horsepower" under computed piston displacements, there are none of the compressors in ordinary use that deliver much over five cubic feet of actual volumetric delivery per horsepower at the meter (if indeed they average so much as five cubic feet).

Humidity or damp air reduces the efficiency of the compressors. Valve leaks, gland leaks, slip, heat of compression, are each constantly ready to reduce the compressors' efficiency, while pipe line leaks, careless waste, transmission losses, ignorance and improper drainage costs much more than that which is actually used. It is hard to believe an abstract statement, but there are very few compressed air users in the shipbuilding industry who get 20 per cent efficiency out of compressed air power.

An air compressor that delivers 2000 cubic feet of air per minute requires 400 horsepower to drive it, or $4 per hour if the power rate is but 1 cent per horsepower hour.

A riveting gun will ordinarily drive the average rivet in from six to ten seconds of plunger motion. Three hundred rivets driven in eight hours (allowing ten seconds each), means 50 minutes of actual plunger motion a day. If we call it one hour, it's only 12½ per cent of the time. It is not to be supposed, in a plant with 200 riveting guns, that all would be working together. The problem could be assumed, from the recording gauges, that the average consumption of air would be about even over the eight hours of the day. If this is true, but **one-eighth** are in operation all the time. Compressed air hoists are, occasionally requiring air for a minute or so now and then, while air drills and chipping guns also have an intermittent demand. If there are 500 air tools and hoists installed' it is a big plant. In such a plant it is not uncommon to find from 3000 to 5000 horsepower driving the compressors. I often wonder why it requires from six to ten horsepower for eight hours to run an air tool one hour, with a power bill of from $300 to $500 a day, without some one kicking.

But we must not forget that fuel oil burners are hogs on the compressed air line, as will be mentioned later.

Steam power is also expensive in its stand-by, maintenance and operation costs. Condensation losses are enormous and all must be added to the cost of fuel and water. Long distance transmission of steam is prohibitive, bare pipes and lines through wet conduits or under water are merely courting bankruptcy.

Electric power is the most flexible, is easy of transmission and most economical when the factors of load, power and demand have been properly figured and the installation made with reference to the work efficiency.

Intra Plant Transportation

The movement and handling of material around the plant or yard is partially improved by "business doctors," "systematizers," "work expediters" and other "quacks" who call themselves "efficiency experts," generally planned upon straight line movements of material through the plant, but the engineering economies of the movements and performance of the mechanical motions are beyond their knowledge or ability.

It would be almost beyond belief if I were to state the number of movements that some materials make before they are in their final place upon the finished product. It is a well known fact in all transportation that the greatest expense of transportation is the **terminal expense.** For example, loading a shipment upon a truck, unloading upon a warehouse platform, loading onto a hand truck, unloading inside the warehouse, loading upon a hand truck, unloading in a freight car, and the reverse at the other end of the haul, calls for six handlings at each end of the line. It makes but little difference then whether the car is hauled one mile or five—the big expense is in the twelve times it is handled.

If some shipyard foremen would count the number of times a single plate is picked up, laid down and turned over from the time it is taken from stock until it is in place on the ship, they would get the shock of their lives. It has to be laid out, punched, scarphed, countersunk, planed, sheared, perhaps mangled, and often turned around, turned over, and piled or racked between operations. Often it is necessary to move it, to get some plate that is under it. Altogether the times it is handled may run as high as forty, fifty and even sixty times. With economic power and efficient engineering, the distance it moves makes little difference. Is it any wonder that some shipyards can build or repair a ship for $25 a ton less than some of the others? That is just the difference between "efficiency experts" and efficiency engineering.

In very few instances is it justifiable to point out the inefficiencies, more than to generalize. The preferable way is to point out the better way, that different industries may select any that they find an improvement upon their practices. The important point is this, that workmen going from one industrial plant to another, do openly criticise, which has a very bad effect upon the morale of their fellow workers.

If you, reader, were a worker in a plant, where a steel plate came up to you on a table of live rollers, and moved up to the work by throw of a lever, and then dropped upon a conveyor that automatically moved it up to the next step in its preparation when it had been finished by you, how would you feel about it if you went to another plant to work where you had to call three or four men from neighboring machines, to pull your plate to position with chain blocks or tackle, and then call them again to remove it to a push-car that took twenty-four men to shove it within reach of chain blocks for the next step? You could not take the interest in your work, you could not turn out half as much work, and you would interrupt the production of your fellow workers. The workers in every industry feel just as you would about it; therefore, it must be realized that efficiency is not strenuousness.

I am informed upon the best authority that certain shipyards in foreign countries hang their shell plates with ginpoles and tackle, by man power, while in this country they are swung into place with power cranes. How long would an American plate hanger work with a ginpole? How much interest would he have in his work where such a method was in use?

(To be continued)

SELF-TRIMMING VESSELS

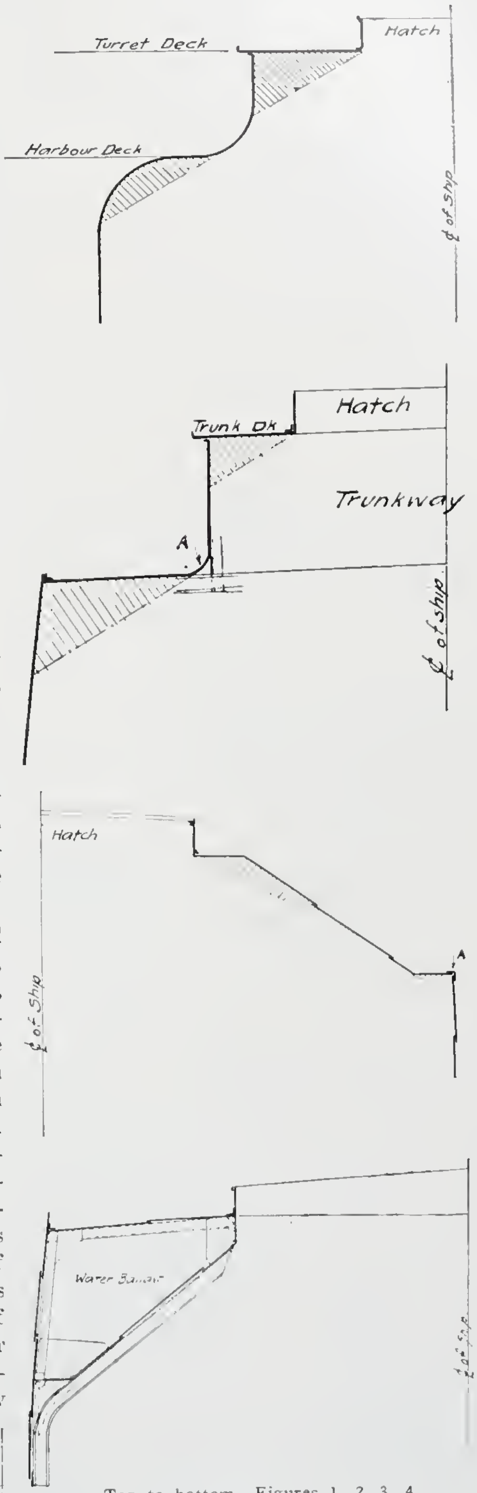
By JOHN R. F. DETTMER

THE tremendous changes which took place in the character and distribution of world trade in the last quarter of the nineteenth century brought a demand for special types of hulls for carrying freight in bulk. This was especially true in the coal, grain and ore-carrying trades, and was largely accentuated by the development in both Americas of land transportation in bulk for the grain, ore and coal from the great new regions which were being opened up to agiriculture and mining development. This demand led to a great deal of work on the part of naval architects and practical shipbuilders in an attempt to design and build steel ships which would combine strength, seaworthiness and ease of loading and discharging such cargoes. It was very soon evident in these attempts that in order to be economical, both in the matter of speedy turnaround and in the matter of expenditures for wages, some form of hold which would be self-trimming for bulk cargoes was necessary.

Turret Steamers

The first so-called self-trimming vessels of the turret and trunk types began to appear in the British merchant marine in the beginning of the last decade of last century.

The first turret steamer was designed and built at the yards of the patentees, Messrs. William Doxford & Sons, Ltd., of Sunderland, one of the most progressive and at the same time conservative shipbuilding firms of Great Britain. An outline of the one-half midship section of this vessel is shown in Figure 1, and as will be seen from the dotted line indicating the slope angle of bulk cargo, the shape is not entirely self-trimming. Structurally, these turret vessels were expensive to build on account of the difficulty of fitting the rolled plates at the sides of the harbor deck and of the turret. The connection of the bar joining the lines of the turret and harbor deck to fair the shape of the bow and stern is especially difficult. The large radius of the curve at the outboard edge of the harbor deck makes it impossible for a man standing on the harbor deck to see the side of the ship and hence raises quite a difficulty in proper mooring at the dock.



Top to bottom—Figures 1, 2, 3, 4

Trunk Steamers

For these and other reasons the turret type steamer was not employed to any very great extent and was soon followed by what is known as the trunk type, which was first patented by Ropner & Sons and built by them at their yard at Stockton-on-Tees, Great Britain. Figure 2 shows an outline midship section of the trunk type and also shows that it is very little, if any, more self-trimming than was the turret type. In the trunk steamers weaknesses easily develop at point A, Figure 2, and much trouble has been experienced at sea with the bridge and poop front bulkheads, which on several vessels of this type have been carried away on account of presenting a square boxed end effect to the wash of seas which are prevented from escaping across the vessel by trunk sides.

Priestman, another British builder, patented the self-trimming steamer shown in Figure 3 which, although not completely self-trimming, is much more so than either the trunk or turret types. This midship section is in construction very difficult to make and keep watertight at point A and is expensive on account of the fact that special bars must be rolled for the stringer angle in order to get the required landing.

Cantilever Frame

A still later type and an improvement on the others is shown in Figure 4. This is known as Raylton-Dixon's patent cantilever frame. This type is almost completely self-trimming, but the form of construction has several decided disadvantages. It is practically impossible to caulk and keep tight the water ballast tanks, and on numbers of these ships, as, for example, the steamer Berwindvale, after rough passages the inside of the cargo holds has been found covered with red rust from the bilge up

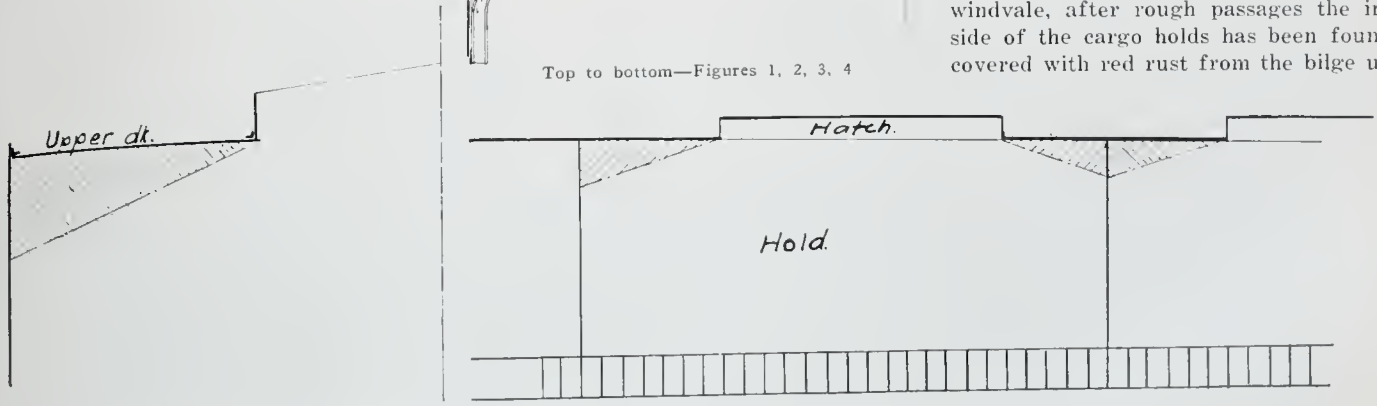
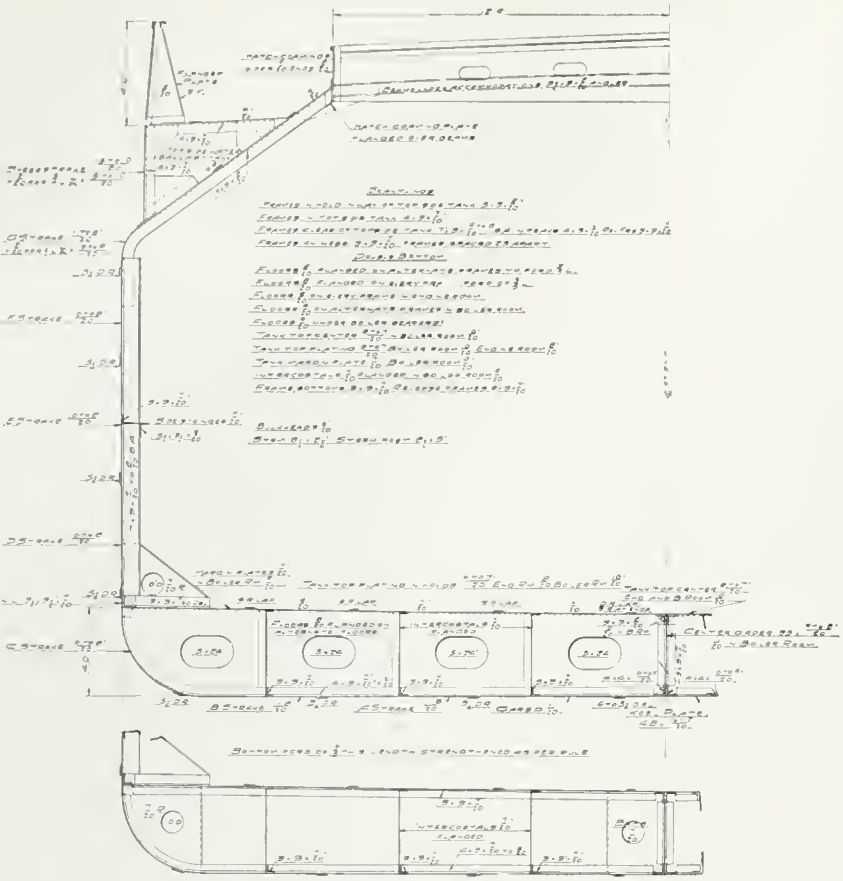


Figure 5



SKELETON FLOORS ON ALT FRAMES

Figure 7

to the knuckle. Another bad feature is the construction of the inboard end of the frames which often catch on cargo slings or blocks and thus cause much damage.

The criticisms cited above by the writer on the various forms of so-called self-trimming special types are based upon his personal experience in working as a ship fitter and foreman at Priestman's yard and at the yard of William Doxford & Sons and also on numerous trips of inspection to the yards of Ropner & Raylton-Dixon. The writer has also on more than one occasion experienced bad weather at sea on these types of vessel and has particularly inspected these vessels in the loading and discharging of cargo. In fact, it was from observations made on these special types that the writer designed and patented the construction hereinafter described, which he believes has overcome the objectionable features and preserved all of the merits of the former self-trimming types.

The ordinary cargo vessel is entirely lacking in self-trimming properties, both in the thwartship and in the fore and aft directions, as is graphically shown in Figures 5 and 6.

Dettmer's Patent Hull

Figures 7, 8 and 9 show midship sections of several types under the writer's patent construction for a vessel 275 feet long by 42 feet beam. All opportunity for damaging the topside in docking is eliminated by placing the outboard sides of the water ballast tanks about 9 inches inboard of the side of the vessel. It is thus easily possible for a man at the side of the ship standing on the deck to see over and along the whole side of the ship when mooring. It will be noted that the tank top is carried through to the side of the ship and that the margin angle at that point is 5 inches higher than the top of the center girder. It is intended that this vessel shall be constructed without sheer to the deck, although it would be an easy matter to have sheer in the poop and forecastle on the top of the bulwark plating, if this were desirable for appearances. In cases where bulwarks are used, these are so constructed as to permit of free passage of water through ample provision of freeing ports. Rails and stanch-

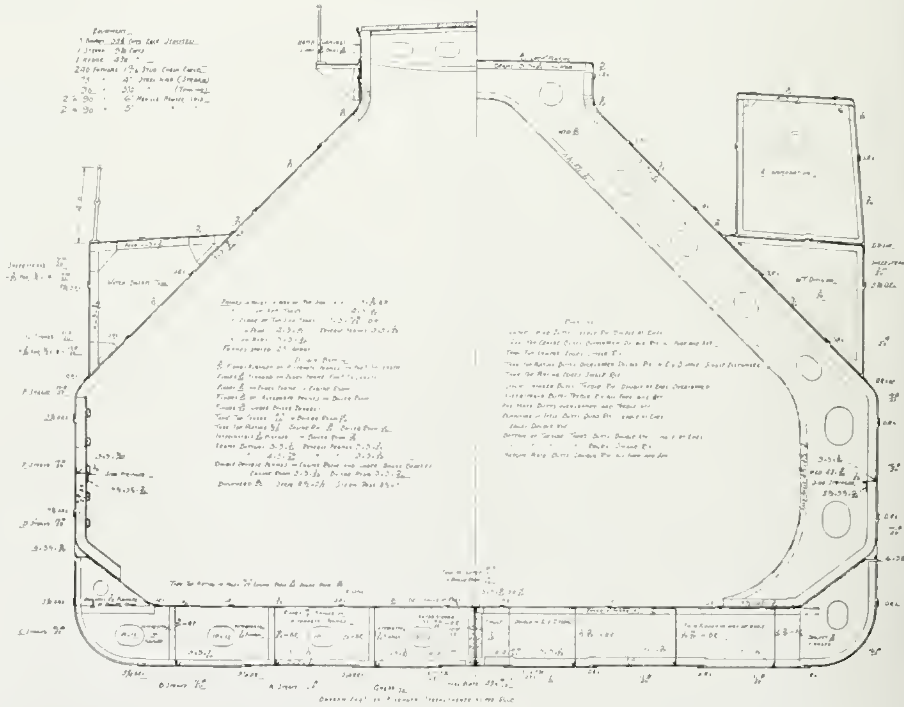


Figure 8

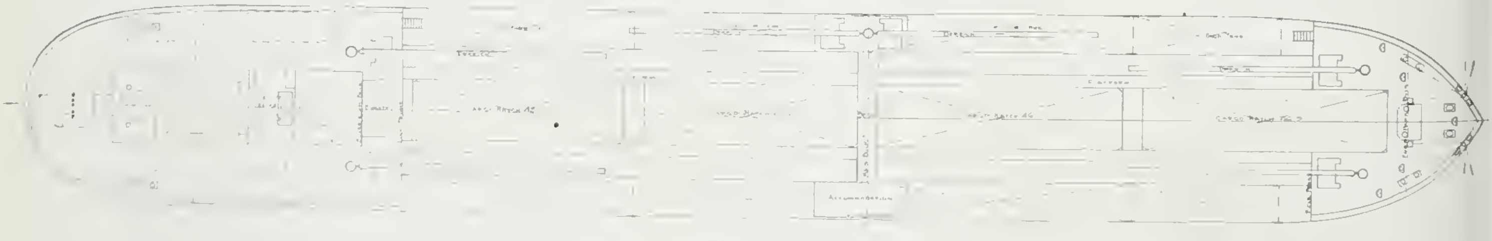


Figure 11

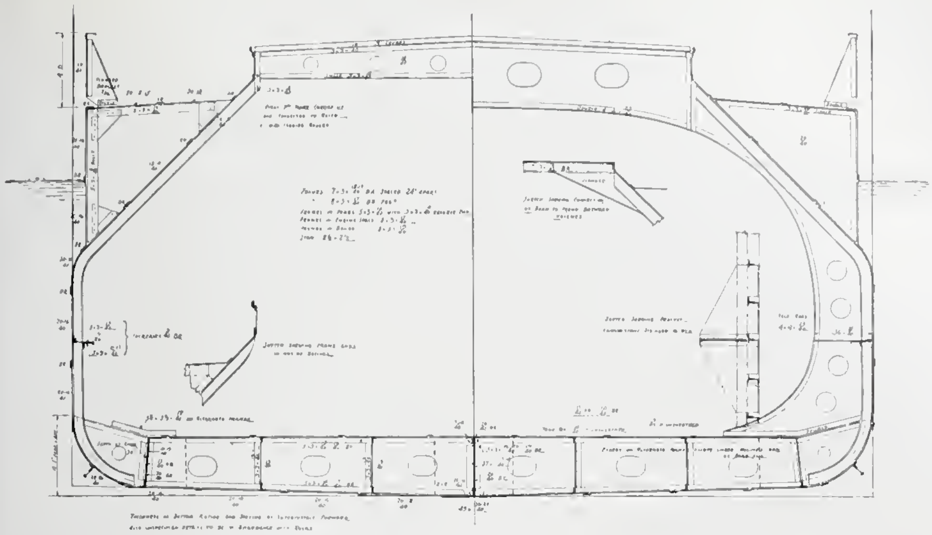


Figure 9

ions are shown on one type of section and may be used on all.

The midship sections shown in Figure 8 are particularly adapted to the carriage of bulk grain and have a larger volumetric capacity than the section shown in Figure 7.

The vessel whose sections are shown in Figures 7 and 8 is designed for a draft of 22 feet. Figure 9 shows a slightly different type of construction for a draft of 20 feet 3 inches. It will be noted in all of these sections that the hatch coaming covers the inboard end of the frames, extending to their lower edge and flanging over the same.

One very interesting feature in connection with this arrangement is the way in which it lends itself to the installation of self-trimming coal bunkers for coal-burning steamers. This arrangement is shown in Figure 10. The chute to the bunker is formed by a continuation of the bunker bulkhead parallel with the angular tumblehome of the vessel's side and the vertical sides of the machinery hatch casing. This makes a bunker which is very easily filled and trims itself very nicely, both in regard to the loading of the coal and in regard to working the same to the bunker doors in the fireroom.

A skeleton deck plan of a vessel of this character is shown in Figure 11. It will be noted that the arrangements of cargo hatches afford great lengths of hatch. This feature can be carried out either with the machinery aft, as shown, or with the machinery amidships and lends itself to the quick loading and discharge of cargoes, which is so essential to economical turnaround of vessels in operation. This construction has been approved both by Lloyd's and the American Bureau of Shipping.

The construction described and illustrated has been patented by the writer, both in Great Britain and in America, and for it the claims are made: first, that all of the cargo and bunker spaces can be filled completely without the use of a trimmer of any kind; second, that the design lends itself to very quick and safe discharge of cargo; third, that it is economical to operate; fourth, that it has a cargo capacity equal to any vessel of similar dimensions; fifth, that the topside tanks, being of simple construction, can easily be fitted for use with fuel oil or as fresh water tanks; sixth, that the vessel's construction does not present any difficult features but is so arranged that it is easy to caulk and that ordinary workmanship can produce a good sound job.

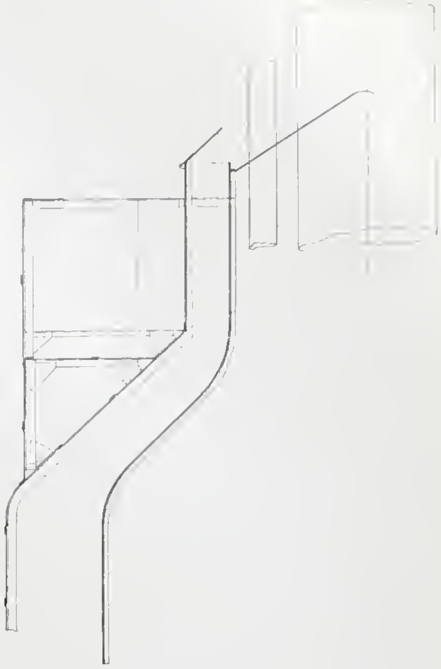


Figure 10

The writer would welcome constructive criticism on any or all of these points and is open to any suggestions for the improvement of this design or the substitution of a better.

EUROPEAN MARINE DEVELOPMENTS

Exclusive Correspondence of Pacific Marine Review

Our European correspondent in this month's notes on marine conditions points out a new phase of the operating game which carries with it both a comforting and a threatening indication for American shipping. English shipowners are faced with a tremendous rise in the rental values of berths for laying up ships. We may comfort ourselves that we have plenty of free berths, but we must at the same time consider that the British tramps will be taking freight for little or nothing rather than pay this high rent.

To people who remember the enormous figures charged for freights a year or eighteen months ago, the rates fixed for many voyages today seem almost incredible. Not infrequently they are far below the 1914 level. One large importer told me that he had just fixed freight from Bombay to the United Kingdom at 15s. (say, at an exchange rate of four dollars to the pound sterling, $3) a ton, although the lowest pre-war quotation was between $6 and $8. When the increases in wages and the price of coal are considered, one sees that such a rate cannot pay the shipowner. So many shipowners are anxious to lay their vessels up that the rents of berths have risen enormously and it is actually cheaper to keep tramp steamers wandering round the world at unremunerative rates. The rate for the same Bombay trip fixed by the Shipping Conference, which has reduced its freights but little, is still $18 a ton, so somewhere between these two figures is the one on which solid business will be built in the future.

Chamber of Shipping

The annual meeting of the British Chamber of Shipping on February 25 last was one of the biggest musters of shipowners ever seen in this country and momentous questions were discussed at this shipowners' parliament. Sir Owen Philipps was elected president. He made a very fine inaugural speech, and after dealing with the destruction of the German mercantile marine he made the following interesting announcement with regard to the future of British shipping, which I give verbatim:

Seven years ago the United States owned just over five million tons of mercantile shipping, of which less than three million tons were employed in oversea trade. As a direct result of the magnificent effort the American people and American shipowners made on behalf of the allied cause—which effort helped so largely to bring about the defeat of the submarine campaign—the United States has today the second largest merchant fleet in the world and now owns over 16,000,000 tons of shipping, of which over 14,000,000 tons are employed in oversea trade. The United States, therefore, have much more than taken the place forfeited by Germany. The aggregate of the German overseas mercantile marine was only just over 5,000,000 tons, while the present mercantile fleet of the United States is three times the size of the pre-war German mercantile fleet. As I have already said, there are over 60,000,000 tons of world shipping afloat compared with under 50,000,000 tons prior to the war. In other words, there are, roughly speaking, six vessels today to do the work of every five vessels before the war. As the total quantity of trade of the world, reckoned in tonnage, has not yet resumed even the pre-war level, there are consequently more vessels afloat than the world is at present in need of. The practical effect of this large surplus of tonnage has been modified, however, by the fact that in many ports of the world labor has been working very badly, which has caused most vessels to take longer over their voyages than otherwise would have been the case. Even allowing for this, there are over 5,000,000 tons of shipping at the present time laid up in various ports of the world.

An Optimistic Outlook

Sir Owen Philipps continued: Personally, I am an optimist about British shipping. In my commercial life I have been through several periods of bad times when British steamers have been laid up in hundreds. I know from experience that nothing is more calculated to teach a shipowner efficiency and economy in working his vessels than a few years of really hard times, when the uneconomic ships of a fleet have to be sold to the shipbreaker, organizations overhauled and businesses necessarily run on the rock-bottom basis. Depression in shipping is different from that in any other trade or manufacture, because the life of a ship is very limited. Although in certain trades some vessels may continue to do economic work for long periods, the normal life of a vessel is only about twenty years, and therefore 5 per cent of the total tonnage of world, or, say, over 3,000,000 tons of world shipping, ought to be broken up every year.

Owing, he said, to the well-meaning—although I fear mistaken— policy of the government which prevented British shipowners from selling their old vessels to foreigners unless they paid the penalty of 15 per cent on the sale price for a license to do so, more than 3,000,000 tons of British shipping is at present twenty years of age and over. During the seven years since 1914 the business of the shipbreaker has fallen into abeyance. There is at the present time an unusually large number of old vessels of all countries afloat, which, owing to their age, construction or design, must be unsuitable to compete in the strenuous times that lie ahead. The sooner these old, obsolete vessels are broken up the better for all concerned. In the interests both of shipowners and shipbuilders and all their employes, I trust the industry of the shipbreaker will again become active, as otherwise I fear that shipbuilders in this and other countries will have very few new orders for some time to come. A combination of bravery, endurance and perseverance won the war, and I for one feel confident that the same qualities, combined with hard work by all sections of the community, will enable Great Britain to come through the present economic depression.

Fine Salvage Feat

A very interesting salvage operation has just been completed on the Tyne. Last November the French passenger liner Meduana, 500 feet long, after a fire in the forehold, heeled right over on her starboard side. A Sunderland firm, Lindsay, Swan, Hunter, Ltd., undertook the job of salvaging the vessel, under Mr. Lindsay's superintendence. To ensure that all the starboard sidelights were closed a number of divers were employed under the most precarious conditions. The hatches, stairways, scuppers, discharge vents, and other openings had to be closed. Holes were then cut in the two upper decks to drain the water into the lowest 'tween deck. Watertight tests were carried out and by the end of February the firm started pumping operations. Twelve motor-driven pumps placed on barges alongside worked simultaneously, discharging water from the ship at about 2000 tons per hour. From practically the first few hours of pumping the ship began to right itself. When the starboard edge of the bridge deck appeared above water, leaving the ship heeled to starboard about 50 degrees, the upper parts of the hatch covers were then removed and a "Titan" crane transferred some of the pumps into the holds of the Meduana. The water in the lower holds was thus pumped out and the ship right-ed, and the Meduana is now in the graving dock of Swan, Hunter & Wigham Richardson, Ltd. The salvage company regards this feat as being one of the best in the long list of difficult salvage operations.

The Giulio Cesare

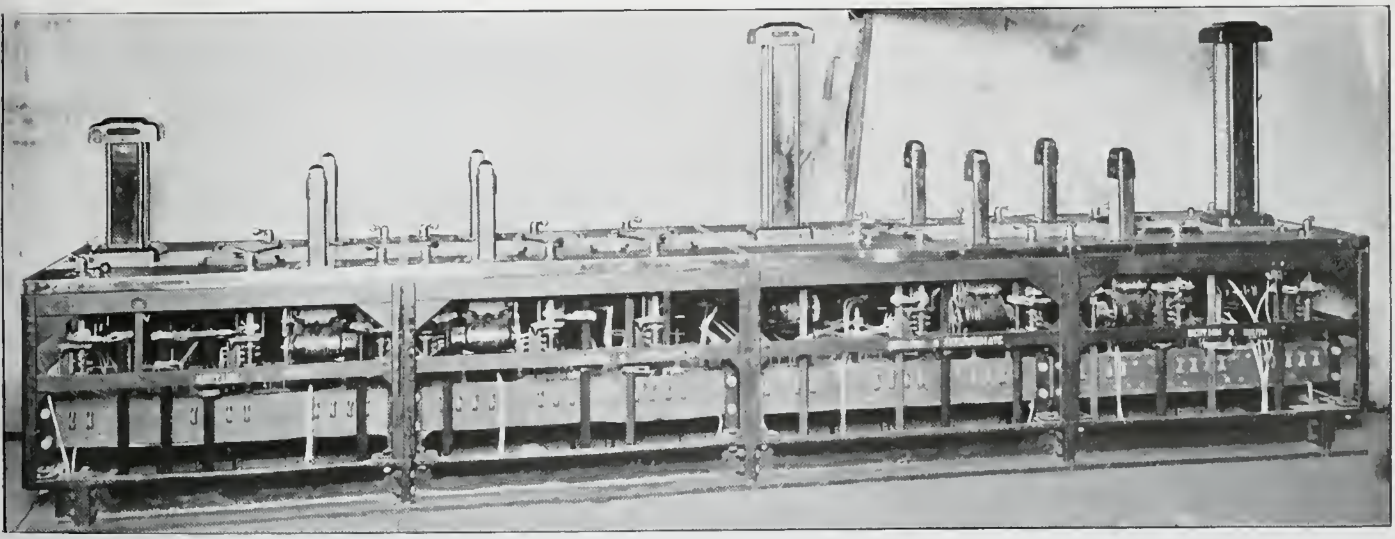
The Giulio Cesare is a magnificent passenger liner of 22,500 gross tons built at Wallsend-on-Tyne for the Navigazione Generale Italiana, to run between Geona and Buenos Aires. Her overall dimensions are: 633 feet in length and 76¼ feet in breadth, with a molded depth of 50¼ feet to the awning deck. Built to the highest class of the Registro Nazionale Italiano, the British Corporation and Lloyd's Register, the ship also fulfills the merchant shipping laws in Italy, the United States and Great Britain. She has eight decks with widely spaced pillars and girders, a straight stem, a cruiser-shaped stern, two pole masts and two funnels.

The very greatest care has been taken in the ship's construction to afford every possible protection to life. The watertight divisions and decks, the boats and other life-saving appliances, and the fire-extinguishing apparatus are extraordinarily complete. There are sixteen watertight doors giving access to various compartments in the ship, and these are operated hydraulically from the navigating bridge, or by hand gear at each door itself. The bulkheads between each boiler room and the engine room are watertight with no communicating doors. The builders have just carried out a series of exhaustive trials previous to the ship's departure to Italy. After all sorts of preliminary trials of auxiliary machinery and apparatus at the builders' yard, the ship was taken to sea for a six hours' test of speed. The next trial trip involved a continuous run of twenty-four hours at a speed of 19½ knots with the ship in a loaded condition, which was successfully accomplished. Following this was another twenty-four hours' trial at 18½ knots to test the consumption of coal. The guarantee given to the owners was easily achieved with a comfortable margin.

Greek Vessels

It is common knowledge that since about November there has been an epidemic of total losses and other casualties of Greek vessels. Most of the casualties have been in the nature of marine losses, but, curiously enough, there have been two vessels which have struck mines. Some months ago a good many underwriters refused to accept Greek steamers, and underwriters are now about to decide to exclude Greek vessels from all covers and open policies. It is not intended to sign an agreement to exclude Greek vessels altogether, but these will be held covered at rates to be arranged, and underwriters will maintain their right to cover such risks if they wish to do so. Since November some thirty odd steamers have been lost, three of them costing underwriters very heavily. They are the Iocasti, lost by fire; she was built in 1919 with a tonnage of 3747 tons gross; the Navarchos Koundouriotis, also lost by fire; she was built in 1918 with a gross tonnage of 5703 tons; and the Ioanna, lost by mine; she was built in 1920 with a gross tonnage of 5171 tons. Underwriters are giving notice that from March 3 until the expiry of thirty days they will continue to take Greek steamers under their covers; thereafter, the Greek steamers will be excluded.

NEW ORLEANS SHIP CANAL



Lock control board built by the General Electric Company for the Port Commission of New Orleans

A CANAL which will connect the Mississippi River with Lake Pontchartrain and will eventually provide a shorter water route from New Orleans to the Gulf of Mexico is now under construction by the Port Commission of New Orleans.

The canal is approximately five and a half miles in length, and runs through a section of the city of New Orleans. Its bottom width is 150 feet and its depth is 30 feet, making it adaptable for many classes of deep-water vessels.

Active work on the project was begun in May, 1918, and the canal is now about three-fourths completed. The expectation is that it will be possible to put the canal in commission during the coming summer, probably soon after July 1.

The canal represents a cost of $20,000,000, which was raised by bonds issued by the Board of Commissioners of the Port of New Orleans.

The canal is to be known as the Inner Harbor Navigation Canal. Its outstanding construction feature is a large reinforced concrete lock which will enable a fixed water level to be maintained in the inner harbor, and will overcome differences of elevation between the Mississippi River and Lake Pontchartrain. These differences of elevation between river and lake amount to as much as twenty feet.

The lock is located approximately 2500 feet from the Mississippi River and the connecting channel is 275 feet wide at the surface of the water. The lock has a usable length of 640 feet, a clear width of 75 feet, and will accommodate vessels of thirty-foot draft.

The water of the Florida Walk Drainage Canal, which crosses the Inner Harbor Navigation Canal at right angles, is carried under the latter canal by means of a reinforced concrete inverted siphon. Four railroad bridges, of the Strauss Bascule type, span the canal with channel spans of 117 feet.

The new canal provides an addition of approximately eleven miles of waterfront to the port of New Orleans. It provides a shorter route to the Gulf of Mexico through Lake Pontchartrain, saving many hours of travel and bringing New Orleans closer by water to the Alabama coal fields. It also completes one of the links in the intracoastal canal which is to stretch all the way from Boston, Massachusetts, to Brownsville, Texas.

A tract of land extending on either side of the canal a distance of 500 feet has been reserved for industries and shipping.

One of the most interesting features of the installation is the electrical switchboard for controlling the locks of the canal, which is a representation of the actual canal in miniature. This was worked out by the switchboard engineers of the General Electric Company.

Quite out of sight of the canal itself, one man as operator can control the movements of the lock machinery and see before his eyes just what is happening on the actual canal when he turns the control handles.

The system is patterned closely after the central boards built for the Panama Canal by the General Electric Company. The control apparatus there is also carried out as a model of the real canal. It is working satisfactorily and has attracted a great deal of interest among engineers.

The control board built for the Port Commission of New Orleans will be the first of its kind in the United States, and the only one outside the Panama Canal zone.

The miniature canal, or control board, is 16½ feet in length and is rated at 110-220 volts a. c. In solving the problem of lock control, the engineers so designed the switchboard as to show in miniature the actual operation of all main apparatus; also to indicate the level of water in the lock chambers and the position of all water valves.

The switchboard shows the lock chambers of the canal by a stretch of marble slabs, extending from one end to the other of the control board. At various points along the line of this miniature canal, columns rise to various heights. These columns are scaled for reading, and indicate the rise and fall of water in the lock chambers when the operator, by means of the control handles, opens and closes the water gates in the actual canal.

On the top and near the edges of the board are located the control handles. These handles are operated through an angle of 90 degrees. They open and close the circuits to the electrical apparatus which works the lock machinery, located in the walls of the locks. Name plates show the "open," "close" and "off" positions of the handles.

A special arrangement was worked out to take care of the question of interlocking. A series of vertical and horizontal bars is provided, which move in a direction 90 degrees apart. The bars are provided with beveled stops, known as "dogs," designed to engage one another.

When these dogs meet, it is impossible to move one bar until the turning of a control handle has lifted the dog out of the way. Other control handles meanwhile are locked out of action.

The advantage of this arrangement is that there is no possibility of an incorrect sequence of control. No handle can be turned out of its proper order, so that the operator cannot move handle No. 4 before he turns handle No. 3, a proceeding which might empty the water out of a lock while the vessel was still in the lock chamber. The Sylsyn system is used as the medium of indication between the lock machinery and the switchboard.

OPERATING COSTS

Here is a very interesting commentary on the reasons why American ships are being laid up. It is written by a New York operator. The same comparative conditions apply to operating on the Pacific Coast.

IN connection with the cost of operation, we have seen very few remarks on this subject which set forth the matter more clearly than the following open letter addressed by the executive of the Oriental Navigation Company of New York to its sea and shore employes and to anyone else to whom it may be of interest.

This letter was sent out on the occasion of the laying up of the steamer Orinoco on account of low freight rates and small offerings. It is to be especially noted from the figures set forth that they make no provision for overhead, depreciation, interest and other capital charges. Were these added, the loss shown would be at least three times as great as is indicated by the figures in the letter.

The expenses of operating our steamer Orinoco on a round voyage to the River Plate are as follows:

1. Insurance 120 days (based on only $60 per deadweight ton)	$ 9,032
2. Wharfage at New York (outward bound)	3,500
3. Stevedoring at New York (outward bound)	12,000
4. Ship's wages 120 days	18,760
5. Provisions, stores and repairs	22,000
6. Fuel (1800 tons of oil at $13)	23,400
7. Stevedoring southbound cargo at Buenos Aires	10,000
8. Stevedoring northbound cargo at Buenos Aires	10,000
9. Stevedoring northbound cargo at New York (wet hides)	14,000
10. Wharfage northbound at New York	3,500
11. Clerking, watching, port charges and sundries	10,000
Total	$136,192
The maximum gross freights at today's rates could not possibly exceed	120,000
So this is why the Orinoco and other steamers are laid up and a number of you thrown out of work. Loss	$ 16,192

No provision is made in the above figures for office salaries and expenses, nor for depreciation of the steamer, interest and other capital charges.

We would increase the rates if we could (obviously), but we cannot.

Would you help reduce the costs if you could? You and we know that you can—some of you already have; but the stevedore still averages $1 per hour for a day's work, and the sailor gets $85 a month and found (I got $22, less than twenty years ago). Overtime is still the watchword; grapefruit and ducks still appear on stewards' requisitions; shore gangs are still called upon for minor repairs; all this with thousands of sea-going men and officers on the beach and the stevedores averaging only one or two days a week.

What are you going to do about it? Think it over—if you want to help us keep the flag flying.

PHILIP DE RONDE, President.

THE GREAT LAKES ORE TRAFFIC

By W. A. CHAPMAN
Manager of the Western Department, Fireman's Fund Insurance Company

Reproduced by courtesy Fireman's Fund Record

W. A. Chapman

The development of the Mesaba Range, part of what is said to be the largest iron producing district in the world, has been a big factor in the growth of the country's iron and steel industries. When Lake Superior ores were first used, the ordinary lake vessel's cargo was 500 tons, which required several days to load and unload at each of the four points where it had to be handled. The average ore car carried ten tons. Now there are vessels that load as high as 16,000 tons at the upper ports in an hour or two, with one or two men on the dock. These ships unload directly into 50-ton cars in the same time, without manual labor. Something of what this traffic means is told in the following article.

No more romantic or wonderful story of business or social development has ever been unfolded to modern man than the story of iron, the magic metal to which many cities and several states credit their prosperity. Since the discovery of almost unlimited natural deposits of iron ore in Michigan in the early fifties, and in northern Minnesota in 1892, to the present day of Iron Range development, a steady stream of wealth has been flowing from open pits and subsurface mines to eastern furnaces to such an extent as to place the industry on a business volume basis equal to, if not greater, than that of the American octopus of oil.

In many respects the 1920 season of iron ore production, which of nesessity closed December 1, when marine insurance on the Great Lakes officially terminates, has been the most remarkable in the history of the industry. Weather conditions have been most favorable; the problems of transportation, coal supply, labor and industrial readjustments have been met and overcome in a manner that reflects credit upon this particular branch of business, and the coming season of activity will find the mining companies prepared with new and improved equipment to surpass all prior production records.

The state of Minnesota has contributed the bulk of the 60,100,000 tons of iron ore transported from the ore loading docks of the Great Lakes region for the season of 1920. Of this movement 1,600,000 tons were shipped by rail, and 58,500,000 tons by vessels.

From the Mesaba Range, which is the leading producer of mineral wealth in Minnesota, a total of 34,312,880 gross tons of iron ore was shipped during the season just closed. Since its opening in 1892, this range has furnished 554,999,511 tons of iron ore to the world, which is more than half of all the ore that has ben shipped from the Lake Superior region since the first Michigan ore was transported in the fifties.

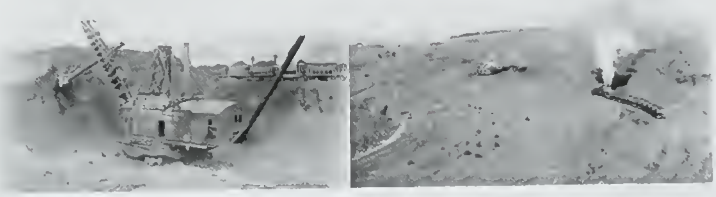
The development of this industry has proven to be a boom and benefit to the communities situated on the Iron Range in Minnesota and at other points where vast quantities of this natural mineral wealth are to be found. Steel corporations favor modern cities with paved streets, exceptional school and hospital facilities and up-to-date fire fighting apparatus, and where public funds have proven inadequate to meet public needs, the deficiency has been met from the private coffers of the corporations owning and controlling these mines.

Today the new and modern city of Alice, Minn., is nearing completion to take the place of the main business section of Hibbing, under which the exploration operations of the mining corporations have discovered what is said to be the richest vein of iron ore in the world. While the tremendous task of moving the old city and constructing the new is in progress, that the hidden vein of rich mineral may be uncovered by stripping operations, there has been removed from surface and underground mines of the three iron ore producing ranges in Minnesota during the 1920 season, the enormous total tonnage of 47,443,028 gross. Every pound of this tremendous weight has either been removed by rail from the point of production to ore loading docks at the lake ports of Duluth, Superior or Two Harbors, or is in stock piled high on the surface awaiting the reopening of Great Lakes navigation next April.

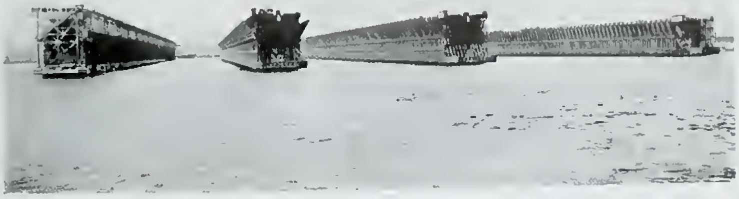
The greatest problem of the iron ore industry is that of transportation. Transportation of the metal by rail presents numberless difficulties, which has been the dominating factor in influencing the construction of enormous docks of steel and concrete at the lake ports, from which the cheaper water transportation is obtained.

The largest docks are located at Duluth, Minn. These docks, four in number, project 2,304 feet into the haror waters. They are equipped with 384 pockets each, a total of 1,536 pockets, with a gross capacity of 402,200 tons available for loading and storage purposes at this one point alone. When it is considered that there are at present a total of thirty ore loading docks at Great Lake ports in the United States and Canada, having a combined storage capacity of 1,741,300 tons, some idea of the immensity of ore production and transportation may be obtained.

Trains of ore are run out on the docks, where contents of cars are dumped into pockets having a capacity of from five to seven cars of fifty tons each. From the dock pocket to the waiting ore freighter, it is merely a question of gravitation. Steel spouts convey the fine ore from dock levels to the vessel hold, the larger lake transports having a gross carrying capacity of 12,000 to 16,000 tons.



Scenes at surface iron mines



Four of the ore docks at Duluth

The progress made in transportation methods in fifty years was summarized in an address before the American Iron and Steel Institute by Joseph G. Butler, Jr., of Youngstown, Ohio, as follows:

"In the old days men with shovels

Ore carrier at a Duluth dock. These docks work entirely by gravity from dump car to dock pocket to ship's hold.

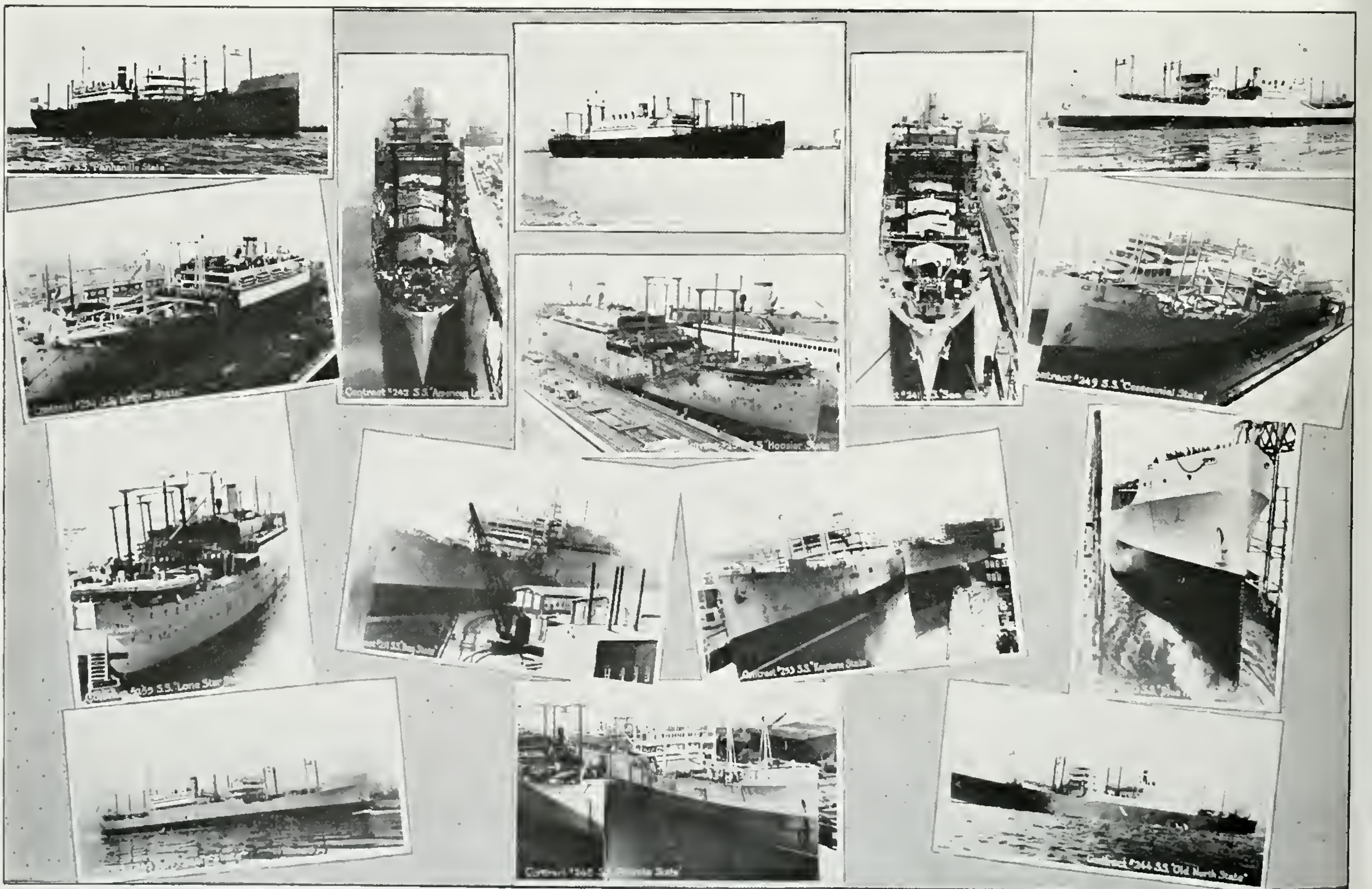
loaded the ore at the mines into small cars, from which it was transferred to railroad cars. They handled it again the same way four times before it reached the furnace, for even the hopper car had not then been invented. Aside from being the most laborious task to which a human back was ever bent, this was extremely costly and slow beyond your belief. Now we handle this vast tonnage entirely by machinery.

"Steam shovels mine the ore; it flows by gravity into great vessels; huge unloaders transfer it to railroad cars and car dumpers empty it under ore bridges—all the work being done by power and at a speed little short of miraculous. These things were all unknown half a century ago. They are the product of the tireless brains and the unflagging energy of the men who have built our industries to their present colossal proportions."

Naturally, transportation charges play no small part in the problem of initial costs. While mining conditions and varying distances are determining factors, it has been said, in a general way, that one dollar will load a ton of iron ore at the mine; that twenty-five cents will take it to the vessel hold and an additional twenty-five cents will carry this ore to the smelter.

The best obtainable information indicates there are approximately three hundred and fifty ore freighters on the Great Lakes, and the experience from an insurance standpoint appears to have been reasonably satisfactory.

Lake freighter in canal at Duluth bound for eastern lake ports. Note aerial bridge in background.


S.S. "Panhandle State"
Contract *243 S.S. "Aeolus"
S.S. "Hoosier State"
Contract *249 S.S. "Centennial State"
S.S. "Lone Star"
Contract *253 S.S. "Keystone State"
Contract *244 S.S. "Old North State"

Pictorial layout showing combination steamships built by the New York Shipbuilding Corporation for the United States Shipping Board
Copyright by New York Shipbuilding Corp.

THE YANGTSE STEAMER ANNING

THE Yangtse-Kiang, in addition to being one of the longest rivers in the world, is remarkable in being the only artery connecting the province of Szechuen with the outer world, except for foot trails which in places pass through difficult country and over high mountains. The province of Szechuen, known in Chinese history as "Nature's Treasure House," has an estimated population of about sixty to seventy million people, so that the provision of an adequate steamship service on this river is of very great importance.

On the lower reaches ordinary steamers of considerable size can navigate as far as Ichang, a distance of about 1100 miles from the mouth. Above Ichang, however, the conditions are considerably changed, the river between that town and Chungking passing through rugged mountain defiles, where the depth of water ranges from six to sixty fathoms at the low level of winter.

The rapids, whirlpools, "boils," "freshets" and other phenomena peculiar to this part of the river, combined with local fogs and shifting shoals, render navigation more difficult than in almost any part of the world, and call for a vessel having shallow draft, propelling machinery of abnormally high power, good steering capabilities, reliability and special arrangements for warping or hauling over a rapid.

In 1913 the Shu-hun was constructed by Messrs. Yarrow & Company for the Szechuen Steam Navigation Company to ply between Ichang and Chungking. The great success of this vessel has resulted in the ordering of a number of vessels of the same type. One of these, the Anning, has recently been completed at Messrs. Yarrows shipyard in Glasgow and shipped in a knocked-down state to be assembled in China.

The Anning is an almost exact duplicate of the Shu-hun, but embodies several improvements which have been introduced since that vessel was built. Her length overall is 190 feet, beam 30 feet and the depth molded to main deck 8 feet. The hull is divided into nineteen compartments by transverse and longitudinal bulkheads, and watertight doors are fitted to the bunker bulkheads.

There are four decks, namely, the main deck, upper deck, boat deck and awning deck. The accommodation for European and first-class Chinese passengers is on the boat deck, and consists of a dining saloon, six two-berth staterooms for Europeans, a dining saloon, and nine two-berth and one four-berth cabins for first-class Chinese. Also pantry, galley, bathroom, cook and boys' cabin.

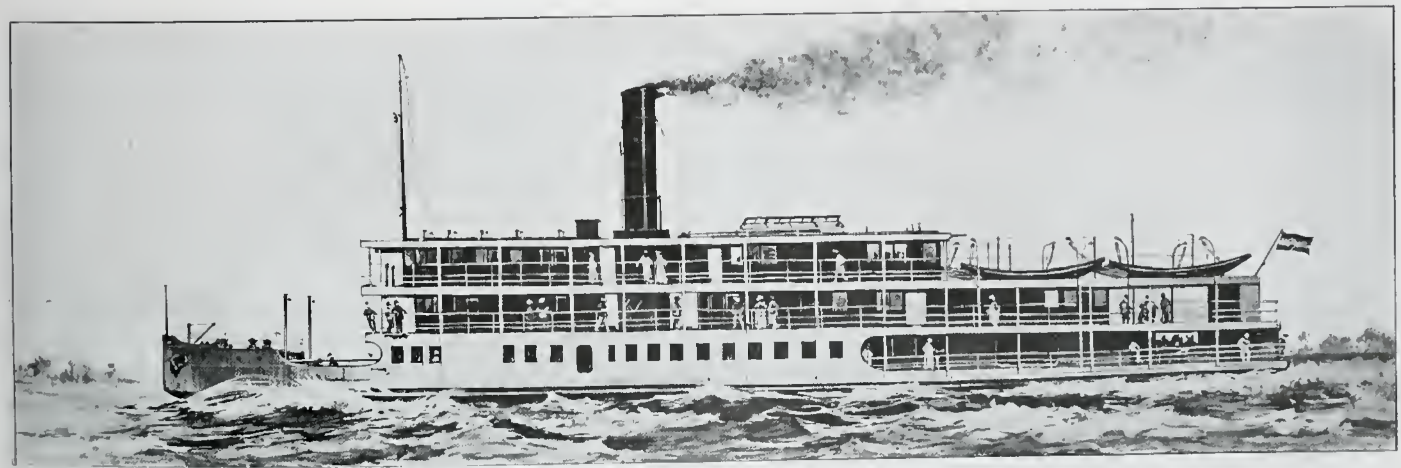
The accommodation on the upper deck consists of captain's, chief engineer's and chief officer's cabins; second-class Chinese dining saloon, nineteen four-berth and six two-berth second-class cabins, purser's office and cabin, and bathroom. On the main deck there is accommodation for 206 Chinese steerage passengers, fifteen firemen and three Chinese engineers. In the forecastle there is accommodation for four petty officers and twelve men, and there is also a mess place for fourteen cooks and boys. The vessel is lighted throughout by electric light, the current being supplied by an oil-engine generating set so as to obviate the necessity of keeping up steam when the vessel is moored for the night.

There are five separate holds for cargo having a total capacity of 16,000 cubic feet, which corresponds with a deadweight capacity of about 260 tons at five feet draft.

There is a special double headed steam capstan forward, one head being arranged for working the anchors and for ordinary warping purposes, the other being specially designed for warping up the rapids at such times as these may be too strong for the steamer to navigate under her own power. Large rollers are fitted on the berthing for bringing in the warp. Strong bollards and fairleads are arranged both forward and aft.

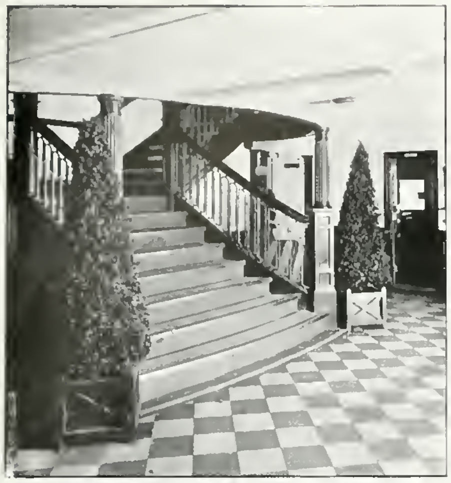
The main propelling machinery consists of two sets of triple expansion surface condensing engines of Yarrow & Company's standard design, having large bearing surfaces suitable for the special service in which this vessel will be engaged. The engines are capable of developing about 2000 I. H. P. collectively. The condenser is of the "Weir Uniflux" type and the usual air and circulating pumps and other auxiliary engines are fitted, including an evaporating plant. The boilers are two in number, of the Yarrow patent double ended type, each boiler being fitted with an independent funnel; they are arranged to burn coal only, and two fans are fitted for providing forced draught. The main and auxiliary feed pumps are by G. & J. Weir, Ltd.

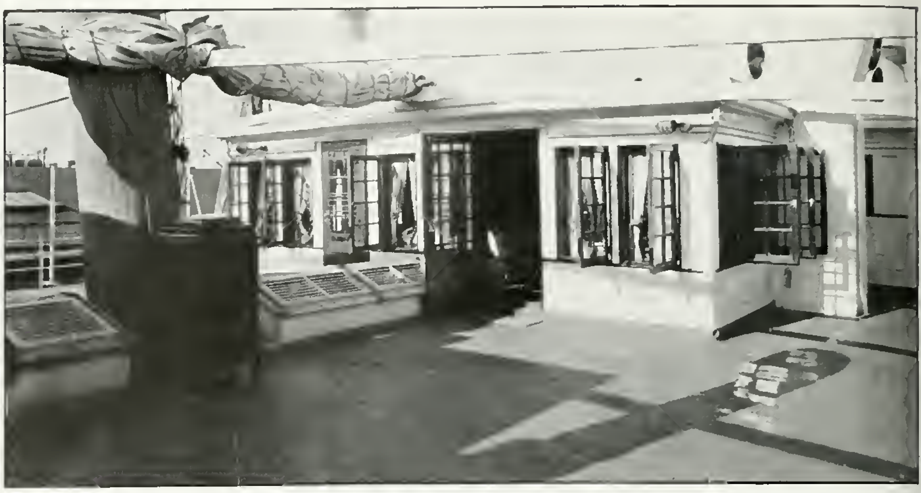
The propellers are of large diameter suitably designed for transmitting the large power which the engines develop. They work in tunnels fitted at the after end with the Yarrow patent automatic flap, which system was so successful on the Shu-hun and numerous other shallow draft vessels and which insures maximum propulsive efficiency at any draft.



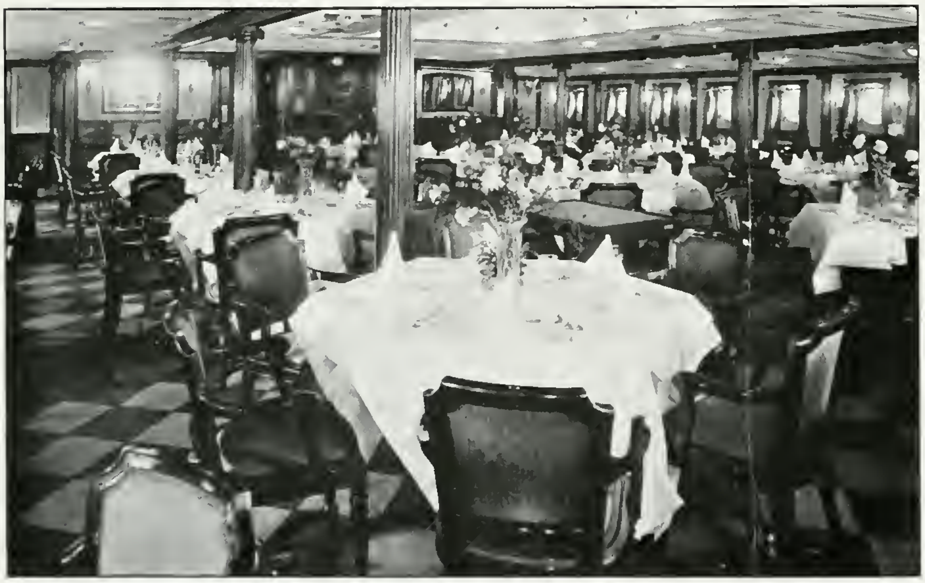
Shallow draft Steamer Anning built by Yarrow and Company at their Scotstoun Yard for the Szechuen Steam Navigation Company for use on the Yangtse-kiang in the upper gorges

SOME VIEWS ON STEAMSHIP SAN LORENZO

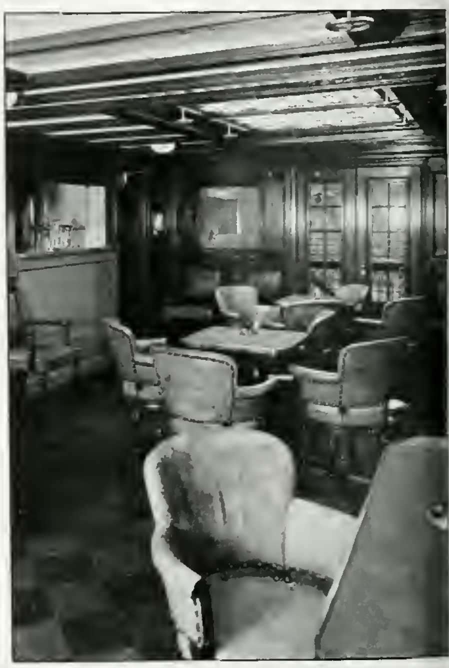




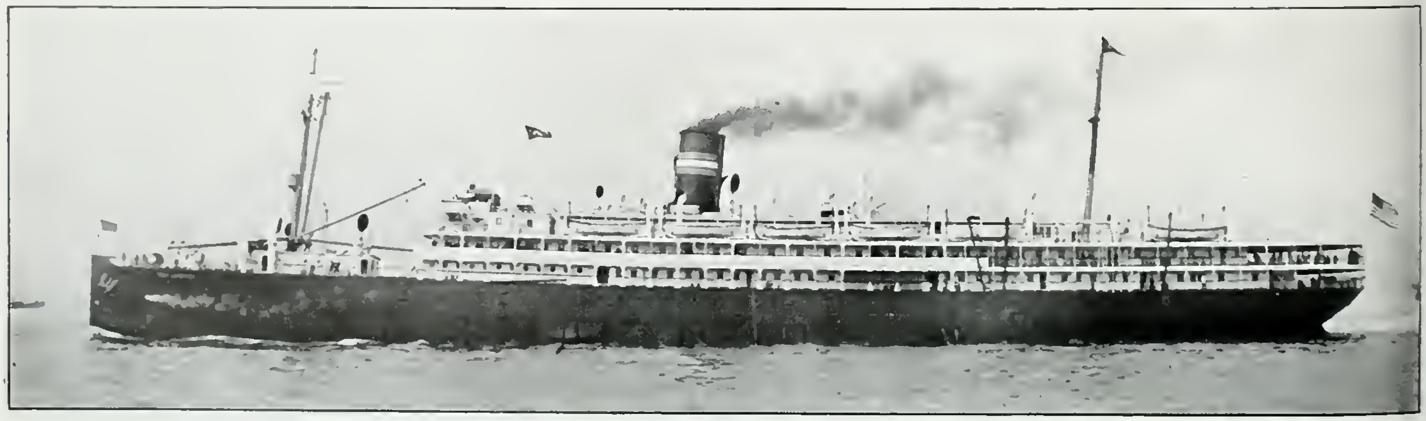
Left.—Main stairway from the dining saloon. Note the beamed and paneled ceiling, graceful newels and banisters. Right.—New deck especially constructed for dancing, and vista into the sun parlor. The latter is handsomely fitted out with wicker chairs and tables and, being located at the head of the main stairway to 'tween deck quarters, makes an elegant lounging place. Note the Victrola bolted to the deck.



Main dining saloon showing various arrangements of table settings. In the design of this feature of the reconditioning of this vessel a determined attempt has been made to get away from the conventional set arrangement of tables, and we find here octagonal, square and oblong tables of varying capacity so that special groups may have seatings to suit their tastes.



One corner in the smoking room



S. S. San Lorenzo leaving New York harbor on her first trip after reconditioning

THE RECONDITIONED S. S. SAN LORENZO

WHEN the steamship San Lorenzo sailed for Porto Rico on March 12, the New York and Porto Rico Steamship Company had added to its high class passenger service what was virtually a new vessel.

Under her original design the San Lorenzo, ex-steamer Brazos, was well known in the New York and Porto Rico trade. Last fall her owners turned her over to the Robins Drydock and Repair Company, at Erie Basin, where, from the plans and specifications prepared by Theodore E. Ferris, the prominent naval architect and marine engineer, along lines laid down by Mr. Franklin D. Mooney, President, New York & Porto Rico Steamship Company, the vessel has been rebuilt and refitted, the work having been carried through to completion under the supervision of Mr. Ferris.

The San Lorenzo is of the hurricane deck type, having a main, lower and orlop deck. She carries a double bottom under the boiler space and built-in fresh water tanks. There are five transverse bulkheads. The house erections were built amidships, two decks high.

The dimensions of the vessel are:

Length over all	416 feet
Length between perpendiculars	400 feet
Beam moulded	54 feet
Depth moulded hur'icane deck	37 feet
Draft, loaded	24 feet
Draft, light	12 feet
Weight equipped ship, about	4500 tons

Six new, single end 4-furnace Scotch boilers (built by the Newport News Shipbuilding & Dry Dock Company), 15 feet 8 inches in diameter and 12 feet 4 inches long were installed on new foundations, one large double stack taking the place of the two smaller ones. The double bottom tanks were fitted with heating coils and grids and piped in preparation for fuel oil.

In connection with the new fuel system, all equipment for the use of coal, such as ash ejectors, ash hoists and other articles of this kind were removed. The coal ports, on port and starboard sides of the lower deck, were permanently closed. A new boiler hatch was rebuilt to suit the latest arrangement. The top or fidley being fitted with gratings and hinged covers. The fire room is served by four new ventilators, 48 inches in diameter, the turning gear on the cowls being operated from the fire room grating at the lower deck level.

During the reconstruction period, machinists were busily engaged in overhauling the propelling machinery. The main engines were carefully examined, the cylinders undergoing a thorough inspection, while the pistons, rings and any other moving parts found to be in need of repair or renewal were promptly fixed. All of the machinery, both main and auxiliary being brought into first-class working condition.

Aft, on the old hurricane deck, in way of the "cut-down," the steel deck houses were joined. The new decks carried out to the ship's side were fitted with rails, stanchions, beams and supports in a similar manner to the old construction. The ship was put in drydock and the bottom scaled, cleaned and painted up to the load line.

It was found necessary to renew the old hurricane deck forward of the deck house with entirely new steel plating; a wood deck being laid over the steel.

In order to supply the new living accommodations, a completely new system of water piping was necessary throughout the ship. This included both fresh and salt water, as well as sanitary piping for the toilets.

The electrical work required a complete installation for lighting throughout the ship. Annunciator and call systems were installed in all the quarters.

Ventilation ducts necessary to fit the new arrangement were built as called for. The fire main was altered and additions made to bring it up to the requirements of the new arrangement of the ship.

To make the vessel comfortable in cold weather, the steam heating system was entirely repiped, using as many of the old radiators as possible after having thoroughly cleaned and put them in first class condition.

With the new arrangement the boat, or "A" deck as it is now termed, will have the captain's office and state room, together with the quarters of the first, second and third officers grouped in one deck house directly below the navigating bridge. Aft of this, in a larger deck house, will be quartered the engineers and petty officers, on the starboard and port sides, respectively. The officers' mess follows these quarters on the starboard side, while the petty officers, cook, pantry man, etc., have quarters on the port and starboard sides, midway of the boiler hatch. The chief engineer's state room is on the starboard side abreast of the engine hatch, with the first assistant directly opposite on the port side.

The main stairway coming from the deck below brings the passengers up to "A" deck, on which is located the sun parlor, directly at the head of the stairs. This room is well furnished and will be used for a resting place. Aft of the sun parlor, on the same deck, is located the smoking room which will have the customary tables and lounges; abreast of this room on the port side will be the refreshment room with the barber shop on the starboard side. The shelter deck enclosure, further aft, with its wide windows and doors, will be a popular resort in rainy weather.

The wireless room is in a separate house on the deck nearer the stern, standing in the middle of what is termed the dancing deck, an open space for the amusement of the passengers.

Strung along this deck amidships, there will be 14 life boats, each capable of holding 35 persons.

The inside finish of all the quarters was planned to be neat, artistic and in harmony with the surroundings. The main stairways have mahogany newel post, rail and risers, the balustrade of metal. The finish around the well opening, the stairway, the inside finish of doors, and suite rooms as well as the window trim and blinds is of mahogany. The wall finish of these rooms is vehisote, of large panel effect. The suite rooms have mahogany dressing cabinets and wardrobes with mahogany doors.

The social halls are finished with a mahogany wainscote with the panel work of vehisote, ending in a carved cap; the decoration in the lounge and music rooms being obtained by approved tints and gold marking or ornamentation on panels. Fumed oak is the general finish in the smoking room.

With open deck space between the forward house and the main house on this deck, the bulkhead forming the forward end of the main dining saloon has large ports affording plenty of light and air.

This room is well arranged to give the maximum accommodation and comfort in order to overcome the set and stiff appearance so often seen in dining rooms in even the largest steamers afloat; the naval architect has so grouped the tables as to give a choice to the most exacting passenger. Some of the larger tables in the central part of the room will seat eight people and others will accommodate six at one sitting. For smaller families, tables seating three may be found while tables with only two seats are located against the bulkheads. This arrangement is new for this type of vessel and will probably be copied in many others.

MOUNT CARROLL'S POWER PLANT

IN Pacific Marine Review for April, on page 224, we described in considerable detail the new combination freight and third-class passenger steamers, Mount Clinton and Mount Carroll, which have been recently built for the United American Lines by the Chester plant of the Merchant Shipbuilding Corporation. Since that description was written we are in receipt of additional information concerning the details of the main power plant of these vessels, together with the very fine pictures of the Mount Carroll and of her engine room, which are used in illustrating this article.

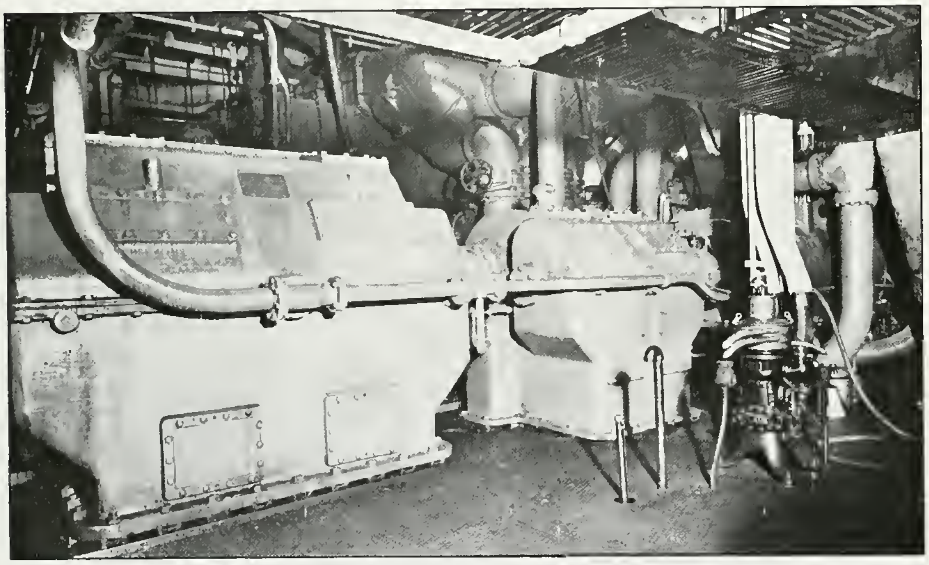
The propelling equipment of each ship consists of a 4200-S. H. P. Westinghouse geared compound turbine, which consists of two separate elements, high pressure and low pressure, either of which can be used alone in case of emergency. Astern turbines are incorporated in each element.

A special feature of these turbines is the use of a new type of governor, which automatically keeps the turbines from racing when the vessel is light or the screws come out of water and thus prevents the racking of the machinery and relieves the engine room crew of long hours at the throttle during heavy weather. The mechanism is not operated by steam in the usual manner, since deposits of dirt from the steam sometimes interfere with the extreme reliability of operation that is desirable. Instead, oil under pressure is used. This oil is derived from the lubricating supply of the turbine, and the controlling pressure is maintained by a small centrifugal pump mounted on the turbine shaft. As the oil supply is of necessity always available, and the controlling pressure varies directly with the speed of the turbine, a very sensitive and reliable governor is obtained.

The gears are of the double-reduction type and consist of three units: two high-speed gears, each driven by a turbine element; and a low-speed gear, which is driven by the high-speed gears and drives the propeller. The total speed reduction is from 3600 R. P. M. to 90 R. P. M. All of the pinions are mounted in floating frames so as to insure uniform distribution of the tooth pressure.

The main condenser has an area of 6000 square feet and is supplied with circulating water by a pump driven by two turbines, either of which can drive the pump. The vacuum is maintained by air ejectors. All of this auxiliary apparatus is of Westinghouse make.

In addition to the Mount Carroll and the Mount Clinton, the Shawmut Steamship Company operates three other Westinghouse equipped vessels: the Sudbury, the Ipswich, and the Mystic. All three of these vessels have been in active service for some time and have had excellent performance records.

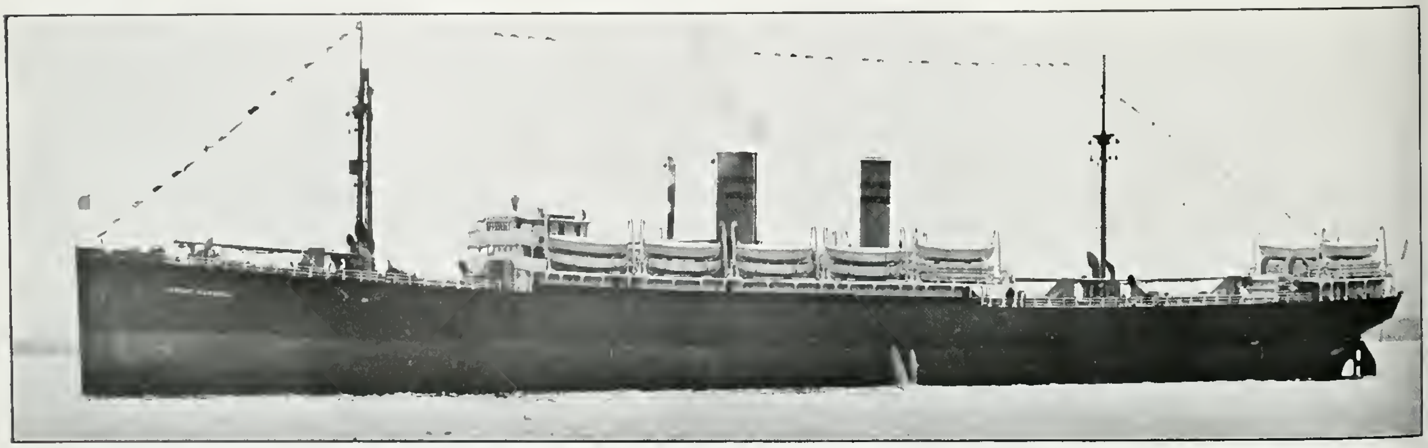


View in the engine room of the S. S. Mount Carroll showing double stage, floating frame reduction gears, steam turbine and condenser. Note centrifugal oil purifier at the right foreground.

MOTOR LIFEBOATS

WHEN the White Star Line steamer Olympic resumed her sailings from Southampton to New York, after having had her oil-burning installation increased in capacity to take sufficient oil for the round trip, she carried, in addition to her ordinary lifeboats, two special motor lifeboats—one on either side of the ship—each twenty-eight feet in length and accommodating thirty-six persons.

The boats are fitted with Marconi's wireless telegraphic apparatus, having a range of about fifty miles under ordinary conditions at sea. The aerial is carried aloft over the two masts, which are so arranged as to be convenient for hoisting into position.



Combination freight and third class passenger steamer Mount Carroll built for the United American Lines at the Chester plant of the Merchant Shipbuilding Corporation

MARINE INSURANCE

CHARLES F. HOWELL, EASTERN CONTRIBUTING EDITOR

The Governor Loss

The most serious loss of the year in Pacific waters occurred when the Pacific Steamship Company's passenger liner Governor was rammed and sunk by the Shipping Board freighter West Hartland April 1 off Point Wilson, near Port Townsend, Puget Sound. In addition to the total loss of the Governor, the West Hartland was seriously damaged. Eight passengers of the Governor were lost.

Insurance on the Governor was approximately $1,250,000, almost all of which was carried in New York and London, only about 3½ per cent having been placed in San Francisco. Insurance on the Governor's cargo aggregated between $180,000 and $200,000.

The West Hartland was operated by the Pacific Steamship Company, but her liability, if any exist, will fall upon the Shipping Board.

Blame for the disaster was placed by the United States steamboat inspectors on the pilot and first and second mates of the Governor. Captain Edward P. Bartlett of the Governor was absolved of blame and was praised for his supervision of the debarkation of passengers.

Captain Harry H. Marden, pilot, was held guilty of inattention to his duties "in not leaving the pilot house, the windows of which were closed, in response to the lookout and bridge quartermaster, that certain lights were in close proximity, which violation resulted in the collision."

Ernest Kellenberger, second mate of the Governor, was inattentive "in not keeping a proper lookout after relieving the third mate to take the 12 to 4 watch, a. m., April 1, 1921, when the steamer lights were in plain view and had been previously reported, and which inattention resulted in disaster to his vessel. He was at this time in official charge of the steamship Governor."

Arne Hage, third mate, in charge of the Governor before midnight, was charged with inattention to his duties "in not leaving the pilot house, the windows of which were closed, in response to the lookout and bridge quartermaster that certain lights were in close proximity, which violation resulted in the collision between the steamship Governor and the steamship West Hartland. The West Hartland, having discharged her pilot off Port Townsend, had set a course to pass Point Wilson that would cross obliquely the course of any vessel passing Pilot Wilson on a course laid within three-eighths or so of a mile off Marrowstone Point. When the master of the West Hartland, Captain John Alwen, who had personal charge of the navigation of the vessel at the time, first saw the approaching lights of the Governor, he realized that the vessels were developing a crossing situation. He watched the approaching lights anxiously, but abided by the provisions of the crossing rule."

Underwriters Win

It is now a certainty that the legislative program desired in New York by the underwriters is to become law. The brightest minds in both ship operating and marine insurance were recently arrayed against one another in hearings at Albany on the proposed amendments to Section 45 and Section 22 of the New York law, and when Insurance Superintendent Jesse S. Phillips threw his influence into the scale on the side of the insurers the result no longer was in doubt.

The ship owners' interests were centered upon the adoption of the proposed amendments of Senator Karle; and their argument was that the fostering of the American merchant marine is being frustrated by the imposition of barriers preventing their securing sound foreign insurance at rates lower than those asked by American insurance companies which entails upon them a competitive disadvantage and prevents their meeting foreign ship operators on equal terms. When asked by Superintendent Phillips whether they would be willing to pay taxes on all their insurance written directly abroad, which is what the ceding domestic insurance companies must do when they use the reinsurance markets on the other side, it was replied that such a requirement would be unconstitutional. To this Mr. Phillips made answer that the taxation committee was preparing a bill requiring every person or corporation placing insurance with an unauthorized company to report such business and pay taxes thereon. Just such a bill was defeated last year.

The Karle amendment to Section 22 has been killed by the action of the Senate insurance committee in reporting favorably on the amendments to 150 and 22 as drafted by the state insurance department. These two amendments will restore the reinsurance facilities needed by American companies by permitting the making of reinsurance treaties directly with the home offices of foreign marine companies that maintain American branch offices, and will also extend the field of operation of our insurance companies by permitting their writing additional kinds of business. The Karle amendment to Section 45 would nullify the famous legislation of last year and restore the American market to direct writings by foreign companies, free of taxation. In the language of Superintendent Phillips: "We cannot tax part of the market and allow the rest to go free. A divided policy won't do while we continue to have insurance regulations." The Karle amendment to Section 45 is hopelessly doomed.

Lake Business

Exceptional freedom from ice in the Great Lakes has attracted earlier and livelier attention to underwriters' interests in those regions than usual. Important meetings were held in New York recently by the Lake Grain Tariff Association and the Lake Hull Underwriters' Association to canvass the outlook for the 1921 season. In a limited way, the underwriting season was advanced by a couple of weeks; that is to say, although April 15 regularly marks the opening of navigation on the Lakes it was decided to quote rates as early as April 1. The same rates and valuations will obtain this year as last, and the same form of policy will be used, without change. In event of a claim for total loss on wooden vessels the liability of the underwriters is to be limited to 75 per cent of the values as agreed upon in the policy.

The outlook, all things considered, is none too bright for the underwriters. Until the grain season opens there will probably be little business. The wharves of the chief Lake ports have comparatively little ore; and it is profitless to carry coal north if the steamers have to come back half loaded. According to competent authorities, there are about 350 ore-freighters on the Great Lakes. They are of improved, scientific construction, and that means a substantial reduction in the hazards of this kind of business.

Transportation is the great problem of the ore miner, and he finds water carriage by far the cheapest and most satisfactory. In 1920, 60,100,000 tons of iron ore was transported from the loading docks of the Great Lakes region, and, of this total, Lake steamers carried no less than 58,500,000 tons. Handling the ore has improved beyond belief. When Lake Superior ores were first used the ordinary Lake boat's cargo was 500 tons, and this had to be loaded and unloaded at four different points, entailing a loss of several days' work at each point. In those days the average ore car carried ten tons. Today there are vessels that load 16,000 tons at the upper ports in an hour or two, with but a man or two to do all

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

of the work; and, similarly, without manual labor, these steamers unload directly into 50-ton cars in the same time.

For Cheapest Repairs

A new tender clause has been substituted for the old one in the Institute Time Clauses by the British Institute of Underwriters, the chief advantage secured being the opportunity for effecting repairs in the cheapest market. It is asserted that the clause will reduce particular average claims, and secure substantial advantages for both shipowners and underwriters. When the clause is used a reduction of 20 instead of 10 per cent in the assured value is allowed; this is shown to be an earnest of the willingness of underwriters to meet the needs of the owners and is considered as a definite concession in return for a possible but indefinite reduction in particular average claims. It is anticipated that the right to select the most economical market in which ship repairs may be made will effect savings as high as 100 per cent, in instances, and will have a wholesome effect upon the attitude of yards that persist in keeping costs of repairs as high as possible. The new clause reads as follows:

"In the event of accident whereby loss or damage may result in a claim under this policy, notice shall be given in writing to the underwriters where practicable, and if abroad, to the nearest Lloyd's agent also, prior to survey, so that they may appoint their own surveyor if they so desire. The underwriters shall be entitled to decide the port to which a damaged vessel shall proceed for docking or repairing (the actual additional expense of the voyage arising from compliance with underwriter's requirements being refunded to the owners) and underwriters shall also have a right of veto in connection with the place of repair or repairing firm proposed.

"Whenever the extent of the damage is ascertainable, the underwriters may take or may require the assured to take tenders for the repair of such damage. In cases where a tender is accepted by, or with the approval of underwriters, the underwriters will make an allowance at the rate of £30 per cent per annum on the insured value for the time actually lost in waiting for tenders. In the event of the assured failing to comply with the conditions of the clause £15 per cent shall be deducted from the amount of the ascertained claim.'

Will Formulate Rules

A movement of considerable interest to underwriters and adjusters, both of the West and of the East, has been started by the Association of Marine Underwriters, San Francisco. This is the declared intention of the association to ascertain what have been the customs of Pacific marine insurance, especially in adjusting, and to reduce these customs, hitherto informal and unwritten, to a set of rules comparable to those of London.

The first step was the appointment of a committee, consisting of C. A. Hulme, underwriter for the companies represented by George H. Tyson; George Jordan of the Fireman's Fund Insurance Company; W. C. Girdlestone of Balfour, Guthrie & Company, and H. J. Knowles, agent of the Boston Insurance Company. These men will inquire into the practices of the association and reduce their findings, so far as practicable, to a definite formula, which thereupon will be placed before a meeting of the association for discussion.

This system doubtless will result in considerable time being consumed in formulating all the rules, but the loss of time will be offset by a decided gain in clarity and comprehensiveness. During the thirty-six years of the existence of the Association of Marine Underwriters (it was organized in 1885), quite a body of custom naturally has grown up. In some cases, however, uncertainty has prevailed as to the rule of a particular case and recourse to other rules has not been altogether satisfactory.

The meeting of the Association of Marine Underwriters doubtless will result in some interesting discussions.

London Pilferage Proposal

Undiscouraged by the failure of their attempt to stop the heavy run of losses from theft, pilfgerage and short deliveries through the adoption of an underwriting clause that the crafty brokers found a way to beat, British marine insurance men have come forward with still another clause. The Institute of London Underwriters has cabled it to American underwriters with recommendations for its adoption on this side, and to this end a committee for its consideration has been appoilnted at New York consisting of William H. McGee, W. J. Roberts and H. H. Reed. It is feared that the usual non-co-operation in the American marine market will kill it here. It is hard to understand why certain underwriters who are losing money freely on these lines should persistently block every attempt to meet the problem. The London clause is as follows:

"(a) It is hereby agreed that this policy covers the risk of theft and/or pilferage irrespective of percentage, but only to pay 75 per cent of the shipping value of any goods so lost. No liability for loss to attach hereto unless notice of survey has been given to underwriters' agents within ten days of (? from) the expiry of risk under the policy.

"(b) It is hereby agreed that this policy covers the risk of non-delivery for which the liability of the shipowner or other carrier is limited, reduced or negatived by the contract of carriage by reason of the value of the goods, but only to pay 75 per cent of the shipping value of any goods so lost.

"'Shipping value,' as used above, means the prime cost of the goods to the assured by whom or on whose behalf the insurance is effected plus the expenses of and incidental to shipping and the charges of insurance.

"Underwriters to be entitled to 75 per cent of any amount recovered from the carriers or others in respect of such

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA
W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING
F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK
AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

losses (less cost of recovery, if any) up to the amount paid by them in respect of the loss.

"The above agreement does not apply to the following interests: Specie, bullion, precious stones, metals, jewelry, bonds, papers of value, pictures, works of art, quicksilver, liquids, and personal effects."

Cotton Deductions

The year ending with April 1 has been the worst for underwriting losses on cotton since 1915. In that period of twelve months no less than 45,000 bales have burned in thirteen compresses alone, involving a loss of about $4,250,000, of which total marine underwriters have had to pay for approximately $1,500,000. The question frequently is asked why marine underwriters make a deduction from a country-damage claim on cotton of one-sixth of the value of the damaged portion. This is allowed by a custom based upon the fact that in country-damaged cotton there is an accumulation of extraneous matter which increases the weight of the cotton beyond its true weight. Should the adjuster pay the assured the full value of cotton pickings by weight he would be paying for an addition of dirt and mud. For this outside increase in weight the above-mentioned difference is permitted. In the same way an allowance of one-third is made for weight increases occasioned by the absorption of sea-water in sea-damage packing claims.

Poor Packing

In a recent address before the Shippers' Conference Committee of New York a representative of the New York Central Railroad made the statement that last year the railroads of this country paid more than $100,000,000 on claims directly arising from improper packing/handling of goods. The same wail is continually heard in marine insurance offices. Indeed, so serious has this condition become the American Railway Association is undertaking an educational campaign, illustrated with motion pictures, for the sole purpose of setting before shippers the economic necessity for more adequate packing. G. J. Webb, of the Glasgow firm of McCraig & Webb, states that American fruit and other perishable products reach the other side in such condition as frequently to be absolutely unmarketable. He says that many British importers have decided to discontinue placing orders for American fruits until some decided improvement in packing has been instituted on this side of the water. It is incredible that our exporters should be so blind to their own interests as to continue content to rest under the constantly reiterated charge of being the worst packers in the world.

Insurance With Russia

It is frequently asked, in view of the refusal of our government to open trade relations with Russia, whether it is legal for our underwriters to effect insurances on shipments to the land of the soviets. The answer lies in the fact that the State Department on July 7, 1920, modified the prohibition against trade with Russia and permits it, though at the risk of the individual. Despite our having no consuls in that country, trade can be carried on; and since trade with Soviet Russia is not illegal neither is insurance on such business.

German Trade Conditions

Now and again banks are asking for deletion of the Trading with the Enemy Clause from certificates of insurance on shipments to Germany. This clause provides that the insurance shall not cover the interest of any one, insurance for whose account would be contrary to the Trading with the Enemy Act, or other statutes or prohibitions of the United States. Underwriters prefer not to delete the clause, for although it may not lay them open to legal action it still might indicate that they had intended to waive this provision, and so put them in the position of being bound by honor to pay claims that might arise. In a marine insurance contract one of the implied warranties is that the transaction which is insured is in every way legal and the Trading with the Enemy Clause merely emphasizes this warranty. It would appear as though the banks have little to gain by having the clause deleted, because the insurance would be no less invalid if in violation of the statutes or prohibitions of our government. Were litigation to arise the banks would be in no stronger position if the clause were out of the marine certificates, provided the shipment were illegal.

Salvage Association Offices

In addition to establishing offices in San Francisco and Seattle, the United States Salvage Association, the working body of Syndcate A, made other extensions. An office has been opened in Boston, with jurisdiction from Eastport, Maine, to Providence, Rhode Island; and of this, J. A. Wilson, of the New York office, has been placed in charge temporarily, with headquarters at 112 Water Street. The Baltimore office's territory has received a new subdivision, a separate district having been made of Norfolk and Newport News. James T. Christie, a chief engineer formerly connected with the division of construction and repair of the Shipping Board, has been placed in charge of the new territory, with headquarters in the Flatiron Building, Norfolk. An independent office has been arranged for at Savannah, to supersede a portion of the former Jacksonville jurisdiction. M. H. Winner, formerly Savannah manager of the United States Bureau of Survey, has been placed in charge of all ports from Wilmington, North Carolina, to Tampa, Florida.

A number of these changes have been made necessary because of the extension of Syndicate work to include periodical surveys of steel ocean-going steamers belonging to the United States Shipping Board. The result will be twofold: the underwriters will have a much more intimate knowledge and control, and the condition of the government fleet will be materially improved.

In Japanese Circles

The Japan Advertiser gives rather a gloomy view of Japanese marine insurance these days. The familiar phenomenon of over-expansion has been followed by the common result of rate-cutting. Says the Advertiser:

"The decline in the value of tonnage owing to the shipping depression, the decrease in shipments of cargo, and the fall in the valuation of merchandise have combined to produce a considerable diminution in the volume of marine insurance business—just the reverse of the conditions that obtained during the war when the marine insurance business displayed great prosperity along with the striking development of the country's shipping, especially in foreign waters. In June of last year the marine insurance contracts existing numbered 279,329, involving a total value of yen 1,475,505,000, but by December of that year the figures had decreased to 247,410, with yen 1,002,669,000.

"The position of the marine insurance companies has become doubly worse owing to competition among themselves. In view of the great prosperity of the business during the war a number of new marine insurance companies were established in those days, while many of the fire insurance companies undertook the marine business also. The competition is increasing in intensity, and it is said that in some cases only one-third of a proper premium is charged. The ruling rates, even when fully charged, are only about half the rates that obtained during the war, and are even lower than the pre-war rates by between 15 and 20 sen per yen 100. Even when allowance is not made for the falling off in business, it is clear, therefore, that the incomes of the marine insurance companies have decreased by about one-half when compared with the war period. On the other hand, marine risks tend to increase as a result of the shipping depression. It is said that as shipping operations are not very remunerative in these days owing to the low freight rates obtainable, shipowners are apt to neglect repairs, and this tends to increase accidents at sea. It is also said that pilferings of cargo have increased in South America, India, and the South Seas. Thus the liabilities of marine insurance companies are larger than during the good days in wartime. In view of the unfavorable condition of the marine insurance business, it is reported that some London insurance firms have proposed to place various restrictions on reinsurance for Japanese insurance companies.

"The marine insurance is thus depressed, but most of the companies are engaged also in fire insurance, and it is believed that they will be able to make up for the decrease in marine incomes by fire insurance operations."

Japanese Society Formed

Organization of the Imperial Japanese Marine Corporation has been practically completed. This is the classification society that was founded last year to supplant foreign societies, especially Lloyds, in Japan. Working agreements have been made with the American Bureau, British Corporation and the Registro Navale Italiano, by which each society represents the others in its home country.

Fred F. Perris, long with the British Corporation, is in Japan to serve as technical advisor. Prince Higashi Fushimi is honorary president; the late Baron Kondo, president of the N. Y. K., was chairman; and Dr. Seichi Terano, of the engineering college, Imperial University, Tokyo, is vice-chairman. There are more than thirty members of the board.

The head offices will be in Tokyo and surveyors will be established in Yokohama, Kobe, Nagasaki and Osaka. No announcement has been made as to the stationing of surveyors at the ports of Northern Japan.

Better provision for the prevention of accidents at sea is being urged in Japan. Shipping men say that there is no adequate machinery for the investigation and prevention of mishaps. Their attitude is expressed thus: "In Japan equipment for the investigation of marine accidents is not adequate. The Marine Court undertakes such investigations, but it is not for the purpose of preventing future accidents but for judging the responsibility of the mariners concerned. There is also a Law for the Prevention of Collisions, but this law indicates the rules to be observed by the mariners; it does not embody the results of actual investigation into the causes of accidents. Moreover, the proceedings at the Marine Court, whose duty it is to apportion the blame for accidents, drag on for a considerable length of time, and it is frequent that investigations are made into the causes of an accident that occurred one or two years before. In such cases, it is not easy to ascertain the real cause. The opinion is held in marine circles that no wthat Japan's shipping has undergone a great development it is necessary that more adequate organs for the investigation and prevention of marine accidents should be established."

Bareboat Charter and Insurance

Sections of the American Steamship Owners' Association proposed charter party for Shipping Board vessels, which has been completed and sent to members of the different steamship associations for their discussion, will be of interest to marine insurance underwriters as embodying the ideas of owners as to insurance. The paragraphs dealing with insurance and other closely-connected phases follow:

"9. If the steamer should be lost, the hire shall cease from the day when she was lost or last spoken, or if not spoken, then from the date when last heard from, and hire paid in advance and not earned shall be returned to charterer.

"10. If the vessel should be damaged to the extent of 50 per cent or more of her value, the charterer shall have the privilege of treating her as lost and of cancelling this charter party without prejudice.

"11. The owner (that is, the Shipping Board) shall be responsible for fire, marine, war and all other risks of whatsoever nature or kind, including all risks of liability for damage occasioned to other vessels, persons and property, and further owner shall also cover vessels against P. & I. risks.

"18. All salvage service shall be for the sole benefit of charterer.

"19. The charterer shall be governed by the laws of the flag of the vessel, except in cases of general average, when same shall be settled according to York-Antwerp Rules 1890, and as to matters not therein provided for according to the usage and customs of the port of New York. If a general average statement is required, the same shall be adjusted by adjusters to be appointed by the charterer, subject to the approval of the owner, and said adjusters shall attend to the settlement and collection of the average subject to the customary charges.

"20. All bids for insurance repairs and general average expenses shall be paid by the charterer out of charter hire for account of the owner, and in cases where the charter hire is insufficient, or these bills exceed the sum of $10,000, the owner shall make payment promptly of a substantial amount on account. If the owner fails to make such payment promptly, and the steamer is detained to such an extent as would make it impossible for the charterer to carry out any of or all his future commitments, then the charterer shall be entitled to recover from the owner the estimated amount of damages thereby caused to charterer and/or others for which the charterer may be held responsible."

New Marine Offices

A marine department has been opened in San Francisco by the Insurance Company of North America with G. Kirkham Smith as general marine agent and J. Hunter Harrison assistant general agent. Mr. Smith formerly was in the service of the Fireman's Fund and Willcox, Peck & Hughes. Existing arrangements between the Fireman's Fund and the Insurance Company of North America will not be affected by the new office.

Charles H. Williamson has assumed the management of the San Francisco office of Frank B. Hall & Company, now at 322 California Street, and has disposed of his marine agencies.

FULL SPEED AHEAD

American Shipbuilding

On April 1 a total of 249 steel vessels of 817,184 gross tons were under construction for private account in American shipyards, according to returns of the American Bureau of Shipping. Of these, 106 were non-propelled. During March 27 vessels of 181,650 gross tons were delivered, and few orders were placed. The classification of vessels for private account follows:

Cargo Boats

Type of Fuel	No.	Gross Tons
Coal	15	8,342
Oil	36	151,455
Coal and oil	6	36,302
Non-propelled	71	35,475
Total	128	231,574

Tankers

Type of Fuel	No.	Gross Tons
Oil	76	561,771
Non-propelled	45	23,839
Total	121	585,610

Steel merchant vessels under construction in yards of the Pacific Coast of the United States on April 1 were 40 of an aggregate deadweight tonnage of 449,670, according to returns compiled by Pacific Marine Review. The decline from March 1 was four vessels of 38,000 tons as follows: Freighter for United States Shipping Board, 1 of 9400 tons; freighter for private account, 1 of 6500 tons; tankers for private account, 2 of 22,100 tons. A correction of 400 tons has been made in tankers for foreign private account, the total reading 9 vessels of 82,680 tons instead of 9 of 82,280, which is due to the two Imperial Oil vessels under construction by Standifer being 11,940 tons instead of 11,740. Otherwise there has been no change in the status of foreign tankers.

No new contracts have been made public.

The work in Canadian yards remained unchanged from March 1, the total being 7 vessels of 50,870 deadweight tons.

The following list shows vessels under construction or under contract April 1:

American Yards:	Number Vessels	Aggregate Deadweight
Freighters U. S. S. B.	7	73,200
Tankers U. S. S. B.	6	60,300
Tankers Private	14	165,490
Freighters Private	4	68,000
Tankers Foreign	9	82,680
Totals	40	449,670
Canadian Yards:		
Freighters Gov't.	6	50,270
Freighters Private	1	600
Totals	7	50,870

Building Declines

During the twelve months ended March 31, 1921, returns of the bureau of navigation show that 1633 vessels of 2,552,653 gross tons built in the United States and officially numbered, compared with 2335 of 4,224,980 gross tons during the twelve months ended March 31, 1920.

On March 1, 1921, private American shipyards were building, or under contract to build, for private shipowners 227 steel vessels, of 901,229 gross tons, compared with 252 steel vessels, of 977,903 gross tons, on February 1, 1921, according to returns of the bureau of navigation. The shipyards have reported no new contracts during February.

The production of ninety-five merchant vessels in the United States during February was the smallest since February, 1918, when the total was 84 vessels of 117,601 gross tons. The gross tonnage of the February output was 121,404. The largest output was in August, 1919, when the total was 238 vessels of 455,338 gross tons.

Forty-five for U. S. S. B.

Forty-five vessels were under construction for the Shipping Board March 15. The following shows the number at each yard: Cramp, 1 (engine installation); Virginia, 1; Daniels, 1; Doullut & Williams, 3; Los Angeles, 6; Pacific Coast, 1; Saginaw, 1; Kiangnan, Shanghai, 4; Baltimore, 2; Bethlehem, Alameda, 3; Moore, 3; Northwest Bridge, 3 (these vessels are for Swiftsure Oil but are being built by arrangement between the board and that company; New York, 10; Bethlehem, Sparrows Point, 4; Newport News, 1; Bentley, concrete, 1. The Los Angeles Shipbuilding & Drydock Company has the largest freighter construction, New York being engaged principally on combination vessels. Four vessels of 41,200 deadweight tons were delivered in the first two weeks of March.

Launchings on the Clyde for the first quarter of 1921 totaled 62 vessels of 150,000 gross tons. In the corresponding period last year 33 vessels of 98,000 gross tons were launched.

Board Work on Pacific

Thirteen vesels of an aggregate deadweight tonnage of 133,500 were under construction in Pacific Coast shipyards for the Shipping Board April 1, as compared with 14 of 142,900 tons March 1; 16 of 155,750 February 1; 18 of 173,950 January 1, and 23 of 219,100 December 1. The freighter Meanticut, 9400 tons, was delivered in March.

In the following table showing status of work April 1, T indicates tanker and C cargo; the figures are of deadweight tonnages and the dates those of estimated delivery:

Bethlehem Shipbuilding Corporation, San Francisco: Hambro, T, 10,100, June 30; Hamer, T, 10,100, July 30; Hammac, T, 10,100, July 30.

Moore Shipbuilding Company, Oakland: Bohemian Club, T, 10,000, July 14; West Tustem, T, 10,000, August 25; West Lubrico, T, 10,000, September 30.

Pacific Coast Shipbuilding Company, Bay Point: Nashaba, C, 9400, June 30.

Los Angeles Shipbuilding & Drydock Company, San Pedro: West O'Rowa, C, 8800, April 30; West Lewark, C, 11,000, May 12; West Faralon, C, 11,000, June 21; West Greylock, C, 11,000, August 9; West Prospect, C, 11,000, September 14; West Chopaka, C, 11,000, November 25.

New Vessel for Hawaii

James A. Kennedy, president and manager of the Inter-Island Steam Navigation Company of Honolulu, arrived in San Francisco April 12 to have plans prepared for a new passenger steamship for the company's Honolulu-Hilo service. When plans have progressed sufficiently to be laid before the directors Mr. Kennedy will go to Honolulu for a conference. Upon approval of the plans by the directors he will return to San Francisco to let a contract.

The company desires a vessel of between 2000 and 3000 tons net, of 15 to 16 knots speed, with accommodations for 300 first cabin passengers and 100 second-cabin. The first-cabin staterooms will accomodate three persons each; the second-cabin sleeping quarters will consist of standee bunks. Heretofore the poorer classes of Hawaii, especially the Orientals, have traveled as deck passengers, but the Inter-Island, desiring to do away with the deck business on the new vessel, has decided to install better accomodations. The vessel will be single-screw, driven by reciprocating engines. Little provision will be made for freight, but a large hatch will be placed forward of the deckhouse so that automobiles may be loaded in the tweendecks. This arrangement will permit of visitors from the States taking their cars with them.

During the last few years there has been a pronounced growth in the company's business between Honolulu and Hilo, the latter city being the gateway to the volcano of Kilauea; and a vessel has been needed to supplement the steamships Kilauea and Mauna Kea; but the company, believing that construction costs would decline, delayed until the present. The new ship will be a considerable advance over the other vessels of the company, both in size and speed. She will make three round trips a week between Honolulu and Hilo, each voyage of 192 miles being covered in twelve hours or so.

The cost of the vessel will be about $1,500,000. All factors being equal, a Pacific Coast shipyard will be given the preference over an Atlantic.

Work in Prospect

The lighthouse service needs about seventeen lightships, to construct which Congress will be asked for $4,000,000 to $5,000,000. An appropriation of $1,000,000 made by the last Congress will be sufficient for only three. Inasmuch as the service does not believe that wooden vessels could be used, as was urged by Grays Harbor, the prospects are good for some steel construction.

Apparently little offers in immediate naval work. Secretary Denby is quoted as saying that he will not even consider another extensive program until the seventeen new capital vessels, dreadnoughts and battle-cruisers, are well toward completion. The last of these vessels should be ready for service in 1923.

Young Brothers, Ltd., Honolulu, have offered to provide a fire tug for protection of the waterfront for $500 a month. The harbor commission has requested an appropriation of $6000 from the legislature, payments by the territory to be $200 a month and the remainder of $300 to be paid by others interested.

Tanker Demand Light

For the first time in years, oil-tankers are being laid up. At the middle of April five were idle in the San Francisco Bay district, while from Portland came the announcement that four of seven 12,000-ton tankers building at Northwest Bridge & Iron Company's yard for Swiftsure Oil would be tied up at Portland until conditions improved. The first vessel to remain idle was the Swiftscout.

In view of these conditions, and of the number of tankers still to be launched, prospects for additional tanker contracts are poor. In fact, none has been let on the Pacific Coast for six months or more.

Eastern Yard Returns

Atlantic and Gulf

AMERICAN BRIDGE COMPANY, PITTSBURGH, PENN.

Purchasing Agent: W. G. A. Millar.

Twenty-five coal barges Carnegie Steel Co; 175 LBP; 26 beam; 8 loaded draft; **3 launch Mar/21.**

Six coal barges US War Dept; 145 LBP; 24 beam; 9 loaded draft; keel Mar/21; launch May/21 est; deliver May/21 est.

Three car floats undisclosed interests; 285 LBP; 38 beam; 8 loaded draft; keel June/21 est; launch Aug/21 est; deliver Sept/21 est.

Three coal barges W. G. Coyle & Co, New Orleans; 175x26x8 loaded draft; launch and deliver July/21.

Two tow boat-hulls Carnegie Steel Co; 149-2x34 4-5 loaded draft; launch and deliver Aug/21.

CONSOLIDATED SHIPBUILDING CORPORATION, MORRIS HEIGHTS, N. Y.

Purchasing Agent: William Rayner.

Oak, hull 251, US lighthouse tender; 160 LOA; 30 beam; 9-6 loaded draft; 875 DWT; TE eng 700 IHP; 1 Scotch boiler 14 diam; keel Nov22/20; launch May/21 est; deliver July/21 est.

Hawthorn, hull 252, US lighthouse tender; sister to above; keel Nov22/20; launch May/21 est; deliver July/21 est.

No name, hull 246, US lightship; 146-3 LOA; 30 beam; 12-7 loaded draft; 825 DWT; comp eng 400 IHP; 2 Scotch boilers 10-6 diam; keel Mar4/21; launch May/21 est; deliver Aug/21 est.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING COMPANY, PHILADELPHIA

Purchasing Agent: Edw. C. Geehr.

Hull 448, scout cruiser USN; keel Feb16/20.

Hull 449, scout cruiser USN; keel Mar29/20.

Hull 501, scout cruiser USN; keel Aug18/20.

Hull 502, scout cruiser USN; keel Aug4/20.

Hull 503, scout cruiser USN; keel Oct14/20.

Cuba, hull 505, passenger P&OSS Co; 325 LBP; 47 beam; 16 loaded draft; 16 loaded speed; 1100 DWT; 2-cyl TE eng 1800 IHP each; 4 SE Scotch boilers 12x14-6; keel May3/20; launch Dec11/20; deliver Apr15/21 est.

OSCAR DANIELS COMPANY, TAMPA, FLORIDA

Brunswick, hull 10, Isherwood cargo USSB; 416 LBP; 54 beam; 26-11 loaded draft; 11 loaded speed; 9600 DWT; TE eng 2800 IHP; 3 WT boilers; keel Oct27/19; launch Feb17/21; deliver May2/21 est.

B. D. Benson, hull 11, Isherwood tanker Standard Oil; 466 LBP; 60 beam; 26-7 loaded draft; 10½ loaded speed; 11,900 DWT; QE eng 2800 IHP; 3 Scotch boilers 15x11-6; keel June29/20; launch Apr15/21; deliver June15/21 estimated.

T. J. Williams, hull 12, Isherwood tanker Standard Oil; sister to above; keel Aug11/20; launch June5/21 est; deliver Aug15/21 est.

DOULLUT & WILLIAMS SHIPBUILDING CO., NEW ORLEANS

Purchasing Agent: B. A. Solomon.

City of Elwood, hull 1910, Isherwood SS for USSB; 395-6 LBP; 55 beam; 27 loaded draft; 11 loaded speed; 9600 DWT; turbine eng 2800 IHP; 3 WT boilers 9150 sq ft; keel Feb27/19; launch Apr10/20; **deliver Mar18/21.**

Jeff Davis, hull 1911, sister to above; keel Jan26/20; launch Oct30/20.

Galveston, hull 1912, sister to above; keel Feb20/20; launch Dec18/20.

Ward, hull 1913, sister to above; keel Mar25/20; launch Jan22/21.

Oldham, hull 1914, sister to above; keel Apr17/20; **launch Mar19/21.**

FEDERAL SHIPBUILDING COMPANY KEARNY, N. J.

Purchasing Agent: J. L. Hastings.

Vancolite, hull 46, tanker Standard Oil of NJ; 500 LBP; 68 beam; 27-6 loaded draft; 11 loaded speed; 15,000 DWT; rec engs 3500 IHP; 3 Scotch boilers; keel May5/20; launch Mar24/21; deliver Apr15/21 est.

E. T. Bedford, hull 48, tanker Standard Oil of NJ; sister to above; keel July 25/20; launch Apr/21 est.

Victolite, hull 49, tanker Standard Oil of NJ; sister to above; keel July22/20; launch May/21 est.

J. A. Moffett, Jr., tanker Standard Oil of NJ; sister to above; keel July23/20; launch June/21 est.

Steel Seafarer, hull 43, freighter US Steel Products Co; 425 LBP; 56 beam; 25-10 loaded draft; 12 loaded speed; 9400 DWT; turb engs 3100 IHP; 3 Scotch boilers; keel Apr/21 est.

Steel Pathfinder, hull 44, freighter US Steel Products Co; sister to above; keel Apr/21 est.

Steel Pioneer, hull 45, freighter US Steel Products Co; sister to above; keel Apr/21 est.

GLOBE SHIPBUILDING & DRYDOCK COMPANY OF MARYLAND, BALTIMORE

Purchasing Agent: H. B. McCauley.

San Leopoldo, hull 101, oil-carrier Eagle Oil Transport Co; 401 LBP; 5 beam; 25-1 loaded draft; 10½ loaded speed; 8600 DWT; TE engs 2800 IHP; 3 Scotch boilers 15-3x11-6; keel Sept/20; launch May15/21 est; deliver June 30/21 estimated.

San Leonardo, hull 102, oil-carrier Eagle Oil Transport Co; sister to above; keel Sept/20; launch May30/21 est; deliver July15/21 est.

GROTON IRON WORKS, GROTON, CONN.

Purchasing Agent: J. S. MacDougall.

No name, hull 13, ferry boat City of Boston; 174 LOA; 57 beam over guards; 900 gross; 2 vert comp engs 750 IHP each; 2 Scotch boilers 11x11; keel Nov/20; deliver May15/21 est.

LAKE TORPEDO BOAT COMPANY, BRIDGEPORT, CONN.

Purchasing Agent: H. C. Stevens.

S-48, hull 48, submarine USN.

S-49, hull 49, submarine USN.

S-50, hull 50, submarine USN.

S-51, hull 51, submarine USN.

MERCHANT SHIPBUILDING CORP., CHESTER, PENN.

Purchasing Officer: G. Coit.

Mount Carroll, hull 379, combination Shawmut SS Co; 440 LBP; 57 beam; 28-8¾ loaded draft; 13 loaded speed; geared turb engs 4200 IHP; 4 Scotch boilers 15-10x12-1; keel Apr 6/20; launch Jan10/21; **deliver Mar18/21.**

Mount Clinton, hull 380, combination Shawmut SS Co; sister to above; keel May27/20; launch Feb8/21; deliver Apr /21 est.

Puente, hull 381, tanker Union Oil Co; 424 LBP; 58 beam; 25-5 loaded draft; 10½ loaded speed; 10,000 DWT; TE engs; 3 Scotch boilers 15-3x11-7; keel July3/20; launch Apr/21 est; deliver June/21 est.

Playa, hull 382, tanker Union Oil Co; sister to above; keel July22/20; launch Apr/21 est; deliver June/21 est.

Robert E. Hopkins, hull 383, tanker Tidewater Oil Co; sister to above; keel Aug30/20; launch May/21 est; deliver July/21 est.

Samuel Q. Brown, hull 384, tanker Tidewater Oil Co; sister to above; keel Oct1/20; launch May/21 est; deliver July/21 est.

No name, hull 385, freighter American-Hawaiian SS Co; 445 LBP; 59-8 beam; 28-6 loaded draft; 11½ speed; 11,000 DWT; 2 6-cyl, 4-cycle Diesel engs, 4500 metric; 1 vertical donkey 400 sq ft HS; keel Feb5/21; launch June/21 est.

No name, hull 386, freighter American-Hawaiian SS Co; sister to above; keel Feb10/21; launch July/21 est.

NAVY YARD, BOSTON

Pecos, fuel ship No. 18, USN; 455 LBP; 56-2 beam; 26-8 loaded draft; 14 loaded speed; 14,800 disp; rec eng 5200 IHP; 4 Ward WT boilers; keel June2/20; launch Apr23/21 est; deliver Oct/21 estimated.

Whitney, destroyer tender No. 4 USN; 460 LBP; 60-11 beam; 21 loaded draft; 16 loaded speed; 10,600 disp; geared Parsons turbs 7000 IHP; 2 WT exp. small tube boilers; keel Apr23/21 est; launch Apr/22 est; deliver Oct/22 est.

NAVY YARD, PHILADELPHIA

Dobbin, hull 7, destroyer tender USN; 460 LBP; 60-10 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp; Parsons geared turb single screw engs 7000 SHP; 2 WT boilers; keel Dec23/19; launch May5/21 est; deliver date not determined.

Constitution, hull 8, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive 180,000 SHP; 16 WT boilers; keel Sept25/20; launch and deliver dates not determined.

United States, hull 9, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive 180,000 SHP; 16 WT boilers; keel Sept25/20; launch and deliver dates not determined.

NEW YORK SHIPBUILDING CORP., CAMDEN, N. J.

Purchasing Agent: L. G. Buckwalter.

Sea Girt, hull 241, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs 12,000 SHP; 8 WT boilers; keel Aug/18; launch July20/19; deliver fall/21 est.

American Legion, hull 242, combination USSB; sister to above; keel Jan 21/19; launch Oct11/21; deliver fall/21.

Granite State, hull 246, combination USSB; 520-8 LBP; 62 beam; 32-3 loaded draft; 14 loaded speed; 13,050 DWT; 4 cyl. TE engs 7000 SHP; 6 SE Scotch boilers 13-3x11-6; keel May22/19; launch July31/20; **deliver Mar7/21.**

Centennial State, hull 249, combination USSB; sister to above; keel Oct/19; launch Nov/20; deliver fall/21 est.

Blue Hen State, hull 250, combination USSB; sister to above; keel Mar4/20; launch Feb23/21; deliver fall/21 est.

Bay State, hull 251, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs 12,000 SHP; 8 WT boilers; keel Oct15/19; launch July17/20; deliver winter/21 est.

Peninsula State, hull 252, combination USSB; sister to above; keel July 20/20; launch Apr/21 est; deliver spring/22 est.

Keystone State, hull 253, combination USSB; sister to above; keel May13/19; launch May15/20; deliver Apr/21.

Empire State, hull 254, combination USSB; sister to above; keel May13/19; launch Aug4/20; deliver summer/21 est.

Lone Star State, hull, 255, combination USSB; sister to above; keel May 13/19; launch Oct23/20; deliver summer/21 est.

Hoosier State, hull 256, combination USSB; sister to above; keel May20/19; launch Oct23/20; deliver fall/21 est.

Solana, hull 259, bulk oil Pacific Mail Steamship Co; 419-3 LBP; 56-3 beam; 25-9¼ loaded draft; 19¾ loaded speed; 9870 DWT; 3 cyl TE engs 3000 SHP; 3 SE Scotch boilers 15-10x11-4; keel Aug23/20; launch Jan22/21; **deliver Mar23/21.**

Yankee Arrow, hull 260, bulk oil Standard Trans Co, NY; 468 LBP; 62-6 beam; 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs 3200 SHP; 3 SE Scotch boilers 15-2x11-6; keel Aug17/20; **launch Apr10/21;** deliver summer/21 est.

Empire Arrow, hull 261, bulk oil Standard Trans Co, NY; sister to above; keel Sept14/20; launch spring/21; deliver summer/21.

Levant Arrow, hull 262, bulk oil Standard Trans Co, NY; sister to above; keel Nov4/20; launch fall/21 est; delivery winter/21 est.

No name, hull 263, combination Munson SS Co; 414 LBP; 57-6 beam; 23 loaded draft; 15½ loaded speed; 4950 DWT; geared turbs 5800 SHP; 5 SE Scotch boilers 16-4x12-3; keel Sept30/20; launch summer/21 est; deliver winter/21 est.

No name, hull 264, bulk oil, stock; 419-3 LBP; 56-3 beam; 25-9¼ loaded draft; 10¾ loaded speed; 9870 DWT; 3 cyl TE engs 3000 SHP; 3 SE Scotch boilers 15-10x11-4; keel Jan17/21; launch fall/21 est; deliver winter/21

No name, hull 265, bulk oil, stock; sister to above; keel spring/21 est; launch fall/21 est; deliver winter/21 est.

No name, hull 266, bulg oil Standard Trans Co, NY; 468 LBP; 62-6 beam; 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs 3200 SHP; 3 SE Scotch boilers 15-3x11-6; keel Aug11/20; launch fall/21 est; deliver winter/21 est.

Saratoga, hull 199, battle cruiser USN; 874 LOA; 850 LBP; 105-5¼ extreme beam; 31 mean draft; 43,500 normal disp; 33¼ loaded speed; GE turbo-electric drive; 180,000 SHP; 16 WT boilers 198,000 sq ft, plus 18,000 superheat; keel Sept25/20.

Colorado, hull 200, battleship USN; 624 LOA; 600 LBP; 97-3½ beam waterline; 30-6 mean draft; 32,600 normal disp; 21 loaded speed; Westinghouse turbo-electric drive, 28,900 SHP; 8 B&W. WT boilers 41,678 sq ft, plus 4169 superheat; keel Oct25/16; launch Mar22/21.

Washington, hull 201, battleship USN; sister to above; keel June30/19.

STANDARD SHIPBUILDING CORP., SHOOTERS ISLAND, MARINERS HARBOR, NEW YORK

Purchasing Agent: Jamie Cortada.

San Tiburcio, hull 29, Isherwood tanker Eagle Oil Transport Co, London; 412 LBP; 53-1 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; TE engs 2850 IHP; 3 Scotch boilers 15-6x11-7; keel Apr19/20; launch Jan29/21; **deliver Mar12/21.**

San Ubaldo, hull 30, Isherwood tanker Eagle Transport Co, London; sister to above; keel May26/20; **launch Mar5/21; deliver Apr9/21.**

San Ugon, hull 31, Isherwood tanker Eagle Transport Co, London; sister to above; keel May26/20; **launch Apr16/21.**

STATEN ISLAND SHIPBUILDING COMPANY, STATEN ISLAND, NEW YORK

Purchasing Agent: R. C. Miller.

Franklin, hull 725, tanker Galena Nav Co; 300 LBP; 43 beam; 22 loaded draft; 11-5 loaded speed; 4000 DWT; TE eng 1800 IHP; 2 Scotch boilers 15x11; keel July15/20; launch Jan3/21; **deliver Mar22/21.**

Dixiano, hull 726, tanker Amer. Sug. Re. Co; 360 LBP; 50 beam; 23 loaded draft; 10 loaded speed; 6300 DWT; TE eng 2000 IHP; 2 Scotch boilers 15-3x11-3; keel Sept9/20; launch apr15/21 est; deliver May15/21 est.

SUBMARINE BOAT CORPORATION PORT NEWARK, N. J.

Purchasing Agent: W. C. Lawrence.

Sunugentco, hull 145, ocean freight Submarine Boat Corp; 324 LBP; 46-2 beam; 23 loaded draft; 11 loaded speed; 5350 DWT; turbine engs 1860 IHP; 2 B&W boilers 2000 HP; keel Mar25/20; launch Jan15/21; **deliver Mar17/21.**

Suspearco, hull 148, ocean freight Submarine Boat Corpn; sister to above; keel May19/20; launch Jan27/21; **deliver Apr1/21.**

Sucubaco. hull 149, ocean freight Submarine Boat Corpn; sister to above; keel May24/20; launch Feb24/21; deliver Apr/21 est.

No name, hull 150, ocean freight Submarine Boat Corpn; sister to above; keel May29/20; launch Apr/21 est; deliver June1/21 est.

The following canal barges Submarine Boat Corpn, Transmarine Line, for towing only:

Transmarine No. 108, hull 182; 100-4 LBP; 21-6 beam; 9 loaded draft; 206 DWT; keel Dec10/20; **deliver Mar20/21.**

Transmarine No. 109, hull 183; sister to above; keel Dec10/20; **deliver Mar20/21.**

Transmarine No. 110, hull 184; sister to above; keel Dec18/20; **deliver Mar20/21.**

Transmarine No. 111, hull 185; sister to above; keel Dec18/20; **deliver Mar20/21.**

Transmarine No. 112, hull 186; sister to above; keel Jan3/21; **deliver Mar20/21.**

Transmarine No. 113, hull 187; sister to above; keel Jan3/21; **deliver Mar20/21.**

Transmarine No. 114, hull 188; sister to above; keel Jan7/21; **deliver Apr4/21.**

Transmarine No. 115, hull 189; sister to above; keel Jan10/21; **deliver Apr4 /21.**

Transmarine No. 116, hull 190; sister to above; keel Jan13/21; **deliver Apr4 /21.**

Transmarine No. 117, hull 191; sister to above; keel Jan18 21; **deliver Apr6 /21.**

Transmarine No. 118, hull 192; sister to above; keel Jan21/21; **deliver Apr6 /21.**

Transmarine No. 119, hull 193; sister to above; keel Jan24/21; **deliver Apr6 /21.**

SUN SHIPBUILDING COMPANY, CHESTER, PENN.

Purchasing Agent: H. W. Scott.

No name, hull 39, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs 4300 IHP; 3 SE Scotch boilers 15-10x11-11¼; keel Nov 5/20; launch Apr23/21 est; deliver May 15/21 est.

Agwiharve, hull 40, tanker A. G. W. I. S. Co.; 480 LBP; 65-9 beam; 26-7 loaded draft; 12 loaded speed; 12,500 DWT; single screw QE engs 4300 IHP; 4 SE Scotch boilers 15-10x11-11¼; keel Nov26/20; **launch Apr2/21**; deliver May 23/21 est.

Agwimex, hull 41, tanker A. G. W. I. S. Co; sister to above; keel Dec8/20; launch May21/21 est; deliver July 1/21 estimated.

Agwiscot, hull 42, tanker A. G. W. I. S. Co; sister to above; keel Dec23/20; launch July2/21 est; deliver July30 /21 estimated.

Agwistates, hull 43, tanker A. G. W. I. S. Co; sister to above; keel Jan3/21; launch July16/21 est; deliver Aug15/21 est.

No name, hull 44, tanker Benham & Boyesen, Inc; 430 LBP; 59 beam; 25-7 loaded draft; 11 loaded speed; 10,600 DWT; TE engs 2600 IHP est; 3 SE Scotch boilers 15-10x11-11¼; keel Jan 12/21; launch May7/21 est; deliver June1/21 est.

No name, hull 45, tanker Tidewater Oil Co; sister to above, except loaded speed is 10½; keel Feb23/21; launch June4/21 est; deliver June30/21 est.

No name, hull 46, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs 4300 IHP; 3 SE Scotch boilers 15x11-11¾.

No name, hull 47, tanker Sun Oil Co; sister to above.

TANK SHIPBUILDING CORPORATION, NEWBURGH, N. Y.

Building non-propelled oil barges.

TERRY SHIPBUILDING CORP'N, SAVANNAH

Purchasing Agent: H. A. Bittner.

Hull 69, oil-barge builder's account; 285 LBP; 44 beam; 21 loaded draft; 3500 DWT.

Hulls 70, 71, 72; sisters to above.

TEXAS STEAMSHIP COMPANY, BATH, MAINE

Purchasing Agent: A. R. Weber.

Illinois, hull 31, tanker Texas S S Co; 415-10 LBP; 56 beam; 25-7¾ loaded draft; 11½ loaded speed; 9600 DWT; TE engs 3000 IHP; 3 Scotch boilers 15-3x11; keel Oct19/20.

No name, hull 32, tanker Texas S S Co; sister to above; keel Nov10/20.

American Lakes

ANCHOR SHIPBUILDING COMPANY, WASHBURN, WIS.

Purchasing Agent: George F. Morgan.

Double ended ferry, no name, Hudson & Athens Ferry Co; 113 LBP; 33 beam; 7 loaded draft; 8 loaded speed; Ingersoll-Rand Diesel engs 300 IHP; keel Feb/21.

DEFOE SHIPBUILDING COMPANY, BAY CITY, MICH.

Purchasing Agent: A. D. Defoe.

Lt. Col. Robert C. Gildart, hull 51, mine-planter US; 100 LBP; 22 beam; 11 loaded draft; 12 loaded speed; comp engs 350 IHP; 1 WT boiler; **deliver Apr/21.**

Lt. Col. Herman C. Schumm, mine-planter US; sister to above; **deliver Apr /21.**

Major Carl A. Lohr, hull 53, mine-planter US; sister to above; **deliver Apr/21.**

Major Lester E. Moreton, hull 54, mine planter US Govt; sister to above; deliver May10/21 est.

Major Albert G. Jenkins, hull 55, mine-planter US; sister to above; deliver May15/21 est.

Major Wm. P. Pence, hull 56, mine-planter US; sister to above; deliver May 20/21 est.

Captain Clarence M. Condon, hull 57, mine planter US; sister to above; deliver May25/21 est.

Captain John W. McKie, hull 58, mine-planter US; sister to above; deliver May30/21 est.

GREAT LAKES ENGINEERING WKS. RIVER ROUGE, MICH.

Purchasing Agent: A. Q. Kretlow.

Delphine, hull 239, yacht Horace E. Dodge estate; 250 LBP; 35-5 beam; 14-8 loaded draft; 16 loaded speed; 4-cyl QE engs 3000 IHP; 3 WT boilers; keel June17/20; **launch Apr2/21**; deliver May15/21 est.

SAGINAW SHIPBUILDING CO., SAGINAW, MICH.

Lake Miraflores, hull 147, 2-deck ocean vessel USSB; 253-6 LBP; 43-8 beam; 24-3 loaded draft; 9½ loaded speed; 4245 DWT; inv TE eng 1500 IHP; 2 Wickes WT boilers 13-2x15; launch Feb 13/21; deliver Apr/21 est.

Canadian

CANADIAN VICKERS, LTD., MONTREAL

Purchasing Agent: H. Graham.

Canadian Commander, hull 79, single-screw steel 2-deck cargo for Canadian government merchant marine; 400 LBP; 31 loaded draft; 11 loaded speed; 8400 DWT; TE engs 3000 IHP; 3 Scotch boilers 15-6; keel June2/20; launch Oct 30/20; deliver May/21 est.

Canadian Leader, hull 80, single-screw steel 2-deck cargo Canadian government merchant marine; sister to above; keel June29/20; launch Nov27/20; deliver May/21 est.

No name, hull 81, single-screw steel 2-deck cargo Norwegian interests; 365 LBP; 49½ beam; 29 loaded draft; 11½ loaded speed; 6400 DWT; TE engs 2600 IHP; 3 Scotch boilers 14-9 with superheaters; keel May8/20; **launch Apr9/21**; deliver May/21 est.

No name, hull 82, Norwegian interests; sister to above; keel July29/20; launch May/21 est; deliver June/21 est.

DAVIE SHIPBUILDING & REPAIRING CO., LTD., LAUZON LEVIS, P. Q., CANADA

Purchasing Agent: N. W. Van Wyck.

Canadian Challenger, hull 476, single-screw cargo Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE surface cond engs 3000 IHP; 3 Scotch marine boilers 15-6x11-6; keel May14/20; launch June/21 est.

PORT ARTHUR SHIPBUILDING CO., PORT ARTHUR, ONTARIO

Purchasing Agent: N. S. Thrasher, Cleveland, Ohio.

Canadian Harvester, hull 45, double-deck ocean freighter Canadian government merchant marine; 251 LBP; 43-6 beam; 22-3 loaded draft; 10 loaded speed; 3950 DWT est; 3 cyl TE 18-30-50x36 engs 1250 IHP; 2 Scotch boilers 16x10-9; keel Mar30/20; launch Nov 20/20; deliver May1/21 est.

Glenafton, hull 46, single-deck Lake freighter Glen Transportation Co; 251-11½ LBP; 42-6 beam; 16-6 loaded draft; 10 loaded speed; 3000 DWT est; 3 cyl TE 20-33-54x60 engs 1300 IHP; 2 Scotch boilers 14-6x11; keel Oct20/20; launch Apr/21 est; deliver June 1/21 est.

News of Eastern Plants

American Bridge

Three of twenty-five coal barges for the Carnegie Steel Company were launched by the American Bridge Company, Pittsburgh, in March. New contracts have been announced for three coal barges for W. G. Coyle & Company, New Orleans, and two tow-boat hulls for Carnegie Steel.

Beaumont

The Beaumont Shipbuilding & Dry Dock Company, Beaumont, Texas, which discontinued its wooden shipbuilding program shortly after the signing of the Armistice, is doing some barge work for the oil trade in Mexico, having recently converted three of the Ferris ships into oil carriers for the National Oil Company and more recently being engaged in finishing a 105-foot lighter for the Penn Mex Fuel Oil Company. The yard has in operation a 2500-ton marine railway and is completing machine, plate and boiler shops at a cost of over $100,000, which will enable the company to do all kinds of repair work to steel and wood ships.

Bethlehem

The Bethlehem Shipbuilding Corporation, Harlan Plant, Wilmington, Delaware, has launched the last vessel under construction, a 6900-ton deadweight tanker for Sinclair.

Sparrows Point on March 19 launched

the Shipping Board combination 535 Pinetree State, one of three under construction.

The Moore yard has delivered the first of two three-track, twenty-seven-car steel barges for the Western Maryland Railway.

At the annual meeting of the Bethlehem Steel Croporation, held at Newark, April 5, President E. G. Grace stated that the Fore River and Sparrows Point shipyards on the Atlantic Coast and the Union plant at San Francisco were running full time with sufficient orders on hand to keep going for the balance of the year. The Harlan plant at Wilmington, Delaware, and the Moore plant at Elizabeth, New Jersey, will be shut down. The Fore River and Union plants are winding up tanker orders while Sparrows Point has ore carriers on hand.

Canadian Vickers

Canadian Vickers, Montreal, launched a 6400-ton cargo vessel for Norwegian account April 9. She and two 8400-tonners for the Canadian Government Merchant Marine are scheduled to be delivered in May and another vessel for Norwegian account in June, launching to be in May.

Chickasaw

The Selma City, 10,000, the ninth vessel built by the Chickasaw Shipbuilding Company at Mobile in the last two years, was launched on April 2.

Consolidated

Three lighthouse tenders for the United States, Oak, Hawthorn and unnamed, will be launched by the Consolidated Shipbuilding Corporation, Morris Heights, New York, in May.

Cramp

The destroyer Paul Jones left Cramp's shipyard March 22 on her trial trip to the Delaware Capes. This is the forty-sixth torpedo boat destroyer constructed at Cramp's since the outbreak of the war.

Crane

The first section of a new 11,000-ton floating drydock projected by the Theodore A. Crane's Sons Company, was launched March 6 at Erie Basin, Brooklyn. Alfred M. Crane, president and general manager of the company, announced that the drydock would be put in operation by October 1, 1921, and that when all of the four sections, were joined together, it would accommodate vessels 500 feet long, having gross registers up to 11,000 tons.

Daniels

At Tampa, Florida, the shipbuilding plant of the Oscar Daniels Company is being cleaned up in preparation for closing, no new contracts being on hand. Delivery of the freighter Brunswick to the Shipping Board will be made about May 2; of the tanker B. D. Benson to the Standard Oil about June 15 and of the tanker T. J. Williams to the Standard Oil about August 15.

Defoe

The Defoe Shipbuilding Company, Bay City, Michigan, is delivering mineplanters to the United States Army at a rapid rate, two having been finished in April and six being scheduled for May.

Doullut & Williams

Doullut & Williams, New Orleans, delivered the 9600-ton deadweight steamship City of Elwood to the Shipping Board March 18. The Oldham, a sister, and the last of eight vessels, was launched the next day. Deliveries of the four vessels still under construction probably will be made before July.

Federal

The largest merchant ship ever built in the port of New York ran a satisfactory loaded sea-trial off Sandy Hook March 11 and was delivered the next day to her owners, the Standard Oil Company of New Jersey. The ship was the 15,000-ton tanker Walter Jennings, built in Kearny by the Federal Shipbuilding Company, her gross tonnage being 10,805 and net 8133. The hull measures 500 feet between perpendiculars, beam 68, and depth 38 feet 9 inches. The mean loaded draught is 27 feet 6 inches. Special provision was made for rapid loading and discharging facilities. The ship's pumps and piping permit discharge at the rate of 750 tons an hour. There are twenty-two main cargo and twelve summer tanks, in addition to fuel-oil bunkers and ballast tanks. The engines and boilers were all built at the Federal yard.

Federal on March 24 launched the twin screw tanker Vancolite for the Standard Oil Company of New Jersey. The sponsor was Miss Jean McQueen of Toronto, whose father is president of the Imperial Oil Company, the Canadian subsidiary of the Standard. It is understood that this 15,000-ton deadweight ship, second of five being constructed by the Federal, is to be transferred to the Canadian flag.

The company's new repair barge, which is to be operated as part of the drydock and repair department, is in service. It is equipped with electric welding outfit and an air compressor, power in each case being generated by semi-Diesel engines. The mechanical equipment includes bolt and pipe threading machines, drill press, lathe, shaper, grinder, forge and anvil. With these tools the company believes the barge is the most complete unit of its kind in New York harbor.

Pontoons for the Federal new drydock are being launched at the rate of one each week. These pontoons are being built by the yard's regular force of shipwrights. The steel wing walls have been fabricated in the Federal plate shop, and it is expected the dock will be in operation by July. The pontoons are built of timber from the state of Washington, brought directly by ship to the Federal yard, and have been constructed by the regular Federal organization.

The yard is assembling six 350-ton coal barges for the War Department, which were fabricated by the American Bridge Company.

Fuller

The George A. Fuller Company (Carolina Shipyards) has delivered its last ship under contract. The plant will be shut down pending decision by the company as to whether it will dismantle the plant and retire from the shipbuilding business.

Great Lakes

The Great Lakes Engineering Works, River Rouge, Michigan, launched the yacht Delphine for the estate of Horace E. Dodge April 2. Delivery will be made about May 15.

Ley

All shipbupilding materials and equipment in the yard of Fred T. Ley at Mobile are being dismantled and sold and the last concrete ship, which was about one-third completed on the ways, has been broken up.

McDougall-Duluth

The present program of the McDougall - Duluth Shipbuilding Company, the yard of which, at Riverside, near Duluth, Minnesota, consists of eight launching ways for steel vessels, calls for the construction of five canal ships, work on which has just started.

Merchant

The Merchant Shipbuilding Corporation, Chester, Pennsylvania, delivered the combination steamship Mount Carroll to the Shawmut Steamship Company (United American Lines) March 18. Delivery of the sister Mount Clinton was estimated for April. Puente and Playa are the names recently assigned to two 10,000-ton tankers for Union Oil, launching of both of which was scheduled for April.

Wireless reports from the new Shawmut steamer Mount Carroll, seven days out on her maiden voyage to Europe, state that the ship has averaged 13.6 knots in spite of head winds and that her performance has been thoroughly satisfactory. The Mount Carroll is being followed with special interest because she is of post-war design and construction throughout and should represent American marine practice at its best. She was built at the Chester yard of the Merchant Shipbuilding Corporation and is propelled by Westinghouse geared turbines of 4200 shaft horsepower.

Navy Yard, Charleston

The Charleston Navy yard at present is devoted almost entirely to emergency repairs and docking of the ninety torpedo boat destroyers that are in reserve in the port of Charleston. Naval Gunboat 22 (Tulsa), is still under construction. Destroyer 135 (Tillman), will be completed about May 1, though the trials will not be conducted until the summer.

Newport News

The second and last of two oil tankers building at the yard of the Newport News Shipbuilding & Drydock Company for the Atlantic, Gulf and West Indies Steamship Lines was launched March 26. Delivery was estimated for late April.

New York

The New York Shipbuilding Corporation, Camden, delivered the combination Granite State to the Shipping Board March 7 and the 9870-ton tanker Solana to the Pacific Mail March 23. The next Shipping Board combination scheduled for delivery is the Keystone State in April.

Port Arthur

The Port Arthur Shipbuilding Company, Port Arthur, Ontario, launched the 3000 deadweight ton Lake freighter Glenafton for the Glen Transportation Company March 30. She will be delivered about June 1, following the Canadian Harvester, for the Canadian Government, May 1. The two are the only vessels now building.

Southern

The Southern Shipyard Corporation, Newport News, is building six concrete oil barges for the War Department Transportation Service. This plant, which includes a marine railway with lifting capacity of 3000 tons, is primarily a repair yard but occasionally some construction work is done.

Standard

The Standard Shipbuilding Corporation, New York, delivered the 8400-ton tanker San Tiburcio to Eagle Oil March 12; lanuched the sister San Ubaldo March 5 and the San Ugon April 12. The San Ubaldo was delivered April 9.

The keel was laid March 31 for a new steel fireboat that Standard is building for the fire department of the City of New York. The new fireboat, which will cost $222,000, will be similar to the William J. Gaynor, 121 feet long, 27 feet beam, 14 feet 9 inches depth, and will have a speed of 12 miles. She will be equipped with the latest fire fighting appliances, and, when completed, will supplant the William J. Gaynor at Brooklyn while the latter will be transferred to Staten Island to protect the City of New York's new pier developments.

Staten Island

Delivery of the 4000-ton tanker Franklin was made by the Staten Island Shipbuilding Company to the Galena Navigation Company March 22. A 6300-ton tanker, Dixiano, probably will be delivered to the American Sugar Refining Company about May 15.

Submarine Boat

All twelve canal barges building at the yard of the Submarine Boat Corporation, Port Newark, for the Transmarine Line (Submarine Boat) were delivered in the last half of March and the first week of April. The 5350-ton steamship Sunugenteo was delivered to Submarine Boat March 17 and the Suspearco April 1. A third sister, Sucubaco, was scheduled for April delivery and a fourth, unnamed, for April launching and June delivery, closing the yard's present program.

The annual report of the Submarine Boat Corporation contains the information that the last of the thirty-two fabricated ships of the 5350-ton type, which the company built on its own account after they were cancelled by the Shipping Board, is to be fitted with a 2000 horsepower Diesel installation of the Craig design. The vessel is to be ready during the summer.

Sun

Sun Shipbuilding Company, Chester, Pennsylvania, launched the 12,500-ton tanker Agwiharve for the Atlantic, Gulf & West Indies Line April 2. She was the thirty-eighth Sun vessel. The yard schedules launchings and deliveries of seven of the eight vessels under construction as follows: Launch, April, 1; May, 2; June, 1; July, 2. Deliver, May, 2; June, 1; July, 3; August, 1.

Todd

The Todd Shipyards Corporation has been awarded the contract by the Shipping Board for the replacement of gearing with turbine-electric drive on the steamship Independence. This contract was awarded on a lump sum basis of $60,000, the work to be completed within twelve months. This work will be done at Todd's Tebo Yacht Basin in Brooklyn.

The industrial insurance commission of Washington reports that Todd built the motorship Kennecott from keel-laying to launching without a single timeloss accident.

William J. Gokey & Company, Inc., has retired from business after having been actively engaged in ship repairs for nearly fifty years. It docks have been purchased by Todd.

Union of Baltimore

The tanker Gulfprince, built by the Union Shipbuilding Company, Baltimore, for the Gulf Refining Company, was lanuched April 2 practically complete, boilers and engines having been installed while she was on the ways. A sister, Gulfking, was launched in December. The vessels are single-screw, 436 feet 1 inch over-all, 419 feet 3 inches between perpendiculars, 35 feet 4 inches deep to the upper deck, of 9970 tons deadweight; shelter-deck, with machinery and quarters aft and bridge-house amidships, with two pole masts; built to Lloyds 100 A-1; Isherwood-framed.

The propelling unit consists of a triple expansion engine 27x45x75 -51, which gives a loaded sea-speed of 11½ knots. Steam at 195 pounds working presure is generated by three single-ended Scotch boilers 15-10 diameter by 11-4 long, having three 46-inch Morrison corrugated furnaces. The Howden system of forced draft is used. The cargo space is divided into eight main cargo oil tanks, subdivided by the center-line bulkhead, with the customary summer or wing tanks, and a dry-cargo space forward of 52,320 cubic feet. The pump room is located just forward of the boiler room separated by a large cofferdam.

Mrs. W. H. Blakeman, wife of the general manager of the Union Shipbuilding Company, was sponsor.

Notes of the Yards

The Dravo Contracting Company, machine manufacturer of Pittsburgh, has opened an Eastern sales office in Philadelphia, under the supervision of P. J. Ralph. Materials are being fabricated in Pittsburgh to be sent to Philadelphia for erecting and launching five steel dump scows for the Philadelphia office of the United States Engineering Department and also three steel oil barges for a private company.

B. H. Elliott, Inc., Houston, Texas, recently organized to operate a shipyard, has plans under way for the establishment of its initial plant at Harrisburg, Texas. It will be used primarily for repairs and will comprise a machine shop, 60 by 100 feet, and other buildings.

The Pilkington Boat Yards, Miami, Florida, is planning improvements in the plant, to include remodeling of present buildings and installation of new equipment. A marine railway will be constructed and hoisting machinery installed.

The Albert & Arctic Transportation Company, Fort McMurray, Alberta, Canada, has secured a site and will proceed with the erection of shipyards for the construction of vessels. W. J. West is manager.

The Seaboard Transportation & Shipping Company, which owns a yard at Channel Dyke, Pelican Spit, near Galveston, Texas, established in 1917 to build steel and wood vessels, is under process of reorganization and incorporation, and promises an announcement later as to its future plans.

Partial revision of the contract between the United States Shipping Board and the United States Mail Steamship Company was agreed upon at a conference April 5 between Admiral Benson, chairman of the board, and T. E. Burns, representing the company. Under the agreement the board will recondition by July 1 at a cost of approximately $1,500,000 the George Washington and the Amerika, two of the ex-German liners chartered to the United States Mail Company. Further revision of the contract will be left to the new board.

Adjustment of claims by the Norwegian government growing out of action of the United States during the war in taking over contracts under which ships were being built in American shipyards for subjects of Norway, is in the hands of the State Department, Admiral Benson announced April 5. A commission representing Norway, it is understood, is on its way to the United States, to seek an adjustment of the claims. The Shipping Board, however, it was explained, will not figure in the conferences.

Pacific Construction

BALLARD MARINE RAILWAY COMPANY, SEATTLE

Tug Pacific Creosoting Co: 53-6 long; 13-8 beam; 8 deep; heavy-oil engine; launch Mar/21.

B. C. MARINE ENGINEERS & SHIPBUILDERS, LTD., VANCOUVER

Lady Kindersley, aux. schr. Hudson Bay Co; 3-masted, 200 LOA; 36 beam; 15 deep; 12 loaded draft; 700 DWT; oil engs 360 BHP built by William Beardmore & Co; speed 7½ knots; vessel delayed by non-arrival of engines, ordered in England; engines expected Apr25/21; vessel launched Mar26/21.

Two 35-foot schrs. Hudson Bay Co.

Two 43-foot schrs; same.

Deliver all vessels May20/21, est.

B. C. YACHT & BOAT BUILDERS, LTD., VICTORIA, B. C.

Two 75-foot motor patrol-boats Canadian Marine Department; 100 HP Fairbanks-Morse engs; launch Jan4/21 and Jan17/21.

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Purchasing Agent: O. W. Street

Hammac, hull 5274, tanker USSB; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT: rec engs 2600 IHP; 3 Scotch marine boilers 15x11-9; launch May20/21 est; deliver July 30/21 est.

Alameda Works

Hambro, hull 5272, tanker USSB; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec engs 2700 IHP; 3 Scotch marine boilers 15x11-9; keel Sept8/20; launch Apr15/21 **deliver May31/21 est.**

Hamer, hull 5273, tanker USSB; sister to Hambro; keel Nov1/20; launch May16/21 est; deliver July30/21 est.

K. R. Kingsburg, hull 5306, tanker Standard Oil Co of California; 440 LBP; 58 beam; 28 loaded draft; 11 loaded speed; 11,600 DWT; rec engs 3200 IHP; 3 Scotch boilers 15-6x12-1; keel July2/20; launch Feb7/21; **delivery Mar31/21.**

Chilore, hull 5309, combination ore and coal carrier Ore Steamship Corporation; 571-6 LOA; 550-1 LBP; 72 molded beam; 44 molded depth; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; Curtis turbines with Falk reduction gears; 5000 SHP; 3 Scotch SE boilers 17-6x12, each 4287 square feet; oil-burners; date of keel laying not set.

Lebore, hull 5310, combination ore and coal carrier Ore Steamship Corporation; sister to above; date of keel laying not set.

F. H. Hillman, hull 5311, tanker Standard Oil Co of California; 500 LBP; 68 beam; 25-11 loaded draft; 11 loaded speed; 15,000 DWT; rec engs 4000 IHP; 3 Scotch marine boilers 16-xx12-9; keel Jan10/21; launch May5/21 est; deliver Aug15/21 est.

H. M. Storey, hull 5312, tanker Standard Oil Co of California; sister to F. H. Hillman; keel Jan19/21; launch June 1/21 est; deliver Sept1/21 est.

W. S. Rheem, hull 5313, tanker Standard Oil Co of California; sister to F. H. Hillman; keel Mar1/21; launch June 15/21 est; deliver Sept15/21 est.

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Naval Work

Destroyers USN; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1308 tons; turbine engs 27,000 IHP; 4 Yarrows boilers as follows: **Chase, deliver Mar10/21; Robert Smith, deliver Mar11/21; Mullany, deliver Mar 23/21; Coghlan, deliver Mar31/21;** Preston, hull 327, keel July18/19, launch Aug7/20; Lamson, hull 328, keel Aug13/19, launch Sept1/20; Hull, hull 330, launch Feb18/21; McDonough, hull 331, keel May24/20, launch Dec15/20; Farenholt, hull 332, launch Mar9/21; Sumner, hull 333, keel Aug 27/19, launch Nov24/20; Corry, hull 334, **launch Mar28/21;** Melvin, hull 335, **launch Apr11/21.**

Submarines USN: S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145, launch Jan5/21; S-41, hull 146.

CHOLBERG SHIPYARD, VANCOUVER, B. C.

Purchasing Agent: W. Meed.

Sir Henry Drayton, hull 5, 4-masted barkentine Victoria Shipowners, Ltd; 250 LOA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel; shaft logs fitted for auxiliary but no machinery installed; keel May 15/20; launch Aug1/21 est.

No name, hull 6, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel June4/20; launch Oct1/21 est.

No name, hull 7, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel Feb/21.

J. COUGHLAN & SONS, LTD., VANCOUVER, B. C.

Purchasing Agent: J. Joseph.

Canadian Transporter, hull 20, steel freighter Canadian government; 400 L BP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE eng 3000 IHP; 3 Scotch boilers 15-6x11-6; keel Jan6/21.

Canadian Freighter, hull 21, steel freighter Canadian government; sister to above; keel Jan6/21.

HANLON DRYDOCK & SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: R. Barker.

Dan F. Hanlon, hull 89, steam schr. D. J. Hanlon; 2500 DWT; 1400 IHP engines; 2 B&W boilers.

HARBOR MARINE COMPANY, VICTORIA, B. C.

Purchasing Agent: B. L. Robertson.

Canadian Traveller, steel freighter Canadian government merchant marine; 400 LBP; 52 beam; 25-2 loaded draft; 11½ loaded speed; 8390 DWT; TE eng; 3 Scotch boilers 15-6x11-6; 2 deck; keel Aug9/19; launch Sept29/20; deliver uncertain; refrigerating plant being installed.

Car ferry Canadian Pacific; 270 LOA; 42 beam; 12 molded depth; single-deck; three tracks, capacity 18 cars; launch Jan25/21.

LOS ANGELES SHIPBUILDING AND DRYDOCK CO., SAN PEDRO

West O'Rowa, hull 30, steel cargo USSB; 410 LBP; 54 beam, 24-2 loaded draft; 10½ loaded speed; 8800 DWT; TE eng 3500 IHP; 3 WT boilers; keel June14/20; launch Dec30/20; deliver April30/21 est.

West Lewark, hull 31, steel cargo USSB; 430 LBP; 54 beam; 28-2 loaded draft; 10½ loaded speed; 11,000 DWT; TE engs 3500 IHP; 3 Scotch single end 15-9; keel July30/20; launch Feb24/21; deliver May12/21 est.

West Faralon, hull 32, steel cargo USSB; sister to above; keel Sept27/20; **launch Apr19/21;** deliver June21/21 estimated.

West Greylock, hull 33, steel cargo USSB; sister to above; keel Nov10/20; launch May24/21 est; deliver Aug9/21 estimated.

West Prospect, hull 34, steel cargo USSB; sister to above; keel Dec31/20; launch July2/21 est; deliver Sept14/21 estimated.

West Chopaka, hull 35, steel cargo USSB; sister to above; keel Feb24/21; launch Sept6/21 est; deliver Nov10/21 estimated.

MAIN IRON WORKS, SAN FRANCISCO

Purchasing Officer: B. W. Bengston.

Two tugs for Shipowners' & Merchants' Tug Boat Co; 150 over-all; 30 beam; 16 loaded draft; TE engs 1000 IHP; 2 Scotch marine boilers 11-6; deliveries April and May.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: W. E. Hostetter.

Bohemian Club, hull 2862, tanker USSB; 425 LBP; 57 beam; 26 loaded draft; 10,000 DWT; rec eng; 3 Scotch boilers 15-2x11; keel Oct23/20; launch May7/21 est; deliver June7/21 est.

Tustem, hull 2863, tanker USSB; sister to above; keel Nov24/20; launch June4/21 est; deliver June30/21 est.

Lubrico, hull 2864, tanker USSB; sister to above; keel Jan/21; launch June 4/21 est; deliver June30/21 est.

Manulani, hull 158, freighter Matson Nav Co; 480 LBP; 62 beam; 30 loaded draft; 14,000 DWT; Parson engs; 5 Scotch marine boilers 15-6x12-3½; keel Aug 5/20; launch Feb 20/21; **deliver Apr/21.**

Manukai, hull 159, freighter Matson Nav Co; sister to above; keel Aug17/20; launch Feb20/21; deliver May6/21 est.

H. T. Harper, hull 163, tanker Standard Oil Co of California; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engs; keel Oct/20; **launch Apr16/21.**

Tamihua, hull 165, tanker S. P.-Atlantic S S Co; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; rec engs; 3 Scotch boilers 15-9x12; keel Feb28/21.

No name, hull 166, tanker Vacuum Oil Co; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec engs; 3 Scotch marine boilers 15-2x12; keel Dec9/20.

NAVY YARD, PUGET SOUND

Nitro, ammunition carrier for government; 460 LBP; 61 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp; turbine engs 5300 IHP; 4 Babcock & Wilcox WT boilers; keel Mar 19/19; launch Dec6/19; **commissioned Apr1/21.**

Medusa, repair ship for government; 460 LBP; 70 beam; about 19 loaded draft; 17-5 loaded speed; turbine eng 7000 IHP; 2 WT express type boilers; 10,000 tons disp; keel Jan2/20; date of launching not set.

Holland, submarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K. loaded speed; turbine eng 7000 IHP; two WT express type boilers; 10,000 tons disp; **keel Apr11/21.**

NAVY YARD, MARE ISLAND

California, battleship USN; 600 LBP; 97-3½ beam; 30-3 loaded draft; 21 loaded speed; 32,300 disp; turbo-electric engs 26,800 SHP; 8 Bu's express boilers 50,984 sq ft; keel Oct25/16; launching Nov20/19.

Montana, battleship USN; 660 LBP; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 disp; turbo-electric engs 60,000 SHP; 12 Bu's express boilers 74,040 sq ft; keel Sept1/20.

Wasmuth, destroyer USN; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 disp; geared turbine eng 26,000 SHP; 4 Normand boilers 27,000 sq ft; keel Aug12/19; launch Sept15/20.

Trever, destroyer USN; sister to above; keel Aug12/19; launch Sept15/20.

Perry, destroyer USN; sister to above; keel Sept15/20.

Decatur, destroyer USN; sister to above; keel Sept15/20.

NORTHWEST BRIDGE & IRON COMPANY, PORTLAND

Purchasing Agent: W. C. Smith.

Swiftscout, tanker Swiftsure Oil Trans Co (France & Canada S S Co); 12,000 DWT; shelter-deck; Isherwood system; 465-7 LBP; 60 beam; 26-3 loaded draft; 10½ loaded speed; TE eng 3150 IHP; 3 Scotch boilers 15-5½x11-9; launch Mar12/21.

Swifteagle, tanker Swiftsure Oil Trans Co; sister to above; **launch Apr 9/21.**

Swiftking, tanker Swiftsure Oil Trans Co; sister to above.

Swiftlight, tanker Swiftsure Oil Trans Co; sister to above.

PACIFIC COAST SHIPBUILDING CO., BAY POINT

Purchasing Agent: J. A. Smiley.

Nashaba, hull 950, steel cargo USSB; 402-6 LBP; 53 beam; 26-6 loaded draft; 9400 DWT; rec eng 2800 IHP; 3 Scotch boilers 11x15-6; keel Aug25/19; **launch Mar24/21**; deliver June30/21 est.

PACIFIC MARINE IRON WORKS, PORTLAND

Steel hull Port of Portland dredge Columbia; **launch Feb24/21; deliver Apr15/21 est.**

J. H. PRICE CONSTRUCTION CO., ANDERSON SHIPBUILDING PLANT, SEATTLE

One 1000-ton scow.

PRINCE RUPERT DRYDOCK & ENGINEERING COMPANY, PRINCE RUPERT

Canadian Scottish, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Sept27/19; launch May12/21 est.

Canadian Thrasher, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Oct20/19.

These vessels will be completed by the Wallace Shipbuilding & Drydock Co, North Vancouver. The terms are time and material plus 8 per cent.

JAMES ROBERTSON SHIPYARD, ALAMEDA

Purchasing Agent: James Robertson.

No name, hull 102, side-wheel ferryboat Richmond-San Rafael Ferry Co; 190 LBP; 34 beam; 17 loaded draft; 10 loaded speed; diagonal cross comp eng 500 IHP; 2 marine dry back boilers 9x17; keel Nov15/20.

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

La Placentia, hull 22, Isherwood tanker Union Oil Co; 440 LBP; 58 beam; 29-2 loaded draft; 11 loaded speed; 12,000 DWT; QE engs 3300 IHP; 3 Scotch boilers 15-6x12-1; keel May20/20; launch Mar8/21; **deliver Apr15/21.**

La Purisima, hull 23, Isherwood tanker Union Oil Co; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engs 2800 IHP; 3 Scotch boilers 14x12; keel Dec22/20; launch July/21 est; deliver Aug/21 est.

Scopas, hull 24, Isherwood tanker Nederlandsch - Indische Tankstoomboot Maatschappij; 412 LBP; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engs 2800 IHP; 3 Scotch boilers 15-6x11-7; keel Oct20/20; launch Apr/21 est; deliver May/21 est.

Silvanus, hull 25, Isherwood tanker Nederlandsch - Indische Tankstoomboot Maatschappij; same as above; keel Oct 20/20; launch Apr/21; deliver May/21 estimated.

Semiramis, hull 26, Isherwood tanker Nederlandsch - Indische Tankstoomboot Maatschappij; same as above; keel Nov 5/20; launch May/21 est; deliver June/21 estimated.

G. M. STANDIFER CONSTRUCTION CORP., VANCOUVER, WASH.

Purchasing Agent: Horace Luckett.

Calgarolite, hull 19, shelter-deck tanker Imperial Oil; 463 LBP; 60 beam; 26 loaded draft; 10½ loaded speed; 11,940 DWT; rec eng 3000 IHP; 3 Scotch boilers 14-9; keel Dec10/21; **launch Apr 16/21**; delivery May/21 est.

Albertolite, hull 20, shelter-deck tanker Imperial Oil; sister to above; keel Dec21/20; launch May/21 est; deliver June/21 est.

W. F. STONE & SON, OAKLAND

Purchasing Agent: Lester F. Stone.

Sea Ranger, Sea Scout, tugs Main Iron Works; 150 LBP; 30 beam; 16 loaded draft; 12 loaded speed.

TODD DRYDOCK & CONSTRUCTION CORPORATION, TACOMA

Purchasing Agent: C. L. Bankson.

Omaha, hull 100, scout cruiser USN, 555-6 LOA; 550 LBP; extreme beam 55-4; molded beam 54-9; depth molded 26; mean loaded draft 13-6; disp 7100 tons; Westinghouse Parsons turbines and reduction gear, 105,000 IHP; designated speed 34; 12 Yarrows WT boilers; keel Dec6/18; launch Dec14/20.

Milwaukee, hull 106, scout cruiser USN; sister to above; keel Dec13/18; launch Mar24/21.

Cincinnati, hull 107, scout cruiser USN; sister to above; keel May15/20; launch May15/21 est.

UNION CONSTRUCTION COMPANY, OAKLAND

R. J. Hanna, hull 14, oil-tanker Standard Oil Co of California; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engs 3000 IHP; 3 Scotch marine boilers 15-2x11-6; keel July12/20; launch Feb5/21; **deliver Apr 6/21.**

Acardo, hull 15, oil-tanker Anglo-Saxon Petroleum Corp, Ltd; 412 LBP; 53-5 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec engs 2600 IHP; 3 Scotch marine boilers 15-6x11-7; keel Aug7/20; launch Mar12/21; deliver May1/21 est.

Tampa, hull 16, cutter USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engines 2600 IHP; 2 WT boilers; keel Sept27/20; **launch Apr16/21.**

Haida, hull 17, cutter for USCG; same as above; keel Sept27/20; **launch Apr19/21.**

Mojave, hull 18, cutter USCG; same as above; **keel Apr16/21**; launch Sept 10/21 est.

Modoc, hull 19, cutter USCG; same as above; **keel Apr19/21**; launch Sept 10/21 est.

Shawnee, hull 20, cutter USCG; 150 LOA; 30 beam; 13-6 loaded draft; 12½ loaded speed; 1000 DWT; rec engs 1000 IHP; 2 WT boilers; keel June1/21 est.

Achatina, hull 21, oil-tanker Anglo-Saxon Pet Corp, Ltd; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec engs 2600 IHP; 3 Scotch marine boilers 15-6x11-7; keel Dec15/20; launch May21/21 est.

Ampullaria, hull 22, oil-tanker Anglo-Saxon Pet Corp, Ltd; sister to Achatina; keel Feb5/21; launch June20/21.

Amalthus, hull 23, oil-tanker Anglo-Saxon Pet Corp, Ltd; sister to Achatina; keel Mar12/21; launch July15/21 estimated.

All cutters on transverse system; others on Isherwood system.

WALLACE SHIPBUILDING & DRYDOCK CO., VANCOUVER, B. C.

Canadian Skirmisher, cargo Canadian government; 8400 DWT; 413 long; 52 beam; 31 deep; 11½ loaded speed; keel Oct/20; launch Mar17/21.

Coastwise steamship Canadian Pacific; 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel Oct/20; launch May/21 est; deliver Aug or Sept/21 est.

This company also will complete the Canadian government steamships Canadian Reaper and Canadian Thrasher, each of about 8400 tons deadweight, work on which was suspended when the Prince Rupert Drydock & Engineering Company went into the hands of a receiver.

Western Yard Progress

B. C. Marine

The B. C. Marine Engineers & Shipbuilders, Vancouver, launched the auxiliary schooner Lady Kindersley for the Hudson Bay Company March 26. The engines were expected about April 25 from England, and the Lady Kindersley, with four smaller schooners for the Hudson Bay Company, will be delivered about May 20.

Bethlehem

The Union Plant of the Bethlehem Shipbuilding Corporation delivered the 11,600-ton tanker K. R. Kingsbury to the Standard Oil of California, March 31. Four destroyers for the United States Navy, Chase, Robert Smith, Mullany and Coghlan, were delivered in March. The Corry was launched March 28 and the Melvin, the last of the program of sixty-six, April 11. Deliveries of all the destroyers now under construction at the Union Plant will be completed about May 31.

Cholberg

The Cholberg Shipyard, Vancouver, B. C., expects to launch the four-masted barkentine Sir Henry Drayton in August instead of April, and the second in October instead of May. The keel of the third was laid in February.

Los Angeles

A contract has been executed by the Navy Department and the Los Angeles Shipbuilding & Drydock Company under which destroyers, colliers, mine-layers, tugs and other light vessels based on Los Angeles and San Diego will be sent to the Los Angeles yard for drydocking and repairs. Heretofore such work has been done for the most part at the Mare Island Navy Yard but the increase in the Pacific fleet, especially in the destroyer forces, has made it imperative that other provision be made, and the contract with the Los Angeles yard is the result.

Following upon an inspection of the Los Angeles yard by Rear Admiral Roger Welles, commandant of the Eleventh Naval District, the mine-layer Gannet and the destroyer Rathburne were drydocked. The test given the new floating drydock by the Rathburne was severe, because in general the navy hesitates to pace vessels as fragile as destroyers in a sectional floating dock, inasmuch as a slight difference in the rate of lifting the different pontoons might be disastrous.

As an example of service appreciated by shipowners, a contract completed on April 2 by the Los Angeles company on the Kathryn Luckenbach of the Luckenbach Steamship Company is worthy of note. The big freighter arriving with cargo at San Pedro required some boiler and other repairs and, thanks to the equipment and resources of the Los Angeles company, she had 132 tubes replaced in her four boilers, her steering engine and tiller motor repaired, two main brasses bored and re-babbitted, and other minor repairs effected during the forty-eight hours she was discharging. Not only was this work done without the ship losing an hour of her running time, but by attending to one boiler at a time, the shipbuilding company enabled the ship to keep up steam needed for unloading, thus not delaying her at the dock even longer than she would ordinarily have stayed.

Los Angeles launched the 11,000-ton Shipping Board freighter West Faralon, the second of a group of five, April 19. She is the thirty-second vessel to go down the Los Angeles ways.

Matthews

The last Ferris-type wooden hull to be launched in the United States went down the ways at the Grant Smith-Porter yard in Portland April 7, being christened Undaunted. She was completed by G. F. Matthews for the Hart-Wood Lumber Company as a five-masted schooner for the lumber trade. When the Shipping Board decided to discontinue wooden building, a deal was made with George Rodgers, a shipbuilder of Astoria, whereby he was given title to the thirty-four uncompleted hulls and was to be paid $5000 for the removal of each from the ways. Upon the completion of the Undaunted by Mr. Matthews the last of the hulls has been cleared away.

Moore

The Moore Shipbuilding Company, Oakland, launched the 4750-ton tank motorship H. T. Harper for the Standard Oil Company of California April 16. The first of two 14,000-ton freighters for the Matson Navigation Company, the Manulani, was delivered in April, having been launched February 20. The Manukai will be delivered about May 6.

The names of the three 10000-ton tankers building for the Shipping Board have been changed from West Bohemian, West Tustem and West Lubrico to Bohemian Club, Tustem and Lubrico. The first change was in compliment to the well-known club of San Francisco.

The seventh section of the new floating drydock of the Moore yard was placed in commission early in April. The eighth section will be completed about June 1. With it in use the yard will be equipped to handle vessels of 800 feet or more in length, or, if smaller vessels are to be taken, can divide the dock into two, each of four pontoons. Five of the eight pontoons were bought of Skinner & Eddy and three were built by Moore.

Navy Yard, Puget Sound

The Puget Sound Navy Yard placed the ammunition-carrier Nitro in commission April 1 and she is scheduled to depart from the yard May 1. Following upon completion of the Nitro the keel of the submarine-tender Holland was laid April 11. One other vessel, the repair ship Medusa, remains on the ways. Her launching date is uncertain.

Northwest Bridge

The Northwest Bridge & Iron Company, Portland, launched the 12,000-ton tanker Swifteagle for the Swiftsure Oil Transport Company April 9. Delivery of the sister Swiftscout was made March 30. The two vessels still under construction are scheduled to be launched in late May or early June. Following upon their delivery, the yard will close, say Portland advices, after having built forty-six steel steamships. The plant formerly was operated by the Northwest Steel Company.

Pacific Coast

The Pacific Coast Shipbuilding Company, Bay Point, California, launched the Shipping Board freighter Nashaba, 9400 deadweight tons, March 24. Delivery is estimated for June 30. This is the last vessel under construction at the yard, which will be closed about the middle of the year.

Prince Rupert

The Wallace yard, which is completing two Canadian government merchant marine vessels at the Prince Rupert plant, expects to launch the first, the Canadian Scottish, May 12. This vessel was to be named Canadian Reaper, which was changed, however, to Canadian Scottish in honor of the regiment of that name. There are reports that the second vessel will be christened Canadian Fisherman instead of Canadian Thrasher.

Southwestern

The Southwestern Shipbuilding Company, Los Angeles, delivered the 12,000-ton tanker La Placentia to the Union Oil Company in April, following upon the completion of a sister ship, Montebello, in March. Southwestern expected to launch the 8400-ton tanker Scopas, the first of three for the Dutch Shell, in April and make delivery in May.

Standifer

The G. M. Standifer Construction Corporation, Vancouver, Washington, launched the 11,940-ton tanker Calgarolite for Imperial Oil April 16. Delivery is scheduled for May. The sister Albertolite, the last vessel building at the Standifer yard, will follow within a month.

Todd

On May 15, one year after the keel was laid, the Todd Drydock & Construction Corporation, Tacoma, expects to launch the scout cruiser Cincinnati, the third of three sisters building for the United States Navy. Progress on this vessel has been quite rapid, inasmuch as the first, the Omaha, was launched two years after the laying of the keel and the second, the Milwaukee, fifteen months after work began.

Union Construction

Union Construction Company, Oakland, delivered the 10,200-ton tanker R. J. Hanna to the Standard Oil of California early in April. The next delivery will be that of the Anglo-Saxon tanker Acardo, 8400 deadweight tons, scheduled for May 1. This vessel is the first of four sisters building at the Union Construction yard and probably will be the first to be delivered of nine tankers building on the Pacific Coast for foreign account. The Coast Guard cutters Tampa and Haida, the first of four building for the United States, were launched in April and the keels of the second pair, Mojave and Modoc, were laid immediately thereafter. The keel of the Coast Guard tug Shawnee will be laid about June 1. The Tampa and Haida will be delivered in late June.

Miscellaneous Construction

COLUMBIA STEEL COMPANY, PITTSBURG, CALIF.

Steel castings for many steel vessels now under construction in the Pacific Coast yards, including the dreadnought Montana and sister ships 49, 50, 52; also for Coast Guard cutters under construction in the Union Const. Co. yard.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING COMPANY, PHILADELPHIA

Twelve Parsons manganese bronze propellers for scout cruisers 4, 5 and 6 building by Todd Drydock & Construction Corpn, Tacoma. Two right-hand and two left-hand propellers for each vessel. Weight of propellers 13,200 lbs. each; diameter 11-3; pitch 11-10.

ALLAN CUNNINGHAM COMPANY, SEATTLE

On order and under construction: Six steam and electric steering gears; 13 steam and electric anchor windlasses; 18 steam and electric and hydro-electric and hand capstans; 37 steam and electric winches.

DOW PUMP & DIESEL ENGINE COMPANY, ALAMEDA

H. T. Harper, motorship Standard Oil Co; one 200 IHP, two 267 IHP Diesel auxiliary electric drive engines.

JAMES C. H. FERGUSON, SALES AGENT, MONADNOCK BLDG., SAN FRANCISCO

American Engineering Co.: Two steering engines, hulls 21, 22, Southwestern; 4 steering engines, ferries Newark, Piedmont; electric capstans drydock Moore; hydraulic telemotor, hull 2077, Moore; 3 towing machines, 4 steering engines, Shipowners & Merchants' Tugboat Co.

Pneumercator Co.: 116 pneumercators USS California, Mare Island; 4 for Matson SS Manulani, Manukai, Moore; 40 for 4 Coast Guard cutters, Union Construction; 10 for West Lewark, West Faralon, West Greylock, West Prospect, West Chopaka, Los Angeles; 60 for 12 submarines USN, Bethlehem.

Rostand Mfg. Co.: air ports and lenses complete 4 Coast Guard cutters and 4 Anglo-Saxon tankers, Union Construction.

FORD & GEIRRINE, AGENTS, SAN FRANCISCO

McNab direction indicator, manufactured by the McNab Company, hull 163 at Moore's; National stockless anchors, Upson Walton Company, for hull 165 at Moore's; Dean feed pumps, Dean Bros' Steam Pump Works, for 166 at Moore's; Reliance forced draft equipment, John Reid & Co, for hulls 165, 166 at Moore's; National stockless anchors, Upson Walton Co, hull 166, at Moore's; Dean feed pumps, Dean Bros' Steam Pump Works, hull 23, Southwestern; Balsa wood for cold storage spaces, hulls 158, 159, Moore's; hull 5306, Bethlehem; Willett Bruce whistle control, McNab Co, hulls 16, 17, 18, 19, Union Const, hulls 19, 20, Standifer; ten sets Welin davits, American Balsa Co, hulls 158, 159, Moore; McNab direction indicators, McNab Co, hulls 16, 17, 18, 19, Union Const! Reliance forced draft equipment, John Reid & Co, hull 23, Southwestern; Anchor chain, Lebanon Chain Co, hull 23, Southwestern; windlass, gypsy and steering gear, Hyde Windlass Co, hull 20, Union Const; Welin davits, American Balsa Co, hulls 5311-2-3, Bethlehem, hull 163, Moore; Reliance furnace fronts, John Reid & Co, hulls 2862-3-4, Moore; Willett-Bruce whistle control, McNab Co, hulls 5311-2-3, Bethlehem; McNab direction indicator, hulls 31-2-3-4-5, Los Angeles; Balsa wood for cold storage, American Balsa Co, hulls 5311-2-3, Bethlehem.

LIDGERWOOD MFG. CO., NEW YORK SAN FRANCISCO, LOS ANGELES

One 10x10 inch screw gear steering engine for USS Holland building at Puget Sound Navy Yard.

LLEWELLYN IRON WORKS, LOS ANGELES

Two marine engines for G. M. Standifer Const Corp, 24½ x 41½ x 72, 48-stroke, TE, 2800 IHP.

MARINE IRON WORKS, CHICAGO

Five hundred special ice machines.

SKANDIA PACIFIC OIL ENGINE COMPANY, OAKLAND

Purchasing Agent: A. Bolander.

Ten 850 BHP Werkspoor Diesel engs building for USSB; 6 cyl, 135 RPM; four delivered.

Ten 140 BHP 4-cylinder Skandia engs for self-propelling barges on Erie Canal; 6 delivered.

Fifteen 16 BHP 1-cylinder Skandia engs, auxiliaries for above; 9 delivered.

One 180 BHP Skandia 2-cylinder stationary eng for driving generator, Benguit Consolidated Mining Co; delivery in April.

One 120 BHP 2-cylinder Skandia eng for river freighter for N. Fay & Son.

STEWARD DAVIT & EQUIPMENT CORP., NEW YORK, SAN FRANCISCO, SEATTLE

Steward davits are being installed in the following: At Union Const Co: Coast Guard cutters, hulls 16, 17, 18, 19.

For Swiftsure Oil tankers building at Northwest Bridge & Iron Co.

The Steward Davit and Equipment Corporation is recently in receipt of many congratulations on the smoothness with which its equipment functioned at the time of the sinking of the steamer Governor.

Deaths

Captain Hans Thompson, master of the Shipping Board steamship West Conob, operated by the Pacific Mail, in Manila in March. He had been in the Pacific Mail service since 1891.

Captain Daniel George Macaulay, former sealer, in Victoria, B. C.

Frederick E. Scammell, of Scammell Brothers, New York, in New York on March 3.

Captain John W. Cann, formerly surveyor of the National Board of Marine Underwriters, in Brooklyn March 8.

John V. Barnes, president of the Maritime Association of the port of New York in 1900, in Brooklyn March 13.

John Swan, ship broker of New York, in Brooklyn March 16.

Captain James Guthrie, for eleven years assistant inspector of hulls and for the last nine years inspector, in San Francisco April 21.

Few Keels to Be Laid

"With the reduction of approximately 10 per cent in labor costs in the ship-repair yards of this district, a step is taken which it is hoped will aid in saving American shipping and its allied industries from the practical extinction with which they are threatened," says a statement issued by Henry C. Hunter, counsel for the New York & New Jersey Dry Dock Association. Mr. Hunter's statement embodies the results of an exhaustive survey of current conditions in shipyards and ship repair plants throughout the country.

"The prevailing depression in shipping is manifested in far greater degree in the United States than in any country in the world," it is stated. . . . .

"The remedy lies primarily in establishing a level of costs that will enable the industries involved to secure employment on a competitive basis with other nations. . . .

"The cut now put into effect in wages in this district is much less than the reduction in the cost of living. But the whole burden is not being placed on the shoulders of labor, for the yards have made material reductions in their schedules of charges. Every district outside of New York has already put wage reductions into effect, and in some cases these have run from 20 per cent to 35 per cent, or two to three times the amount of the cut here.

"How the American repair yards have been handicapped by their high production costs due to the rates they have had to pay for labor and material is evidenced by the increasing amount of repair work that has been going from this country to Europe. Foreign shipowners, especially, have been having only sufficient work done to their vessels here to patch them up so that they could be sent to foreign yards. Work lost in this way has not only taken millions of dollars worth of production from American industry, but it has been chiefly responsible for the sharp shrinkage in the amount of employment available for American labor. As a result the labor supply today is far in excess of the demand and greatly increased unemployment is inevitable unless reductions in production costs can be effected which will enable American yards to secure some of the work which is going to other countries. There must be reductions in materials as well as labor, and wage cuts in the industries allied to ship-repairing will help towards this end.

"How sharp the decrease in the American ship construction and repair industries has been is indicated by a survey made for the New York and New Jersey Dry Dock Association of conditions prevailing in this work throughout the country. Figures have been secured representing fully three-fourths of the yards in the United States. These show that the number of workers employed today is little more than half the total of a year ago. That the shrinkage has been general the country over is proved by the figures for the various districts, giving the number of men employed on April 1, 1920, and on the same date this year.

"Rapid completion of the work on hand in the shipyards, without any replacements through new orders, as conditions are at present, will effect a radical reduction in the total employed from now on unless there is a marked improvement in the situation. Even as things are today, employment is only about a quarter of what it was during the war period.

"That only a comparatively small percentage of the shipbuilding and ship-repair workers displaced by the contraction in the volume of production has been absorbed by other branches of industry is evident from the reports of applications for employment being received daily at every yard in the country. In the aggregate the men applying run to thousands. In the plants of the Delaware River district, for instance, seekers for work vary from 100 to 500 per day, according to the size of the plant. The range in the New York district is from 5 to 150; along the Great Lakes from 15 to 300 per plant; at South Atlantic and Gulf ports from 25 to 100; in Norfolk and vicinity from 25 to 150; in Baltimore from 10 to 125; and in New England from 5 to 75. The larger yards on the Pacific Coast report applications averaging about 100 daily for each plant. It is manifest, therefore, that a large volume of surplus labor is available to draw upon. . . .

"Eliminating those yards with no construction work on hand, out of 383 ways in yards active today, 154 are idle. Excluding one yard specializing in small craft, which has 33 keels still to be laid down, only 51 keels still remain to be laid, or less than a third of the ways available. Within a short time, it is apparent, idle ways will outnumber those on which construction is being carried on. And there has been a proportionate shrinkage in the use of available American ship repair facilities. The growth of the American merchant marine requires the maintenance of repairing plant commensurate to its needs, but without work to make profitable operation possible the continuance of these facilities on the present scale is impossible.

"Through the reductions sought in the cost of labor and material it is hoped that a solution may be found to the problem. American repair yards are now in a position to handle any work offered as well as it can be done in any country in the world. That lower prices will bring more work and a consequent increase in employment is the consummation sought for the preservation of what has become an American key industry and a vital factor in the development of the American merchant marine."

Wages and Employment

A survey of recent wage adjustments in shipbuilding and ship-repair yards on the Atlantic, Gulf and Pacific coasts and the Great Lakes district indicates reductions in wages in the various districts as follows: New England district, 10 to 45 per cent; New York district, 10 per cent; Delaware River district, 10 per cent; Baltimore district, 10 to 12 per cent; Norfolk district, 10 per cent; South Atlantic and Gulf districts, 10 per cent; Texas district, 10 per cent; Pacific Coast, 10 to 20 per cent; and Great Lakes, 10 per cent.

Returns from the majority of the members of the Atlantic Coast Shipbuilders' Association showing the number of employes on the last payroll of March indicate that the total shipyard workers employed today by the association members is a little less than two-thirds of that a year ago. Twenty-one shipyards along the Atlantic seaboard and the Gulf of Mexico show the following maximum totals of workmen in their empoy, exclusive of office help, clerks and supervisory force, as compared to the last payrolls in preceding quarters during the past year: March (1921), 57,680; December (1920), 67,127; September (1920), 72,296; June (1920), 77,092; March (1920), 86,002.

The association also states that eighty two companies that on April 1, 1920, had in their employ about 130,996 workmen had only 82,694 a year afterward.

535's Altered

Changes have been or are being made in the first of the 535's of the Shipping Board to appear on the Pacific. During the passage through the torrid zone of the Caribbean and the Panama Canal the vessels had a foretaste of the weather of the Hawaiian and Southern Oriental routes. The discovery was made that the steamers, although perhaps suited well enough to the North Atlantic trade, were too hot for comfort in the warmer Pacific. Upon her arrival at San Francisco, therefore, the Golden State of the Pacific Mail underwent some alterations, which consisted principally of insulating decks, installing additional ventilators and changing fixed lights to swinging ports. Similar work will be done on the Matson steamship Hawkeye State on the Atlantic.

The second and last of the 535's allotted to the Matson Line, the Buckeye

State, was turned over to the company in April and is scheduled to depart from Baltimore May 7 on her first voyage to Havana, Panama, Los Angeles, San Francisco and Honolulu. The work on the Hawkeye State will be completed in time for her to follow the Buckeye State at an interval of approximately thirty-five days.

Union Gas Engine

The last of six 45-horsepower marine engines for launches belonging to Mexican oil companies was shipped in April by the Union Gas Engine Company, Oakland. These engines were sent by express, the charges to the border alone being $1200 for each.

An 8-horsepower Union engine is being installed in each of two launches built by John Twigg & Sons for the new Matson steamships Manulani and Manukai. The two launches will be used as lifeboats.

Some other recent orders placed with the Union Gas Engine Company are: An 8-horsepower Union electric light set by the Canadian Fairbanks-Morse Company, representative of the Union Company, for a Vancouver fishing boat. A 9-horsepower windlass for the San Francisco & Sacramento Railroad's ferry boat Ramon. The Ramon is equipped with a 600-horsepower Union engine, which is believed to be the largest gasoline and distillate engine ever built. Although the Ramon has been in daily operation since 1914, she has not been given an overhauling. George W. Kneass, San Francisco boatbuilder, has bought an 8-horsepower Union engine for installation in a new launch.

The Alaska-Portland Packers' Association, in connection with other canners, ordered three 8-horsepower Union engines to be installed in launches for use in connection with the United States Bureau of Fisheries work on Bristol Bay, Alaska.

Word has been received by the Union Gas Engine Company from the United States War Department to the effect that eighteen 300-horsepower Union distillate and kerosene engines installed in concrete vessels, which have been assigned to various military posts on the Atlantic Coast, are giving excellent service. It is reported that the cost of fuel is actually less than on the steam vessels of a similar type, due to the fact that fuel is consumed only during the period of actual service. The War Department was unable to obtain experienced engineers at the time these boats were put into service, and steam engineers were assigned. The fact that steam engineers have been able to operate these engines successfully and without difficulty indicates their sturdiness and simplicity in design.

The Union Gas Engine Company has received contracts from both the War and Navy Departments for airplane engines and spares to be used in non-rigid army and navy dirigibles, in which Union engines are standard equipment.

Drydocking and Repairs

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Miscellaneous repairs, drydocking, painting: SS. China Arrow, West Cactus, Sonoma, Algonquin, J. A. Moffett, R. J. Hanna, Montebello, Katrina Luckenbach, Col. E. L. Drake (also repairs to stern frame; S. O. Barge No. 7, No. 91; Yacht Carnegie; Bark General Faidherbe; Sch. W. F. Jewitt. Drydocking, painting: SS. Liebre, Windber (also bottom damage repairs). Miscellaneous repairs: SS. Standard Arrow, Ecuador, Lansing, Korrigan III, Broad Arrow, Whittier, Caddo, Tascalusa (also make new tailshaft); Stm. yacht Venetia; Barge Olinda. Engine, boiler, hull repairs, drydocking, painting: SS. Matsonia, Admiral Farragut, Merauke; Ferry Str. San Pedro; Tug Tatoosh (no painting). Engine, boiler, hull repairs: SS. Marama, Frank H. Buck, Steel Mariner and Cape Henry (boilers only), Waimarino, Cordelia (also make new hawse pipe), Waihemo, Waikawa; Tug Hero. Repairs to evaporator: SS. Suez Maru. Repairs to tailshaft and windlass: SS. Standard Arrow. Winch repairs: SS. Flavel. Repairs to windlass: SS. Coalinga.

Alameda Works

Miscellaneous repairs, drydocking, painting: Barge San Pablo, Sch. Carolyn Frances, SS. Stanley Dollar. Removing section of keel and installing new shoe: SS. C. A. Smith. New propeller: Stm. Sch. Hartwood, SS. Daisy Freeman, Mukilteo (make new install). Drydocking, painting: SS. Pacific. Engine, boiler, hull repairs, drydocking, painting: SS. Point Bonita.

LONG BEACH SHIPBUILDING COMPANY, LONG BEACH

Repairs, docking, for fish packing in Mexican waters: Oceana Vance.

MOORE SHIPBUILDING COMPANY, OAKLAND

Drydocking, cleaning, painting, miscellaneous repairs: SS. Rainier, Anne Hanify, Hyades, San Juan, Star of Holland, Siskiyou; Ferry Str. Ed. T. Jeffery; Tug Virgil G. Bogue; SS. Elkridge, Salina, Saginaw. Extensive engine, hull repairs: Schr. Fred Baxter, Enterprise (hull only), City of Para (engine only). Engine, deck repairs: Dutch Str. Tjisondari.

NAVY YARD, PUGET SOUND

Drydocking, cleaning, painting bottom, urgent repairs: B. S. Mississippi, Idaho. Drydocking, cleaning, painting bottom, misc. alterations, repairs: Armored cruiser Frederick, Ammunition carrier Nitro (preparatory to trials); Destroyers Mackenzie, McDermot. Drydocking, miscellaneous repair: Coal Barges Nos. 447, 358, 359; Freight lighter No. 45; SS. West Canon. Care and preservation: Armored cruisers Seattle, Missoula, Charlotte; S. C. 310. Miscellaneous repairs and alterations: Destroyers Renshaw, O'Bannon, Howard, Stansbury, Welles, Aulick, Turner, Gllis, Delply; Minesweepers Ortolan, Swallow; Patrol boats Eagle 57, S. C. 294, 295. Miscellaneous repairs: Radia repair ship Saturn; Tugs Pawtucket, Sotoyomo, Tatnuck, Challenge, Iroquois, West Canon. Undocked-completion of repairs: City of Spokane.

J. H. PRICE CONSTRUCTION CO., ANDERSON SHIPBUILDING PLANT, SEATTLE

Annual inspection and repairs to fleet of King County Ferry Boat System.

SOUTHWESTERN SHIPBUILDING COMPANY, EAST SAN PEDRO

Repairs H. P. valve gear: SS. Liebre. Repairs to machinery: SS. Santa Rita. Repairs to oil and exhaust piping: SS. Standard Arrow. Repairs receiver pipe: SS. S. C. T. Dodd. Deck repairs: SS. Winbere. General repairs: SS. Uncas, Tug Standard No. 2.

W. F. STONE & SON, OAKLAND

General overhauling, recaulking, etc.: Schr. Melrose. Misc. repairs: SS. Sea Foam, San Jacinto, Tamalpais. General overhauling: Sub-chaser No. 289, Yacht Pronto II.

TODD DRY DOCKS, INC., SEATTLE

Hull repairs: Manila Maru. Drydocking, cleaning, painting: Derblay, Bailey Gatzert (also paddle wheel repairs). Minor repairs: Power boat Aloha, Protesilaus, Teucer. Miscellaneous repairs: U. S. S. Surveyor, Edmore, West Hartland. Cleaning, painting: Admiral Schley (also tank repairs), Pacific, Maid of Orleans, Kayseeka. Survey: Tug Hero.

WINSLOW MARINE RAILWAY & SHIPBUILDING COMPANY, WINSLOW, WASH.

Drydocking and repairs: U. S. Lighthouse tenders Heather, Cedar; SS. Rush; Schr. Bainbridge; Barges General Fairchild, Granco, Louisiana; SS. Griffdu, SS. Explorer; Schr. Omega; SS. Providencia; Schr. Camano; Aux. Schr. Kamchatka; SS. Korrigan III; Bark Belfast; Schr. J. W. Clise; SS. Lydonia (also misc. alterations).

YARROWS, LTD., VICTORIA, B. C.

Complete refitting and reconditioning after being submerged for two and a half months in Swanson Bay: SS. Prince Rupert. Cleaning, painting and repairs to bottom damage due to standing: Whalers White, Grant, Orion, St. Lawrence.

Steamship Operations

The Bareboat Charter

A movement of considerable importance toward the formulation of a bareboat charter party has been made by the American Steamship Owners' Association, a committee of which has drafted a document for consideration of the members. This draft has not been taken up by the general committee of operators and accordingly has not been presented formally to the Shipping Board, so that much remains to be done before a bareboat charter can become an actual fact. Nevertheless, the American Steamship Owners' Association includes within its membership all the important owners of steel tonnage in the United States, Pacific as well as Gulf and Atlantic, and its expression will have considerable weight. In one respect the draft does not represent all operators, inasmuch as non-owners are not members of the association, although they are, of course, represented on the general committee. On the other hand, owners are among the largest operators of Shipping Board vessels.

The committee recommended that in negotiating the charter the Shipping Board should agree:

"First: Not to operate any of its vessels in competition with the bareboat charterers.

"Second: Not to allocate or assign any Shipping Board vessels to any operators to compete with bareboat charterers.

"Third: To cancel the sales of vessels to the companies or individuals who have agreed to purchase and who have not been able to make the stipulated payments, and that these vessels should be dealt with similarly to the balance of the fleet, and chartered on a bareboat basis.

"Fourth: To extend the fullest protection to companies already owning American vessels, such companies being given preference in such trades in which they are already established, or who now express a willingness to meet the requirements with their own tonnage or any Shipping Board bareboat chartered tonnage."

The recommendations of the committee meet the primary conditions as to competition between Shipping Board and private vessels laid down by the Pacific-American Steamship Association in December, when it was requested to formulate its ideas regarding a bareboat form.

A digest of the sections follows:

1. Description of steamer. 2. Deadweight. 3. Surveys. 4. Life of charter. 5. Time of delivery. 6. Hire (amounts left blank). 7. Speed. 8. Payments monthly in advance. 9. Hire ceases upon loss. 10. Fifty per cent damages constitutes loss. 11. Insurance by owner. 12. Charterer to pay operating and pilotage costs, etc.; and, 13, at his own expense, keep vessel in good condition, ordinary wear included. 14. Fuel and stores. 15. Painting and house-flag. 16. Charterer to have use of all equipment. 17. Hire ceases when time is lost because of devcopment of latent defects. 18. All salvage to be for benefit of charterer. 19. Laws of flag to govern charterer. 20. Insurance repairs and general average to be paid by charterer. 21. No sale without charterer's consent. 22. Arbitration by board, but "the arbitrators shall not be lawyers." 23. Redelivery. 24. Notice of redelivery. 25. Charterer may sub-let.

Sections dealing with marine insurance are covered fully in the marine insurance section of this number of Pacific Marine Review.

The committee that drafted the proposed party was made up of J. R. Gordon, traffic manager of the Union Sulphur Company, chairman; Hugh Gallagher, general Eastern agent, Pacific Steamship Company; Robert F. Hand, assistant manager, marine department, Standard Oil Company of New Jersey; A. J. McCarthy, manager American flag steamers, I. M. M.; Oakley Wood, vice-president, Barber Steamship Lines; James Donald, president, States Marine & Commercial Company. Franklin D. Mooney, president of the New York & Porto Rico Line, was the first chairman, but resigned because of the press of business.

New Panama Tolls Plan

An indirect remission of Panama Canal tolls to American vessels is the latest proposal brought forward as a fulfillment of the Republican platform pledge to grant free passage. Representative George W. Edmunds of Pennsylvania, who has been active in furthering merchant marine legislation, has proposed the new plan as a method of averting a dispute with Great Britain. He would grant subsidies "equal to the tolls paid for such vessels for passage through the Panama Canal." Although such subsidies really would be disguised remissions of tolls, the plan nevertheless does offer a way out, for the granting of subsidies by the United States scarcely is open to objection by any foreign country, especially by one that itself grants similar aid. It is stated that Mr. Edmunds has conferred with government officials, who have approved his plan, and that President Harding also received it with approbation.

On the other hand, Senator Jones, not understanding why shipping companies should be compelled to wait for remission each three months, as Mr. Edmunds would provide, has stated that he would introduce a bill for out-and-out free passage.

Whatever course be adopted, the indications are that vessels engaged in the foreign as well as the coastwise trade will be exempt. This is highly important. If only coastwise vessels were granted free passage an advantage would accrue to such steamships in competing with through vessels for cargo to and from the Orient and Australasia, recent arrangements having been made for the transshipment of such freight at Pacific Coast ports. But this is a narrow view. By and large, American vessels would have an advantage of $1.20 a net ton over their foreign rivals, which in some trades would be sufficient to overcome much if not all of the lower operating costs of other countries.

An immediate effect upon the revenues of the canal would appear. During the calendar year 1920 the total tolls collected were $10,295,362, of which American vessels paid $4,724,494. British vessels paid $3,357,357, no other flag exceeded $1,000,000. In view of the larger number of vessels engaged in the coastwise trade, it appears probable that free passage, in whatever form, would cut the potential earnings of the canal for 1921 squarely in two.

Two outstanding results would follow remission: an advantage to American vessels in foreign trade, and a still greater advantage to steamships over railroads in domestic business.

Wool for Atlantic

The first large shipment of freight consigned from the Orient to the Atlantic Coast of the United States for transshipment at a Pacific Coast port under the 50-50 arrangement of the trans-Pacific and intercoastal lines was received at San Francisco March 29 on the Struthers & Dixon Shipping Board vessel West Cajoot. She had approximately 12,000 bales of wool, or 4000 tons, consigned from Taku Bar and Shanghai to New York and Boston. The cargo was turned over to the intercoastal steamship lines. The 50-50 plan, as has been explained, provides for the quotation of the direct service, all-water rate by trans-Pacific lines in the Orient and by intercoastal lines on the Atlantic Coast, the cargo to be transshipped at a Pacific Coast port and the proceeds divided equally after the deduction of handling charges.

A smaller shipment of about 500 tons had been received in Seattle prior to the arrival of the West Cajoot in San Francisco. These two lots were solicited in the Far East at direct rates and were the first dispatched after the consummation of the new agreement. Thus an auspicious beginning has been made and hope is held that the alliance of the intercoastal and trans-Pacific lines may take more freight from the direct steamships. There are certain factors that tend to militate against the transshipment plan, however. Shipments require more time in transit, the exposure to damage is greater and the insurance rates and interest charges may be increased. Moreover, in the event of any further decline in freight rates, the transshipment cost, which is estimated at $2 a ton, might prove to be an insuperable expense. On the other hand, the remission of Panama Canal tolls to vessels engaged in the intercoastal trade would give those steamships an advantage to offset the fixed charge of $2 for handling. The most important element favorable to the transshipment plan is, however, the option afforded the eastbound shipper of choosing between two markets.

The transshipment plan also has been extended to exports to Australia from the Atlantic Coast. The Oceanic Steamship Company has advised intercoastal operators of its willingness to accept cargo. The General Steamship Corporation has discovered that it can book some commodities on the Atlantic at the direct rate, pay the full intercoastal tariff and still have a remunerative return. This is due to the lack of adjustment between the Pacific-Australasian and the Atlantic-Australasian schedules.

China Mail Quits

April opened with another break in the ranks of the Pacific Westbound Conference. Scarcely more than a month after the Java-Pacific Line had agreed to rejoin, the China Mail Steamship Company on April 2 announced its withdrawal. This latest split does not bear the marks of serious trouble, however.

Why the China Mail withdrew was not precisely stated. Indications were given, however, that the company intended to protect itself against rate-cutting and that it preferred to do so after giving formal notice of withdrawal from the conference than to remain a member and still quote rates less than those published. No statement was forthcoming as to the identity of the rate-cutting line.

Although the China Mail operates the three steamships China, Nanking and Nile between San Francisco and the Orient, the vessels are not large carriers and on the whole do a distinctly Chinese business. With these facts is to be coupled the statement of officials of the company that there would be no general rate-cutting and that there was nothing in the situation to cause other steamship operators undue alarm. The withdrawal was not connected with the recent decision of the Shipping Board closing the San Francisco-Honolulu coastwise trade to the company because 75 per cent of its stock was not owned by American citizens.

Leaves Intercoastal Bodies

The two intercoastal conferences also have lost a member, the newly-established United States Transport Line. Heretofore the intercoastal associations have been able to prevent any break and to enroll as members all the operators, the single exception of this rule having been the Williams Line, which withdrew from the conferences but rejoined after a few days.

S. S. Mandarin, first of four sisters built or building by the Kiangnan yard, Shanghai, for the Shipping Board. Note the large lookouts. The Mandarin made an excellent impression in San Francisco.

There is no doubt that the fear of running counter to the Sherman anti-trust law prevents some companies from becoming conference members. The conspicuous case in point is the Isthmian Line, owned by the United States Steel Products Company, which, in conformity to the United States Steel policy, remains outside. In general, however, the different intercoastal lines apparently feel sure of their ground. They certainly find governmental sanction for conferences in the marked policy of the Shipping Board to encourage the formation of the associations and to insist upon operators of government tonnage becoming members, both of foreign and domestic bodies.

First Hawaiian Raws

The first cargo of Hawaiian raw sugar to be dispatched to the Atlantic under the new contracts of the island sugar factors was taken by the Shipping Board combination liner Hawkeye State, which is operated by the Matson Navigation Company in the Baltimore-Hawaii service. She had 6048 tons for New York. Following the Hawkeye State two vessels of the American-Hawaiian and the Isthmian steamship Montgomery City will load under arrangement with the Matson Line, which holds the contract for delivery of about 125,000 tons to the Atlantic.

After the loading of these vessels the use of additional tonnage will depend upon the sugar offering at that time. The two large 14,000-ton freighters Manulani and Manukai, delivered to Matson by the Moore Shipbuilding Company in April, will be available for the Atlantic service. Both will be dispatched from San Francisco to Honolulu for at least one round trip each, however, before they are used elsewhere.

Sugar shipments to date are slightly below normal for this season. At the first of April the accumulation in island warehouses had been well cleaned out, but the grinding is in full swing and the lull should be only temporary.

The use of the Shipping Board combination vessels and other steamers in the Hawaii-Atlantic sugar trade will result in the diversion of considerable quantities of freight from the transcontinental railroads. During the last few years the islands have had no direct Atlantic service, so that the large westbound movement of freight for the islands has been handled largely by rail. Now that a direct service has been reestablished, however, goods consigned from the Atlantic and Middle West will move largely by the all-water route;

and the Matson, American-Hawaiian and Isthmian vessels, moreover, will be able to command large quantities of canned pineapple for Atlantic delivery. Some of this business will be had at the expense of the other intercoastal lines, but a good portion will be taken from the railroads.

The Wage Question

Practically nothing was achieved by Pacific operators and representatives of the labor unions at their conferences in San Francisco late in March and early in April. The employers made their proposals for wage reductions to the unions; the unions promptly declined to consider not only the reductions proposed but any reductions whatsoever, and there the discussion rested at the time the clans gathered for the general conference in New York the second week in April.

Proposals looking toward reductions of approximately 25 per cent were made by the member companies of the Pacific American Steamship Association and the Shipowners' Association of the Pacific Coast to the representatives of the engineers, firemen, deck hands and stewards. In each case the reply was returned that no cuts would be considered by the men. At the time the New York meeting was held, however, no proposals had been made to the Pacific deck officers.

As a result of the replies of the unions and the approaching meeting in New York, the Pacific negotiations were thrown upon the Eastern conference. The following Pacific Coast steamship men attended: George Eggers, Pacific Mail Steamship Company; J. C. Rohlfs, Standard Oil Company of California; M. F. Cropley, Pacific Steamship Company; Captain C. W. Saunders, Matson Navigation Company; and W. F. Sullivan and Ralph Myers, Shipowners' Association of the Pacific Coast. William Kincaid represented the San Francisco district of the Shipping Board.

Acceptance by the Alaska fishermen of wage reductions approximating 25 per cent permitted the San Francisco, Portland and Seattle fleets to go north in April. The vessels had been held in port pending a settlement with the men.

U. S. S. B. Idle Tonnage

At the first of April forty-two Shipping Board steamships were tied up in the San Francisco district. One was at Portland, two were at Los Angeles and the others in San Francisco Bay. Although there are signs of improvement in the trans-Pacific trade, the number of idle vessels probably will increase for a few months, for deliveries continue to be made by Pacific Coast yards and the Kiangnan plant at Shanghai has begun to dispatch its vessels across the Pacific, the first of the four, the Mandarin, having arrived about April 1.

The total number of Shipping Board idle vessels on March 24 was placed at 536. The tonnage of the idle ships plus 226 wooden vessels on the withdrawal list amounts to more than 30 per cent of the government-owned merchant fleet. The number of idle wooden vessels charged to the Shipping Board has been decreased, however, by the sale of 44 hulls to the Northern Transportation Company of Baltimore for $1,580,000.

I. M. M. Earnings

Following the regular monthly meeting of the board of directors of the International Mercantile Marine in March, the following statement was issued:

"It was stated that the net earnings for the year 1920 after payment of interest on bonds and allowance for depreciation would probably slightly exceed the estimate made by the board in November, 1920, namely, $7,500,000, which would be about 15 per cent on the preferred stock.

"It is impossible at the moment to make any forecast for the year 1921, as due to the reduction in exports the freight situation is unsatisfactory, but the passenger situation, although it is much disturbed by the immigration complications, is encouraging."

Passenger Fares Cut

Effective May 26, the China Mail Steamship Company has announced reductions in first-class fares of the steamship Nile as follows: San Francisco to Yokohama, $226; Nagasaki, $257; Shanghai, $269; Hongkong, $293; Manila via Hongkong transfer, $293; Singapore, $343. These fares are the same as those charged for the steamship China.

Because of the congestion in passenger business between Honolulu and San Francisco, the Shipping Board has granted permission to the China Mail to transport passengers eastbound on three vessels sailing in April, May and June, thus relaxing to that degree the recent prohibition against the company engaging in the coastwise trade. An application of the company that it be permitted to carry passengers to Honolulu was denied on the ground that other services were adequate.

Some Corrections

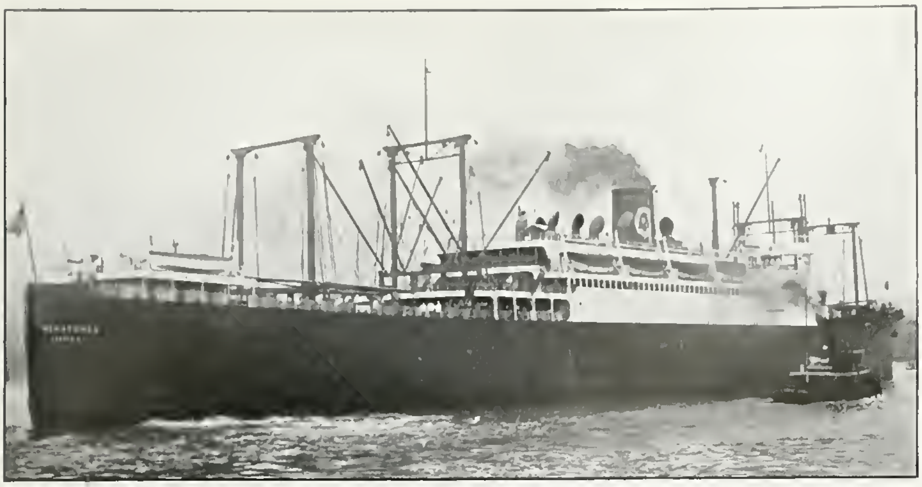
In the summary of Oriental freight conferences that appeared in the February number of Pacific Marine Review there were a few errors and omissions.

J. A. Payne of the Canadian Pacific is chairman of the Trans-Pacific Freight Tariff Bureau, with headquarters at Yokohama. W. L. Johnstone of the Pacific Mail is chairman of the Yokohama sub-committee of the United States Shipping Board Trans-Pacific Homeward Conference; and E. E. Johnson, Pacific Steamship, instead of R. O. Baker, Struthers & Dixon, is chairman of the Kobe committee. Hongkong should be added to the list of United States Shipping Board committees. The Los Angeles Pacific Navigation Company is a member of the U. S. S. B. committees at all ports. The China Pacific is not a member at Manila. To the Trans-Pacific Freight Tariff Bureau of Hongkong should be added the following members: Pacific Steamship, Los Angeles Pacific, Waterhouse, Java-China-Japan, Bank, China Mail and Ocean Transport. E. J. Brown, Pacific Mail, is chairman of the Shipping Board conference at Manila, and W. P. Neeson, Pacific Mail, is chairman at Hongkong. George A. Heyburn, Pacific Steamship, not L. Everett, Struthers & Dixon, is general chairman of the Shipping Board conference with headquarters at Shanghai. With these corrections and additions the summary is complete to date.

Motorships Coming

The Holland-America Line, hitherto operating three vessels in the Pacific-Europe service, has announced that the 13,000 deadweight ton steamship Noorderdyk will arrive at ports of the Pa-

S. S. Taiyo Maru of Toyo Kisen Kaisha, formerly German steamship Cap Finisterre. She will make her first voyage from San Francisco for Japan June 30.



The Wenatchee arrives. Above—The 535 Wenatchee, operated by the Pacific Steamship Company, in Seattle harbor. Below are Captain Gnotill, master of the Wenatchee; H. F. Alexander, president, and A. F. Haines, vice-president, of the Pacific Steamship Company, and R. M. Semmes, district director, Shipping Board, Seattle.

cific Coast in late May. Whether she will continue in the service has not been decided.

Much interest is being manifested in the three motorships now building for the Holland-America, which will be operated between the Pacific and Europe. No details of the vessels have been received, nor is it known definitely when they will be completed. With the Scandinavian motorships becoming increasingly numerous, the Holland-America and Royal Mail Steam Packet constructing vessels of the same type and American shipowners adding a few to their fleets, the day of the motorship on the Pacific may be said to have fairly dawned.

The motorships to be placed on the Pacific-Europe service of the Royal Mail Steam Packet Company, which will maintain a joint service with the Holland-America, will be similar to the Glenogle of the Glen Line, or of a little more than 9000 tons gross.

Line for Los Angeles

In order to afford Los Angeles a trans-Pacific freight service, which that city has not had since the suspension of sailings by the Los Angeles Pacific Navigation Company, the Shipping Board freighters operated by Struthers & Dixon will call at Los Angeles both inbound and outbound, giving monthly sailings. This schedule probably will remain in effect until sufficient business can be developed to warrant the maintenance of a separate line.

The Taiyo Maru

The Toyo Kisen Kaisha has announced that the former German steamship Cap Finisterre, allotted to Japan by the Reparations Commission and turned over to T. K. K. by the Japanese government, would arrive in San Francisco from the Orient about the middle of June and depart on her first westbound voyage June 30. She has been renamed Taiyo Maru. Taiyo is a compound word that may be translated as "Great Ocean," and it follows out the T. K. K. nomenclature, by which vessels have names ending in "yo."

The Taiyo Maru was built by the Hamburg-American for the Hamburg-Buenos Aires service, so that she is well adapted to tropical use. Her passenger accommodations are: first-cabin, 408; second, 102; third, 120; steerage, 828. She will be easily the largest passenger carrier of any vessel plying out of San Francisco, but her freight capacity is no more than 2000 tons.

In reply to criticism by stockholders of the T. K. K., who feared that the company had acted unwisely in accepting the vessel, President Asano said that only 10 sen (5 cents) a ton (probably gross) was being paid each month to the government. On the basis of gross tonnage, the Taiyo is being chartered for about $700 a month; but the low hire really is an indirect subsidy and as such is not unreasonable, inasmuch as the regular subsidy plan provides for a maximum of 50 sen a gross ton for each 1000 nautical miles steamed, plus extra payments for speeds exceeding twelve knots.

Should the company not be able to make the vessel pay, even at the low charter hire, Mr. Asano said that she might be employed between Hamburg and the Argentine, the trade for which she was built.

Advices from Japan say that American travel this year is showing a decrease of 20 per cent from that of 1920. General business depression is blamed. In view of this fact, the demand for passenger accommodations probably will not be so great as for the last few years.

Pacific Mail to Atlantic

The Pacific Mail has announced that the steamship Venezuela of the Oriental service would be withdrawn after her arrival at San Francisco in May for use in the company's Baltimore passenger line. She will depart from San Francisco June 1. A tentative schedule provides for the departure of the Colombia, a sister ship, July 19, and of the Ecuador September 17. Diversion of these three vessels to the intercoastal passenger service is made possible by the allotment of five 535's by the Shipping Board to the Pacific Mail.

Calls will be made at Los Angeles, Mexican and Central American ports, at Balboa and Cristobal, and at Kingston and Havana. On the westbound voyages the call at Kingston will be omitted.

One other intercoastal passenger service is in operation, the Matson Line using two 535's between Honolulu and Baltimore via San Francisco and Los Angeles.

Los Angeles to Mexico

A British steamship service between Los Angeles and Mexican ports will be established by interests affiliated with the Clan Line, according to statements made by Major N. R. Winters and Captain James Irvine. The two Britons recently investigated conditions in Mexico and Los Angeles and decided to recommend to their principals that Los Angeles be made the northern terminal inasmuch as the regular service of the steamships Yale and Harvard would afford a feeder connection with the north and the drydock and repair facilities of the Los Angeles Shipbuilding & Drydock Company would make unnecessary a call at San Francisco. Messrs. Winters and Irvine said that six vessels were under construction in the United Kingdom.

Los Angeles expects to profit materially by trade with Mexico. Business men of the city recently made a tour of its principal cities and are credited with having formed some promising connections.

More New Services

The International Mercantile Marine has announced that beginning with the sailing of May 26 from New York, its American Line steamers carrying passengers to Hamburg, the Manchuria and Mongolia, will call on their eastbound voyages at Cherbourg during the summer season. These stops have been arranged for a largely increasing continental patronage that finds it convenient to proceed by way of Paris to points in France and Central Europe.

The Canadian Government Merchant Marine plans to establish a freight and passenger steamship line between Atlantic ports of Canada and Australasia via Panama. On the return voyage the vessels would call at New York and other ports of the United States.

Another new freight and passenger service announced by the Canadian Government Merchant Marine is to be between Vancouver and San Francisco. Two vessels will be operated on a ten-day schedule beginning in June.

A new tugboat company, the Los Angeles Launch & Towboat Company, has been organized by Henry C. Peterson of San Francisco. The Shipowners & Merchants Tugboat Company of San Francisco has decided to enter Puget Sound with its new tugs.

The New York office of the Trans-Oceanic Company, San Francisco, has been closed and Simpson, Spence & Young and the Texas Transport & Terminal Company will represent the Trans-Oceanic on the Atlantic and Gulf. Both these companies will be represented on the Pacific by the Trans-Oceanic, which thus takes charge of the interests of some important French lines, among which is the Compagnie Generale Transatlantique.

The Granite State, the third and last of the 502's assigned to the Pacific Mail, for the Indian service, arrived at San Francisco April 4 from the Atlantic.

Reports are current that a group of Hawaiian business men is endeavoring to obtain the United States Army transports Great Northern and Northern Pacific for the San Francisco-Honolulu service. These vessels are unusually fast and carry large passenger lists, although their freight capacity is small. Extensive and costly reconditioning would be necessary.

Announcement has been made by the Los Angeles Steamship Company that the Los Angeles-San Francisco service of the steamships Yale and Harvard will begin in May. The steamships will maintain an average round-trip speed of a little more than 21 knots.

C. Henry Smith, formerly agent of A. O. Lindvig in San Francisco, has entered the West Coast trade, in which Lindvig vessels operated prior to the formation of the General Steamship Corporation. The first sailing will be that of the steamship Pacifico, 5500 ton deadweight. Mrs. Smith will use the name South America-Pacific Line.

The Pan-American Line has obtained the steamship Paraiso with which to replace the San Antonio in the Mexican and Central American trades. The Paraiso will be used in conjunction with the Griffdu.

Los Angeles has been added to the Pacific ports of call of the East Asiatic Company.

The Pacific Steamship Company has announced resumption of a direct passenger and freight service between Vancouver, B. C., and ports of the United States. The steamships Admiral Dewey and Admiral Schley will give a weekly service with calls at Vancouver, Seattle, San Francisco and Los Angeles. Heretofore the only Admiral Line vessel calling at VVancouver was the Admiral Sebree, which called once every three weeks. The Pacific Steamship Company employed the steamship Queen as a running mate to the President following the sinking of the Governor off Port Townsend April 1.

With Exporters and Importers

Lumber Rates Firm

Lumber was a principal topic of discussion at a meeting of the Pacific Coast-North Atlantic Eastbound Conference at a meeting held in San Francisco April 13. Representatives of Northwestern interests were heard in behalf of reductions in rates, but on the whole they were unsuccessful. The conference manifested a disposition to stand pat.

The northern men went to the meeting with a request that the lumber rate be reduced from $20 to $16 a thousand feet. Such a reduction they probably did not expect to gain; they did desire a cut to $18, however, because, so rumors say, in anticipation of lower rates some companies had sold quite a bit of lumber in the East on a basis of an $18 transportation cost. Whatever they desired, whether $16 or $18, they failed signally; and indications at the meeting were that the $20 rate would stand for the year.

Shingles formed another subject of discussion; on them the manufacturers lost ground. They asked the conference to cut the rate from 70 cents a hundred pounds to 60. This was denied, as was a request that the steamship lines accept responsibility for losses in excess of 1 per cent. The third important point resulted in an increase. This was the suggestion that the steamships transport dry shingles at actual weight and green at the weights of the West Coast Lumbermen's Association, an action that would have given the shipper the advantage in both categories. The conference denied this request also; it went further, and decided that association weights would be used in all cases thereafter, instead of association or actual weight at ship's option being employed. In general, ship's option always has been construed to mean the use of that standard which would redound to the advantage of the carrier; but some companies, it was stated, had been employing the lesser weight of shingles. By enforcing the association weights, the steamship lines probably will receive more for dry shingles; to offset this, however, the association green weights generally will be less than the actual. The sum total of the ruling is an increase in the rate on dry shingles, although the amount of increase would be difficult to estimate. The fact is that the intercoastal lines do not regard shingles as desirable cargo and are not inclined to make such concessions as they did in the case of box shooks, which were reduced at the same meeting from 70 to 60 cents.

An interesting proposal was made to the conference by Skinner & Eddy, Seattle, who had prepared a plan for assembling lots of lumber at the different ports of Puget Sound and taking them by barge to Seattle, there to load the several lots at one operation, working straight shifts until completion and at no cost to the operator. In return Skinner & Eddy wished a rate of $18. The conference decided that no lower rate could be made for one company than for another, although the steamship lines would not have to call at different ports and would save in loading costs; the plan failed, therefore, so far as the conference was concerned, but the body suggested that Skinner & Eddy take up the proposal with the different lines. Some plan may be evolved that would not necessitate the actual cutting of steamship rates.

Despite the reports that the trans-Pacific lumber rate has been raised, it remains $10, but will be increased, according to present plans, to $15 July 1. A proposal to increase it in April was defeated because some lines held that they should be privileged to accept new cargo at $10 inasmuch as others were booked up at that rate for several weeks to come.

Other Tariffs Lowered

Following upon the emergency reduction in the canned goods rate from the Pacific to the Atlantic, the Pacific Coast-North Atlantic Eastbound Conference has cut the rate on beans from 70 to 55 cents a hundred pounds, effective until July 31. This rate will permit beans to be landed at an Atlantic port and shipped as far west as Pittsburgh in competition with goods moving overland. It was estimated that 86,000 tons of beans were on the Pacific Coast awaiting shipment. Without certainty of being able to sell this accumulation, which was practically one entire crop, growers were not disposed to plant.

The trans-Pacific rate on sacked wheat was reduced March 29 from $9 a short ton to $7. Prior to the fixing of the $9 rate $12 had obtained.

In order to equalize the through rates with the aggregate of two locals, the Matson Navigation Company has reduced the Hawaii-Atlantic rate for canned pineapple from $18 to $17 a ton. When the intercoastal lines reduced the canned fruit rate the sum of the Hawaii-San Francisco and San Francisco-Atlantic charges became less than the through.

Wool Also Down

The Southern Pacific Company has announced a reduction in freight rates on imported wool from California ports to New York pier via Southern Pacific, Galveston and Morgan Lines, to become effective April 4 as follows: Wool in grease, in bales, machine-compressed to not less than 23 pounds a cubic foot, minimum carload weight 30,000 pounds, $1.25. Old rate, $1.66½.

Wool, scoured, in bales, machine-compressed to not less than 17 pounds a cubic foot, minimum carload weight 20,000 pounds, $1.50. Old rate, $2.16½.

A large amount of wool has been received at San Francisco recently from Australia, with New York and Boston as its final destination.

Weakness of Orient

Rates on freight originating in the Orient continue weak. The Japan and Calcutta-Rangoon tariffs fell from yen 2 to yen 8 a ton March 1. Bombay general cargo declined from yen 40 to yen 35, weight or measured, and Rangoon, Calcutta and Colombo from yen 35 to yen 30. At the same time the Dairen-Europe wheat rate fell from 70 shillings to 60; and Dairen-Bombay from 40 to 25. About the middle of March, however, the coasting trade strengthened slightly.

Low rates and small cargoes are affecting prospective dividends. Japanese sources predicted that the dividend of the N. Y. K. for the business term ending March 31 would be about 20 per cent as compared with 30 per cent for the preceding period and 50 per cent during the war boom.

Fruit Rates Again

A flurry was created in intercoastal circles in April by the report that a strong non-conference line had reduced the rate on processed fruit in boxes from 90 to 55 cents a hundred pounds, or 5 cents less than the newly-established rate on dried, non-processed fruit in bags. The Pacific Coast-North Atlantic Eastbound Conference held a meeting to discuss the reported reduction but adjourned to seek additional information before taking any action.

The present railroad rates are $1.66 on boxed and $2 on sacked, which are considerably higher than the old water rates of 90 cents on boxed and $1.40 on sacked. The reduction of the last rate to 60 cents in March resulted in a vigorous effort on the part of the packers to bring about the restoration of a differential. While this case is pending before the Shipping Board the packers have executed a flank movement against the growers, if the reports be correct, which acts still further to confust the situation.

Some processed fruit has been shipped by water recently, despite the old prejudice of Eastern buyers against goods that had been exposed to the heat and humidity of the torrid zone; reports, moreover, credit the rate-cutting steamship line with having booked large quantities. California packers say that they must allow for average damage of about 1 cent a pound when shipping by water. Some fruit might be undamaged; the loss on other shipments might be 2 cents or more. The reported water rate of 55 cents is $1.11 a hundred, or about 1 cent a pound, less than the rail, and accordingly might be expected to attract some cargo, perhaps a considerable amount. But it does appear to be about the highest rate that would accomplish anything.

The statement made last month that 100,000 tons of sacked fruit had been booked at 60 cents was in error. Bookings aggregate 200,000 tons, without, it appears, any time limit.

The motorship Kennecott, recently delivered by Todd to the Alaska Steamship Company and placed on the berth by H. W. Ross, cut the intercoastal flour rate from $11 to $9 and other commodities in approximately the same ratio. Inasmuch as the voyages of one vessel necessarily are infrequent, conference members professed to feel no alarm.

Freight Report

April 13, 1921.

Our last circular was dated March 15. About two days later the United States Shipping Board chartered two of their steamers to load at Portland, at $10.50 United Kingdom-Continent, Bordeaux-Hamburg, option of $12 to Mediterranean not east West Coast of Italy, one by M. H. Houser, and the other by the Northern Grain Warehouse Company. About the same time the motorship Canada was chartering space from San Francisco or the North to Scandinavian ports at $14 per ton. The motorship Indien was chartered by the East Asiatic Company to the Pacific Grain Company at 55/- U. K.-Continent, 60/- usual Mediterranean, for one port, with 2/- additional if two ports in the same range. Just one week later quite a thrill was experienced by shippers when they heard that Kerr-Gifford & Company had taken two steamers at 70/- for U. K.-Continent and Mediterranean from the Shipping Board for April loading. The excitement subsided somewhat when it was learned that this rate had been paid in order to fill short sales of grain. These charters were followed by the British steamer Sedgepool which suddenly offered on the market, but for May/June loading, and which was eventually chartered by M. H. Houser at 60/- for U. K.-Continent, with the option of Mediterranean, at a reported rate of 65/-. There was a lull in chartering for three or four days, although the tone was firmer, when Kerr-Gifford came into the market and took the Kina at 65/- for U. K.-Continent, and 70/- for Mediterranean, May loading. Today it is reported two Shipping Board steamers have been fixed to load wheat or flour from Portland at 70/- for either U. K.-Continent or Mediterranean.

From San Francisco no steamers have been taken for full cargoes of barley, but liners have been arranging space to different ports in U. K.-Continent, at from 55/- to 60/-, and to Scandinavian ports at 70/-.

Quite a business has been done on vessels from Newcastle, Australia, to San Francisco, by J. J. Moore & Company, they having taken the motorboat Oronite, and schooner Vigilant, and it is reported, possibly one or two steamers, all at $5.25 a ton.

The only business done lately for ties to Europe was by the Canada Overseas

Trading Company, they having chartered two Canadian Government Merchant Marine steamers at a reported rate of $27, Canadian currency, a thousand feet, to Alexandria. There were some further orders for U. K. in the market, but in competition with the Gulf ports the latter succeeded in getting the contracts away from this coast.

The schooners Echo and Honoipu have both been chartered to carry copra from the South Sea Islands to San Francisco, the first by Burns, Philp & Company, and the second by Wightman & Crane.

Some charters have been reported for nitrate from Chile, the steamer Everest having been closed at $4.50 a ton from a nitrate port to Gulf-Boston range, and the latest steamer is reported to have been chartered for the same business at $4.

Steamer West Hartland was taken by H. R. MacMillan Export Company, Ltd., at a reported rate of $24.50 U. S. gold, for ties to Bombay from British Columbia. This firm had originally chartered a Canadian Government steamer at about $40 Canadian, but when she missed her cancelling date they were able to fill her place by the charter of the above steamer.

A Canadian steamer, the Canadian Carrier, has been chartered for nitrate to Honolulu by Balfour, Guthrie & Company at $8 Canadian currency.

For lumber to the West Coast, the lowest rate paid has been for the J. W. Clise, namely $17 a thousand to Callao, by the Mohns Commercial Company.

The General Steamship Line is reported to have taken ties from a redwood port to Callao, under charter to A. F. Thane & Company, at $18 U. S. currency, and the schooner Forest Home was chartered by W. R. Grace & Company at $18 to Callao.

The last space engaged by a General Steamship liner for the West Coast has been for account of A. F. Thane & Company, about 400,000 feet to Iquique, at $20 a thousand.

There have been no sailers chartered for lumber to Australia, as their owners do not see any money in sending them down at $18 a thousand, but Africa has bought a fair amount of lumber lately. Balfour, Guthrie & Company are sending their own vessel, the David Evans, with a cargo to Capetown, and the Hastings Mills chartered space for 800,000 feet to Durban at about $35 Canadian currency, on one of the Canadian Government Merchant Marine steamers, and G. W. Gates & Company of Portland have chartered the schooner Hesperian from the Rolph Navigation & Coal Company, at a reported rate of $30 U. S. gold a thosuand, prepaid, for two ports South Africa.

No shippers here are interested in taking steamers on time charter, but the last charter reported on the Atlantic was a 9000-ton steamer for four to six months, delivery and re-delivery New York, at 6/6 a ton a month, on the deadweight. PAGE BROTHERS,

Brokers.

Refrigerator Vessels Needed

The need of refrigerator vessels on the Pacific becomes more apparent month by month. Within the last half-year the flow of Pacific Coast products, especially fruits and other perishable goods, to the Atlantic Coast has increased greatly in volume, and the urgent demand for refrigerator vessels has led at least one intercoastal steamship line to give earnest consideration to installing storage space in old vessels or perhaps constructing specially-designed vessels. In other ocean trades the lack of refrigerators has become manifest. A beginning is being made in the Australasian meat and butter business; fresh fruits and vegetables doubtless will move in larger volume to the Orient and Malaysia on the new Shipping Board combination vessels; now comes a report prepared by the bureau of foreign and domestic commerce urging the establishment of a refrigerator line to handle Chinese eggs:

"As China is in the same latitude as the United States, the laying season corresponds very closely with our own, and consequently the receipts at the American egg freezing plants which have been erected at Shanghai are heaviest in the spring," says the report. "Ample provision for cold storage and other facilities at Shanghai, and refrigerator ships for the trans-Pacific run, must, therefore, be provided in order to keep the plants working to capacity all the year round and the supply of Chinese frozen and dried eggs regular for the American market. A large amount of American capital has been invested in these plants in China."

The report says that nearly 4 per cent of our imports from China in 1920 were dried and frozen eggs. In fact, of 29,022,577 pounds of eggs imported from all countries in 1920, we received from China alone 25,646,791 pounds, valued at $6,093,155. There apparently is a marked increase each month in Chinese shipments, for imports in December were 9,736,453 pounds as compared with 579,814 pounds in January.

American shipowners and shipbuilders will find serious consideration of these facts well worthwhile.

2800 Tons of Glass

The European-Pacific steamship West Kedron, managed by Williams, Dimond & Company, sailed from Antwerp in March with a full cargo for the United States, included in which was 77,335 cases, about 2800 tons, of glass, which constitutes the record shipment for Antwerp. Advices to Williams, Dimond & Company state that Antwerp manufacturers are very active and are making large sales overseas. Commerce Reports has the following to say regarding this shipment: "What is considered to be the largest single shipment of ordinary window glass since the armistice left Antwerp on March 10 for Seattle, Washington. Many of the shipping agencies have commitment for a great amount of glass, one prominent shipping firm stating that it had 60,000 tons to ship. This consists of window glass." In 1913, the last normal pre-war year, Belgian glass exports to the United States aggregated 10,254,089 kilograms as compared with 5,747,263 in 1920. A promising business therefore appears to open.

In Asiatic Ports

Japan's Future Dark

Dr. Junichiro Imaoka, of the Uraga Dock Company, believes that Japanese yards must bestir themselves if they are to remain in business. Said Dr. Imaoka:

"Last year ninety ships of not less than 1000 tons gross, totaling 430,000 tons gross, were launched, as against 174 of 501,081 tons in 1918 and 134 of 616,667 tons in 1919, 4 of 34,478 tons in 1913 and 16 of 78,010 tons in 1914. Though last year's output shows a considerable decline when compared with the years when the wartime prosperity in shipping and shipbuilding was at its height, it indicates a great development when compared with the prewar conditions. As to the future we cannot but be pessimistic.

"There will be very few orders for new ships, and foreign competition must be met. . . . The shipyards capable of building steel ships of not less than 1000 tons gross have decreased to half the number existing at the time of the war boom, but they still number twenty, their total amount of capital being yen 120,000,000, excluding naval shipyards. The workers number about 90,000, and when other employes are taken into account, all engaged in the shipbuilding industry number no less than 100,000.

. . . . .

"It will be difficult for anybody to meet the situation, but no pessimism unaccompanied by remedial measures will do. Let me suggest five remedies: (1) cancellation of the import duty on shipbuilding materials: (2) reduction of wages and increase of efficiency; (3) improvement of equipment and reduction of shipbuilding cost; (4) co-operation between builders; and (5) government measures to help builders."

Dr. Imaoka's first suggestion already has been incorporated in a bill introduced in the Diet. Although shipbuilding materials would be admitted duty-free, the imposts on other irons and steels would be more than doubled, rising from about yen 10.80 to yen 25.

Amalgamation Again

Another plan for the amalgamation of the principal Japanese steamship companies has been brought forward. This is by Matahachiro Tachikawa, a shipowner and large stockholder of the Nippon Yusen Kaisha. He suggests that the subsidized lines, N. Y. K., O. S. K., T. K. K. and Nanyo Yusen Kaisha, offer their fleets and good-will but retain other properties, and that the Kokusai, Kawasaki, Teikoku (Suzuki) and Taiyo Kaiun turn over their vessels only, the whole tonnage thus obtained to be about 2,500,000 deadweight and the company to be capitalized at about yen 500,000,000. Mr. Tachikawa is quoted as saying that a private understanding had been reached with the T. K. K. and smaller companies and that he was about to ascertain the attitude of the O. S. K. An official of the N. Y. K., whose identity is not disclosed, said that Mr. Tachikawa was endeavoring to bring about a rise of N. Y. K. stock.

Mr. Tachikawa proposed that the shareholders of the N. Y. K. should receive four shares of the amalgamated company, worth yen 50 each, paid up, for the one old N. Y. K. and one new N. Y. K. share, the latter one-fourth paid up. The stockholders also would receive about yen 150 for each set of one old and one new N. Y. K. shares in liquidation of the retained N. Y. K. property.

In this connection Mr. Tachikawa analyzed the status of the N. Y. K. as follows:

"The Nippon Yusen Kaisha has a fleet of 494,000 tons gross or about 700,000 tons deadweight. The value of this fleet is estimated at yen 126,000,000 or yen 180 per ton deadweight. The valuation of ships not yet completed and of the business office is put at yen 15,000,000. The title to the operation of the N. Y. K. lines is estimated at yen 60,000,000 the total value of the titles of the Nippon Yusen Kaisha, the Osaka Shosen Kaisha, the Toyo Kisen Kaisha and the South Seas Mail steamship Company being placed at yen 100,000,000. The above figures for the Nippon Yusen Kaisha aggregate yen 201,000,000, which represents the interests to be turned over by the Nippon Yusen Kaisha to the amalgamated company.

"Of the property of the Nippon Yusen Kaisha not to be offered, various securities in possession of the company are value at yen 75,890,000. A sum of yen 8,300,000 represents two items due to the company but not yet received. Of the cash now in the hands of the company, yen 2,000,000 is to be defrayed as bonuses, and the remaining yen 22,900,000 is for the shareholders. In advance payment for ships not yet completed, yen 7,650,000 has been paid, yen 2,970,000 represents the value of launches and lighters (three times the value recorded in the balance-sheets); yen 1,480,000 represents the value of stores and yen 46,050,000 represents the value of land and buildings (six times the value recorded in the balance-sheet). These figures total yen 165,240,000, but this amount includes the value of uncompleted ships and business offices which are worth yen 15,000,000, as already mentioned. This must be deducted from the total as it relates to things to be offered to the amalgamated company. The remainder amounts to yen 150,240,000, which is for distribution among the N. Y. K. shareholders."

British Gain Ground

How the Japanese shipping situation grows worse is disclosed in the announcement that the O. S. K. has decided to suspend its "South Seas"-Europe service and that the N. Y. K. will reduce the number of vessels in the same trade, the European lines having returned in force since the end of the war.

Britain is gaining ground elsewhere. A tabulation credited to a Japanese shipping firm shows that of the vessels calling at Hongkong the British make up no less than 35 per cent as compared with 28 per cent Japanese and 24 per cent American. No less interesting is the statement that 40 per cent of the tonnage was engaged in European trades, 23 per cent in the North American Pacific and 19 per cent in the North American Atlantic. Some of the vessels of the last class ply via Suez, but on the whole the vigorous competition offered by the Atlantic to the Pacific for Oriental business is made manifest again. The leading flags in different Hongkong trades are : European and Indian, British; South American, Japanese; American Atlantic and Pacific, United States. Japan is second in several trades; America is of importance only in the two named.

To add to the troubles of Japanese shipping companies, talk of the formation of a seamen's union is louder. No less than twenty-eight organizations are supporting the latest proposal. The organization would see to the enforcement of the resolutions adopted by the International Seamen's Conference at Genoa and among other things would assist seamen to find berths. Details as to the success of the plan will be awaited with interest.

T. K. K. Report

For the business term ending December 31, the Toyo Kisen Kaisha has declared a dividend of 10 per cent as compared with 15 for the first six months of 1920. Net profits declined from yen 800,000 to yen 385,000, so that the company had to draw yen 700,000 from the dividend - equalization fund in order to pay 10 per cent. Soichiro Asano, president of the company, addressed the stockholders as follows at the meeting March 29:

"When the shipping situation was prosperous, we laid down a plan for building a number of freighters, and for this purpose a sum of yen 45,000,000 was set aside, to begin with. Thirteen vessels had been ordered, when the armistice was concluded, and the shipping market became depressed after that time. Owing to this depression, it does not pay to operate the newy built ships, and as a result five of them are now tied up. Two more ships have already been completed, but steps have not yet been taken to take their delivery. All the other ships are still under construction.

"Thus the whole of yen 45,000,000 assigned for the completion of the first portion of the building program is tied up with no yield from the investment, but it is hoped that the shipping situation will improve in a year or two, and it will become remunerative to operate the new vessels. The tankes are to be sent to South America, and the future of the shipping situation is not without promise. But the question is how to tide over the difficulties during the next year or two. We expect that we shall be able to maintain our position by increasing the number of passenger steamers. By operating these ships we shall be able to pay a dividend of 8 per cent, and by drawing upon the reserve fund for 2 per cent it is expected that the company will be able to maintain a dividend of 10 per cent. After next year, extra profits will be derived from the thirteen new ships and the tankers, and thus we expect to be able to pay between 12 and 15 per cent."

The statement of accounts for the last term compares as follows with that for the preceding term, figures in yen:

	Last Term	Previous
Gross income....	11,264,784	11,910,287
Gross expenditure	10,015,909	10,292,983
Writing off the value of ships	746,458	704,434
Ship repairing..	117,286	112,033
Net profit	385,129	800,835
Brought forward	120,165	302,696

Dividend reserve	700,000		650,000
Total	1,205,294		1,753,532
Reserve fund	20,000		40,000
Dividend, 10 per cent.	1,137,500	15%	1,592,366
Carried forward	47,794		120,165

The stockholders approved an issue of yen 7,000,000 in debentures through the Yasuda Bank, interest to be at 8 per cent and redemption to begin at the end of two years and to continue for three years thereafter. This same bank formerly underwrote an issue of yen 13,000,000 for the T. K. K.

New Tokyo Hotel

President Asano stated in a recent interview that the T. K. K. had plans well under way for a large hotel, which will be built in Tokyo facing the Central Station and the Tokyo Kaijo Building. The plans call for the expenditure of about $8,000,000; there would be 800 rooms, or quarters for a maximum of 2000 persons; and the building would be even larger than the Tokyo Kaijo, which is the largest structure in Asia. In addition to the Tokyo hotel, Mr. Asano proposes to build one in Yokohama, accommodating 300 persons, on the site of the old Club Hotel on the Bund; and the Oriental Hotel in Kobe, which is owned by the T. K. K., will be enlarged with new floors or an annex.

Hotel accommodations are at premium in Japan and the venture proposed should have every prospect of success.

The Nichibei Sentetsu Kokan Domeikai, an association organized to represent Japanese shipbuilders who constructed vessels for the United States Shipping Board under the steel-for-ships agreement, is in process of dissolution. All details of payment by the United States have been settled, or will be settled soon, so that there no longer is any need of the association.

Personals

Charles E. Ware of Boston, president of the North Atlantic & Western Line, visited the principal ports of the Pacific Coast in April.

Ryozo Asano, managing director of the Toyo Kisen Kaisha, returned to San Francisco in April from a visit to Honolulu.

Captain John K. Bulger, supervising inspector, Steamboat Inspection Service, San Francisco, was the guest of honor at a dinner in celebration of the thirtieth anniversary of his entrance into the government's service.

Frank G. Bryant, California representative of the Winton Engine Works, has returned to San Francisco from a trip to Cleveland and Pittsburgh.

Captain H. Z. Howard, president of the San Francisco Bar Pilots' Association, celebrated his eighty-sixth birthday April 1. Prior to becoming a pilot commissioner Captain Howard was an officer of the United States Navy and Pacific Mail, master of steamships of the Oceanic Line and port superintendent of the same company.

H. B. Hatch, formerly of the Illinois Central, has been appointed district passenger agent of the Los Angeles Steamship Company with offices at 685 Market Street, San Francisco.

W. P. Collings, senior surveyor of Lloyds in the Northwest, has been recalled to take charge in Sunderland, England. Captain James Fowler has charge of the Northwest headquarters.

Mrs. G. M. Starr, auditor of the Thorndyke-Trenholme Company, Seattle, has been appointed vice-president and treasurer, succeeding H. W. Ross, who resigned to enter the brokerage business on his own account. L. W. Baker has succeeded as head of the traffic department.

J. C. Ainsworth has been elected president of the Columbian-Pacific Shipping Company, Portland, succeeding C. E. Dant.

K. D. Dawson, general manager of the Columbia-Pacific, has been given the title of vice-president also.

Gordon Glidden, sales manager of the Moore Shipbuilding Company, will have San Francisco offices in the Balfour Building instead of at the Second Street works, as heretofore.

A. Carnegie Ross, British consul-general, San Francisco, has been transferred to be consul-general at Barcelona.

Walter W. Johnson, president of the Union Construction Company, Oakland, was on the Atlantic during April.

S. P. Trood, editor of the Chart, yard publication of the Los Angeles Shipbuilding & Drydock Company, was in San Francisco in April. Mr. Todd will issue the Chart hereafter as a monthly instead of a bi-weekly.

Harry W. Deas has been appointed San Diego agent of Norton, Lilly & Company, representatives of the Isthmian Line. Mr. Deas formerly was with the Gulf Mail, Pacific Freighters and Pacific Motorship.

Drew Chidester, general manager of the General Steamship Corporation, San Francisco, has been made receiver of the Pacific Motorship Company, which has failed in its payments for wooden motorships bought of the Australian government.

J. W. Powell has resigned as a member of the administrative council of the Atlantic Coast Shipbuilders' Association, representing New England, and has been succeeded by E. B. Hill, who is now vice-president of the Bethlehem Shipbuilding Corporation.

Captain Clarence C. Decker has been appointed Shipping Board port captain at New York, succeeding Captain J. N. Patten, resigned.

Albert Christen has been appointed general superintendent of the Consolidated Shipbuilding Corporation, Morris Heights, New York, succeeding Joseph S. Potter, who has been promoted to be sales engineer.

George A. Hoefft has become associated, as president, with the Armstrong Transportation Company, brokers, New York.

J. G. Miller, assistant treasurer of the Baltimore Drydocks & Ship Building Company, has been placed in control of the purchasing and stores department in addition to his other duties.

Hadley F. Brown and **B. L. Myrtetus,** formerly connected with the American International Shipbuilding Corporation at Hog Island, have formed the firm of Brown & Myrtetus, naval architects, consulting engineers and appraisers, and opened an office in Philadelphia.

Captain Albert F. Brown has been re-elected president of the Vessel Owners' & Captains' Association of the port of Philadelphia for his fifth successive term. The directors elected the other officers as follows: Charles E. Davis, vice-president; Maurice E. Gerhard, secretary; Theodore B. Palmer, treasurer, and Howard M. Long, solicitor.

Frederick W. Baker, for the past four years assistant superintendent of construction at the Bath Iron Works, has been appointed superintendent of construction to succeed the late John McInnes. Mr. Baker is a graduate of Massachusetts College of Technology and of a naval architect course in Glasgow University, and formerly was connected with the Cramp, New York Ship, Newport News and Dixon shipyards. He was with the Columbian Iron Works in 1895, the year that Mr. McInnes started in shipbuilding in this country in the employ of the Columbian yard.

The following changes in officials have been announced in the companies directed by the Harriman interests:

W. A. Harriman has been elected chairman of the boards of the American-Hawaiian Steamship Company, the American Ship & Commerce Corporation and the American Ship & Commerce Navigation Corporation. He is also chairman of the boards of the United American Lines, Inc., and the Merchant Shipbuilding Corporation.

Charles M. Schwab will be the guest of former executives of the E. F. C. at a dinner in New York May 6. D. E. Coxe is chairman of the committee on arrangements.

PACIFIC MACHINERY

SOME NOTES ON MACHINE DESIGN

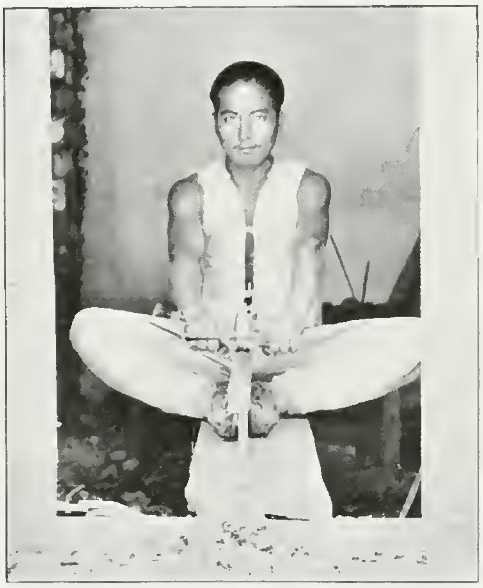
By A. J. DICKIE

MAN since the earliest times of recorded history has been a tool-using animal. During all of that history there has been going on a gradual evolution in the design and manufacture of the tools used by man, this evolution being largely controlled by the more complex demands of man's life as he progresses in what he is pleased to term modern civilization.

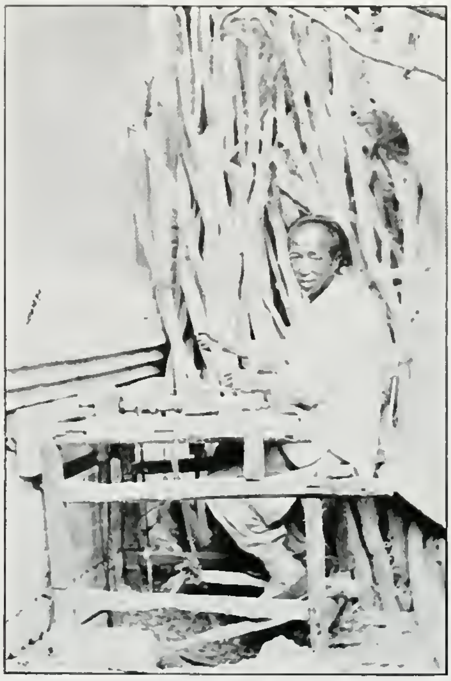
Edged tools, first in stone, then in copper, then in iron and steel, were in very widespread and varied use before their adaptation to the more modern needs of man by the use of what are known as machine tools and the introduction of power. Many of these edged tools in their present form are of quite ancient usage as, for instance, the axe, the adz, and the chisel, either pushed by hand or driven by mallet. Naturally the suggestion came to the users of these tools at a very early period that the intermittent chipping and breaking off of material by tools was a wasteful process, and there came into being those mechanisms which made the process continuous either through a constant motion of the tool itself or by motion of the work or material past the edge of the tool held in a stationary position by the operator.

Evolution

Probably the first step in the evolution toward modern machine tool practice was the application of the rotary movement of the work across the cutting edge of the stationary tool when the first turner started the first lathe. In some out of the way parts of the world we still find in use these primitive lathe forms, as is shown in the illustration on this page depicting a Chinese wood carver operating by foot power a very primitive turning machine. This picture was taken by a friend of the writer on the occasion of a recent trip to a mountain shrine in China. This interesting old character was located in a niche in a canyon wall inaccessible except by foot path along the side of the cliff.



Above—A very efficient machine of the intermittent shaving type. Below—A primitive form of the continuous cutting machine which has developed into the modern lathe. Both of these illustrations are reproduced from photographs taken recently in Central China by a correspondent of Pacific Marine Review. The machine shown in the lower picture is located at a spot accessible only on foot.



The development of the modern lathe from such a simple machine as the one shown was a long, intricate and slow process and a process which is still continuing, as we are yet far from perfection. The grandfather of the writer in his boyhood days chipped masts for sailing ships with an adz by hand. Masts for sailing ships are now turned out complete by a machine in one process. The father of the writer told how, when serving his apprenticeship in a British shop, the shoulder rest was used for holding the tool up against the material and how many of the workmen had been troubled with calloused shoulders.

In designing or choosing a design of a tool for a modern workshop the following criteria should be kept in the mind of the designer or of the shop superintendent: First, efficiency—and this should be measured by the output of and the investment in the machine; second, adaptability—and this should be judged both in the light of the actual work contemplated and the probable future needs; and third, convenient duplication.

Efficiency

In considering the first of these criteria, we may take it for granted that the "best machine is the one that gives the greatest output of satisfactory product." And in considering the means to be used for obtaining the largest satisfactory or accurate output, we find that the first requisite is cutting so as to remove metal quickly.

In general, there are three limiting elements to the rapid cutting of material; namely, heat generated by cutting; stability of the machine for control of tool and material; and the character and section of the material upon which work is being done.

It is to the second of these elements that the designer of machine tools has applied all of his efforts and, other things being equal, that machine tool is the best which furnishes the strongest and most exact control of the cutting edge of the tool. The constantly increasing demand for higher efficiency measured by quantity of output and without any lowering of the standard of accuracy has brought out a great variety of special machine tools designed for particular classes of work and has also so improved the standard of the tools for general machine shop work that we are able today to work on a manufacturing basis in duplicating parts to limits which were not conceived as possible by the machine tool operators of the last generation.

The ultimate limit is by no means reached, and it would seem as if this ultimate limit would be set only by the definition of efficiency as given above, namely, the output per capital investment.

In working for strength and accuracy of cutting edge control modern tool designers have been led into a very close analysis of strength of materials, of the best distribution of weight to achieve rigidity, and of compactness of mechanism for the transmission and control of the driving energy. Mere weight in a lathe, milling machine, or shaper does not necessarily mean better control of cutting edge and may in certain instances with work of large dimensions mean weakness of control. A very heavy machine of large capacity may be capable of taking a tremendous amount of metal in a single cut from the work that it is handling and yet be greatly inferior in the control of the path of the cutting edge to a much lighter machine more especially designed for the work in hand.

The strength of control is dependent upon the margin of strength or what might be called the safety factor of the machine above its working stresses. This factory of safety may be increased along two lines; First, by strengthening the machine parts; second, by reducing the stresses involved for a given result.

Great progress has been made through the study of metallurgy in the heat treatment of certain classes of steels along the second line indicated, and results are now being obtained with the newer steel alloys, which enable light machines to produce very much heavier outputs on account of the fact that with properly ground cutting edges of these materials there is not nearly so much stress involved in the removal of metals as there formerly was with the old blunt-nosed, ordinary tools commonly used in lathe or shaper work.

Adaptability

The adaptability of a machine tool as judged by the designer or shop superintendent is a matter which is usually decided upon the general characteristics of the work which the machine is to perform. Automatic machines may be designed for forming and duplicating all sorts of shapes. These same shapes may be turned out with equal facility, but not equal economy on any ordinary turret lathe, engine lathe, shaper, boring mill, or planing machine, according to the article required, and for any particular shop the question of which machine is best is largely decided by the number of duplicate parts required in the work.

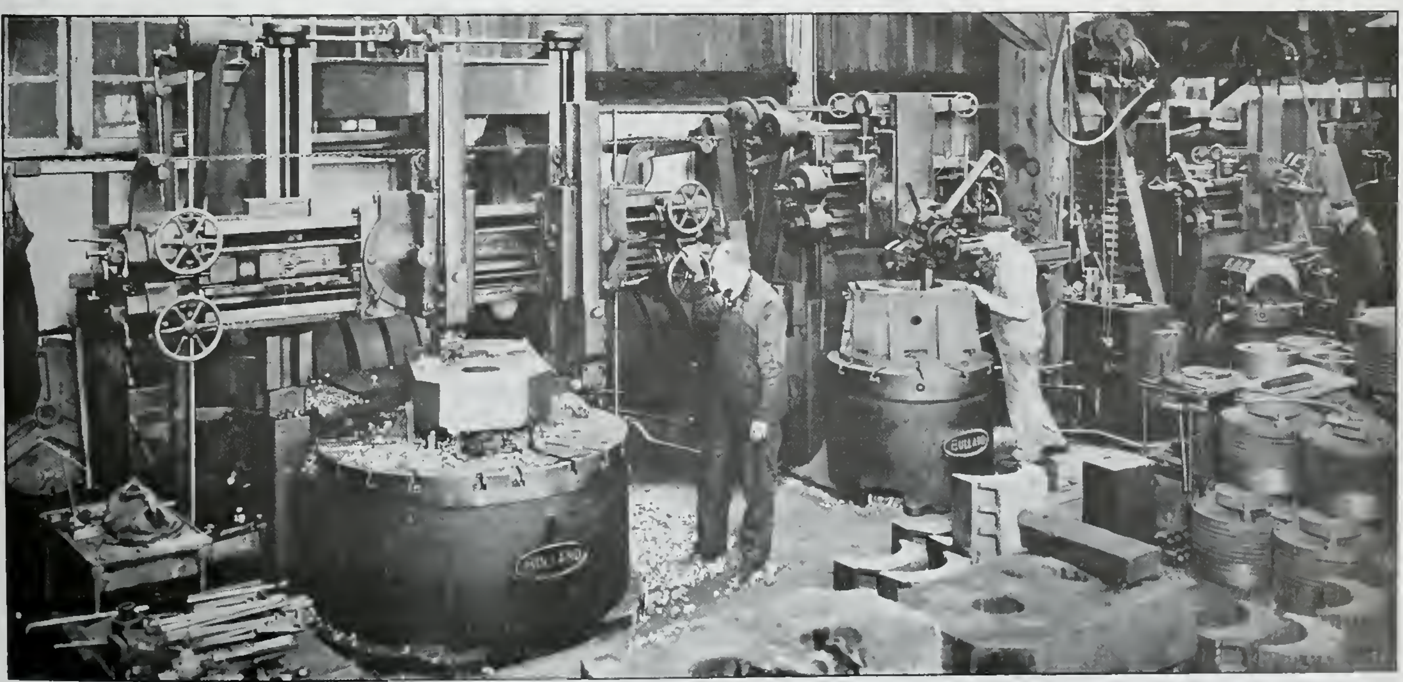
It is not a very difficult matter to design a machine which will turn out in one day 5000 screws for a certain purpose, but it would be a very difficult matter indeed for a shop superintendent to show a profit on such machine if the demand for such screws did not exceed 500 per day and the machine was not adaptable for any other purpose in turning out profitable work.

In the large manufacturing centers this matter of adaptability has largely been subordinated to special adaptability for special operations, and we find the trend of design to be toward machines of continuous operation at previously calculated speeds best adapted to the particular job in hand and the machine locked at that speed, the only duty of the operator being to see that the tools are kept properly ground and that the pieces upon which the machine is operating are removed when finished and others adde.d

Duplication

In the matter of duplication, original design of the machine has a large part in the convenience or inconvenience of adapting the machine to the use of special jigs and tools for dupilcating work within certain limits of accuracy. The designer should bend every effort to so design his machine that tools may be reset in as short a time as possible and that all unproductive motions of the machine be as freely and rapidly executed as is practicable. In this regard it is well to note the tendency toward the use of small independent electric motors in energizing these motions, some large machine tools having as many as six or eight independent motors for as many independent motions of various parts of the machines.

There have been tremendous strides made along these various lines during the last ten years, but the demand is still ahead of the design and there is great room for improvement.



Battery of Turret Lathes and Boring Mills in a modern Pacific Coast machine shop

COST OF CHANGING TO THE METRIC SYSTEM

A CLOSE study of costs involved in changing from our established system to the metric system in a manufacturing concern does as a rule furnish surprises.

To a letter recently received from a prominent Cincinnati firm was attached a comprehensive report giving a cost-estimate covering such a change. From this letter, written by the president of the company, we quote the following:

"This report was made up very carefully and the result is simply astounding. The cost would amount to confiscation of profits for many years to come, if they were years of normal profits."

From the report which it took weeks to prepare we quote these figures:

"The cost estimate is as follows:

Remaking all drawings	$ 36,000
Changing of patterns	12,000
Cost of new metric small tools and measuring tools	27,500
Cost of changing jigs and fixtures (about 75 per cent of the cost of these if they were all to be made new)	130,500
Change in machine tool equipment	19,000
Cost of training employes to use metric measuring tools	15,000
Cost of extra spoiled work from change first year	20,000
Second year	10,000
Additional labor required due to reduction in efficiency:	
First year	40,000
Second year	20,000
Changing production and stock room records to conform with metric units	11,000
	$341,000

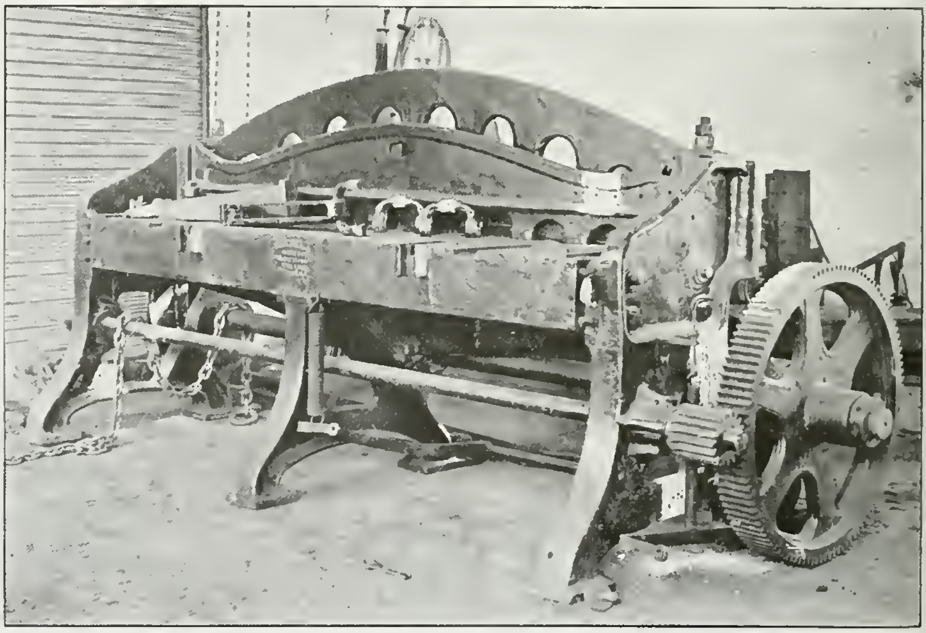
"The changes in jigs and fixtures would cover the full line of machines produced. The figures given cover only the engineering and production expense, no estimate of the cost to the accounting and selling departments has been made. No charge has been made for extra room to carry additional tools and repair parts built to the present system."

We would suggest to manufacturers generally that they prepare a similar statement to cover their own particular case.

WRECKED SHEAR RECLAIMED

THE $3000 metal shear shown in the illustration was broken in thirteen different places. In common parlance it was a "total wreck," and not many years ago it would have been worthless except for a nominal value as scrap. In this day of modern welding, however, broken machinery of all kinds can be repaired so readily, so cheaply and so satisfactorily that the first thought is always for reclamation.

In this instance the big shear was shipped to the Newark Welding Shop of the Oxweld Acetylene Company, where it was speedily made over by the welding operators, at a charge to the customer of a very small fraction of its former value. There were no unusual features encountered, and the job is cited only as being typical of what has now become every day practice in the up-to-date oxy-acetylene welding shop.



Metal Shear after repairs had been effected by the oxyacetylene process

LARGE ELECTRIC ANNEALING FURNACE

THE Electric Furnace Construction Company, 908 Chestnut Street, Philadelphia, announce they have secured an order from the Sociedad Espanola de Construccion Naval, Madrid, Spain, for a new design of electrically heated car type annealing furnace for heat treatment of large steel ingots and forgings.

The furnace will be the largest electric furnace in the world for this particular class of work, and the dimensions are 6900 m.m. long by 4750 m.m. wide by 4140 m.m. high, and will heat a charge of 60 tons of steel to 1700 degrees Fahrenheit every 24 hours.

The Electric Furnace Construction Company has already supplied the same company with an electrically heated furnace 36 feet deep by 12 feet outside diameter for heat treatment of gun and large forgings. The heat regulation on both furnaces is entirely automatic in regulation and a predetermined heat of within five degrees plus or minus can be secured.

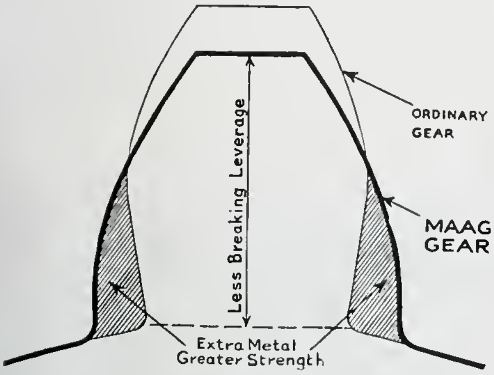
Furnaces of this type offer a big field for the power supply companies, as they have a unity power factor and usually are operated continuously. Under such conditions, it will pay power suppliers to give very special rates and the furnace user should also bear in mind that such electrical installations will bring up his power load factor and often insure a better rate for all his power.

Super-Accurate Gears for Marine Turbine Use

HITHERTO the one weak spot in steam turbine practice has been the reduction gears. These have never been quite satisfactory because of two reasons—lack of accuracy in the gears and lack of strength in the pinions. Maag Gears overcome both these obstacles to success.

Cut, first of all, with an accuracy far beyond that possible in ordinary gears, Maag Pinions for high speeds are case hardened and then GROUND to final perfection.

By case hardening, the originally very strong Maag tooth—which is strongest at the base where other gears are weakest—is made still stronger. By grinding, any distortions due to the hardening process are not only remedied to produce a tooth outline of superaccuracy, but the grinding actually increases the resistance of the metal to wear and tear.



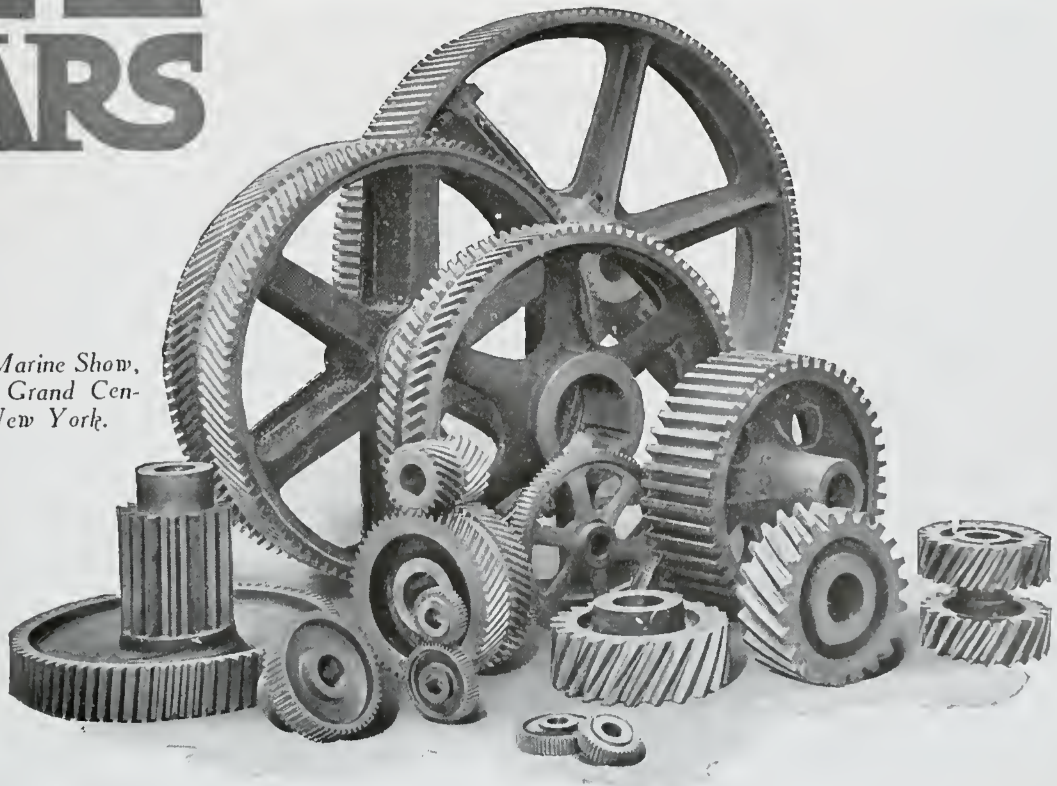
Maag turbo-reduction drives, made in this way, have given results that approach 100% efficiency. For example a standard set of Maag Gears, after being more than 12 months in continuous service, have shown no discernable wear whatever; the original fine grinding lines still remaining visible and unchanged.

We'll be glad to give you figures on high speed Maag Gears for steam turbine, rotary pump, and electric motor reductions.

NILES-BEMENT-POND CO.

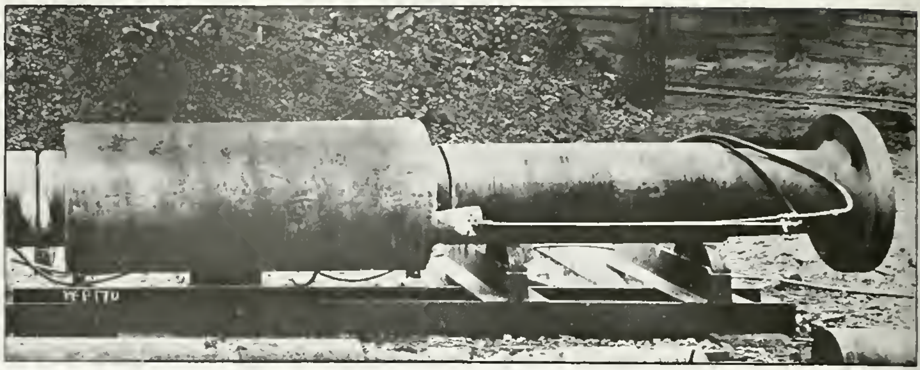
111 BROADWAY NEW YORK CITY

MAAG GEARS



See them at the Marine Show, January 24-29, Grand Central Palace, New York.

NOTABLE WELDING REPAIR


Method of preheating sleeve and shaft

FOUR bronze sleeves were shrunk on a heavy propeller shaft. It was intended to have the sleeves close enough in series to admit of caulking the joints. On cooling, however, it was found that the sleeves lacked approximately half an inch of butting—a distance too great for effective caulking. The sleeves at either end of the series were of slightly greater diameter than the two intermediate sleeves, the former being designed to turn in bearings and the latter to serve merely as a protection for the steel shaft where it would otherwise be exposed directly to the corroding influence of salt water in the section between the two bearings.

To have brought the sleeves together by removing and reshrinking them, even if it could have been successfully accomplished, would have involved considerable difficulty and expense; and it seemed more than probable that such an attempt would have resulted in a repetition of the initial failure. For this reason it was decided to experiment with welding. It was not, however, deemed advisable to fill in the spaces by adding metal fused with the blowpipe while the sleeves were frozen to the shaft, as it seemed likely that the weld would pull apart on cooling. The problem, then, became one of applying preheat in a manner that would not result in disalignment of the shaft.

Solution

First a special preheating hood was prepared to admit of uniformly heating a single one of the four sleeves. Then one of the sleeves was expanded by preheating the area enclosed in the hood, when the preheated section was welded to the cold sleeve next in series. This process was then applied to the succeeding sections serially, in each instance heating a single sleeve and welding it to the cold sleeve adjoining.

Finished Sleeve on Shaft

TWO NOTABLE FEATURES IN THIS REPAIR

WHEN the S. S. Trialos limped into Philadelphia some time ago minus one of its propeller blades it was feared the vessel would have to de drydocked. To avoid this expense the following expedient was successfully employed:

By removing everything possible from the after portion of the ship the bow was sufficiently lowered so that water pumped into the hold would accumulate forward. The pumps were then started and, as the volume of water increased the burden in the bow, the vessel gradually lifted astern. When the keel angle was such that the center of the propeller shaft cleared the waterline twelve inches, one section of the shaft was removed in the shaft alley and the aft section of the shaft jacked forward to provide clearance between the rudder post and the shaft end for wedging off the propeller.

Everything went forward as planned until the wedging-off process was attempted, when the hub was found to be so badly frozen to the shaft that it successfully resisted every attempt to budge it. After twelve hours of gruelling effort this mode of procedure was abandoned and an oxy-acetylene welding blowpipe was used in an attempt to heat the hub and loosen it by expansion; but, due to the size of the casting and its partial immersion in water, nothing could be accomplished.

Having exhausted the usual expedients in such cases, it was decided to try an entirely new procedure that until within the past year was thought to be impossible, and which even more recently was thought to have but little practical value commercially, viz.: oxy-acetylene cast iron cutting. The hub was an iron casting, and if this could be cut without injuring the shaft the broken propeller could be removed and a new one shrunk on in its place. At this juncture a representative of the Oxweld Acetylene Company was called into consultation and he advised that the cutting could be done very easily by a proper manipulation of the Oxweld Type C-6 cutting torch.

In twenty-five minutes' actual cutting time a slot five inches deep and thirty-two inches long was made across the hub, leaving about three inches of the casting still covering the shaft, when the strain cracked the uncut portion through to the shaft. It is interesting to note that, when the cut had almost reached the opposite side of the hub, the wedges used caused the propeller to jump two inches on the shaft, after which removal was a simple matter. From the time the Oxweld representative was called until the propeller was actually removed was approximately one hour. Two hundred cubic feet of oxygen and about sixty cubic feet of compressed acetylene were consumed in the operation.

It is believed that this is the first time the blowpipe has been used for this specific purpose, but it is only one of a constantly increasing number of instances of useful cast iron cutting.

Test Performance of a 20 Horsepower Acme Gas Engine Using a Mixture of Alcoline in the Fuel

D. W. & R. Z. DICKIE

WITH the object in view of determining whether there was any relief for the gas engine owners from the rapidly decreasing volatility of the commercial fuels, a test was aranged on a 20 horsepower Acme Marine Gas Engine, having two cylinders 7¼" diameter and 9" stroke, designed to turn 340 revolutions per minute.

Formerly the gas engines manufactured on the Pacific Coast let all of the lubricating oil wasting from the engine run into the bilge of the boat, but with the increase in price it became necessary to save this oil and use it over again. This was done by making the base tight and fitting a pump to deliver the oil back to the bearings and wearing surfaces.

With the increase in gravity of the fuel increasing complaint has occurred due to the fact that the fuel now is not entirely consumed in the engine and runs past the pistons ruining the lubricating oil in the base and likewise requires an increasing amount of time and patience to get the engine started. In fact, where the atmospheric temperature is low in the morning the time lost amounts to quite a figure in the course of a year.

On the late models manufactured by the Acme Engine Company the bottom of the cylinder is fitted with a "skirt," to catch the fuel passing the piston and thereby protect the oil in the base from injury.

The "Alcoline," manufactured by the Mason By-Products Company, is a derivative of Alcohol and has the volatile characteristics of ether without the metal destroying properties of the latter substance.

The fuels used in these tests had the following characteristics:

	Spec. Grav. 60 deg. Far.	Baume' 60 deg. Far.	Pounds per U. S. Gallon 60 degrees Far.	B. T. U. per Gallon	B. T. U. per Pound
Gasoline	.7549	55.46	6.287	124,386	19,785
Distillate	.8136	42.12	6.778	131,310	19,373
Kerosene	.8260	39.50	6.879	135,227	19,658
Alcoline	.7714	51.48	6.424	88,471	13,772

An average of the readings of all of the tests is given by the following table:

Gasoline

Revolutions per minute	Horsepower	Horsepower per gallon	Cost per H. P. hour in cents
320	23.98	9.85	2.792
330	24.65	9.71	2.832
340	25.30	9.61	2.862
350	25.95	9.51	2.892
360	26.55	9.40	2.925

Distillate

Revolutions per minute	Horsepower	Horsepower per gallon	Cost per H. P. hour in cents
320	23.65	9.48	1.846
330	24.28	9.54	1.834
340	24.89	9.59	1.825
350	25.45	9.60	1.823
360	25.97	9.56	1.830

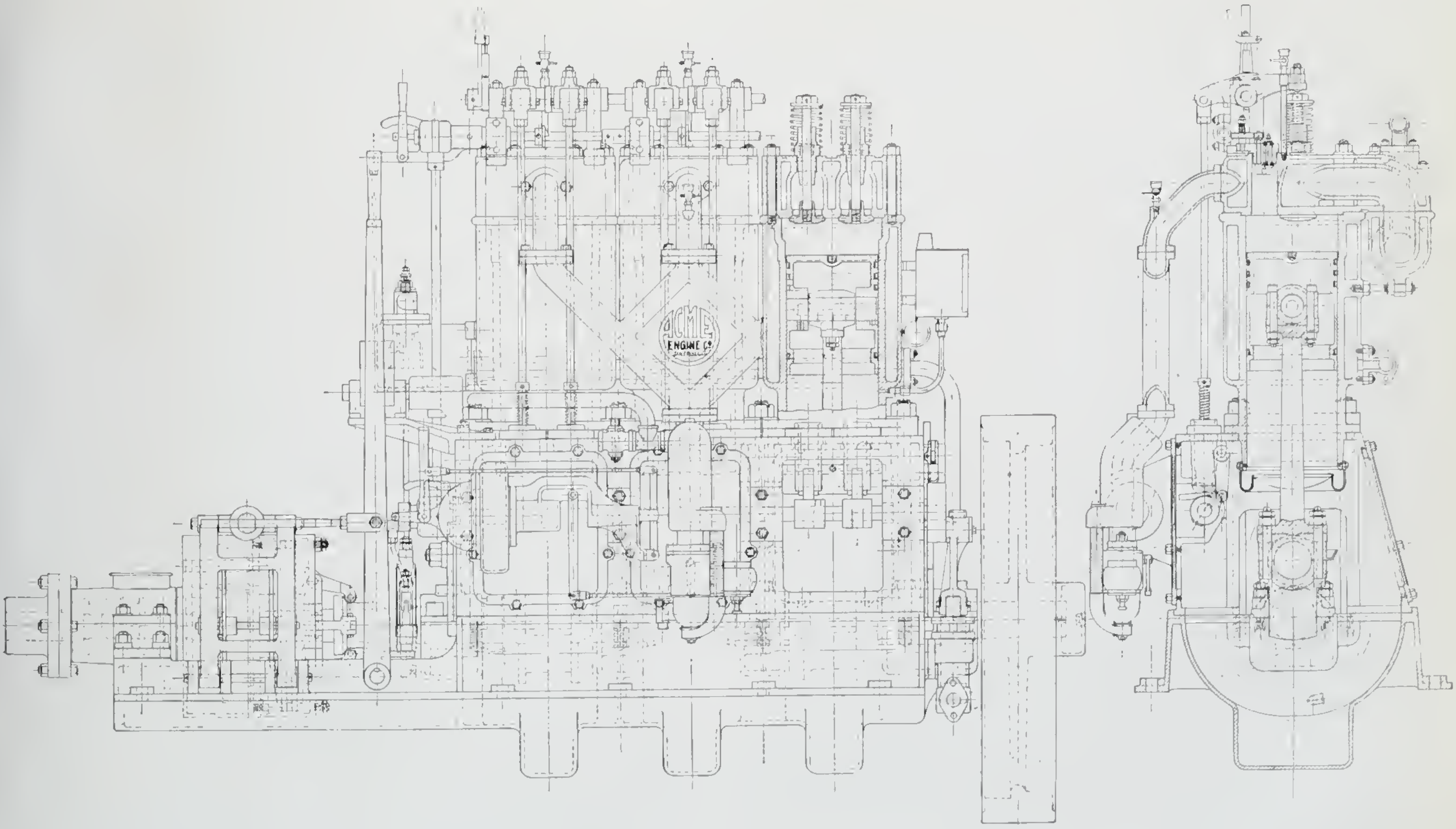
95 Per Cent Distillate and 5 Per Cent Alcoline

Revolutions per minute	Horsepower	Horsepower per gallon	Cost per H. P. hour in cents
320	24.05	9.70	2.239
330	24.52	9.51	2.274
340	25.00	9.46	2.286
350	25.48	9.47	2.283
360	25.88	9.50	2.276

94 Per Cent Kerosene Plus 6 Per Cent Alcoline

Revolutions per minute	Horsepower	Horsepower per gallon	Cost per H. P. hour in cents
320	23.30	8.90	2.417
330	23.96	8.90	2.417
340	24.65	8.87	2.425
350	25.31	8.81	2.441
360	25.96	8.75	2.458

In the month of **May 1913**, the writer made a very extensive test on a random selection from stock of the complete sizes of the Standard Gas Engine Company using the com-



Drawing showing sectional side and end elevations of the three-cylinder Acme Marine Gas Engine. Note the skirt on bottom of cylinders.

mercial **Distillate** used at that time which tested as follows: Specific Gravity .7428-Baume' 59 degrees-Pounds per U. S. Gallon 6.188-all at 60 degrees Fahrenheit and since that time the quality of the fuel has been getting poorer until now, what is sold as **Gasoline**, purchased at Service Station, tests at Specific Gravity .7549 - Baume' 55.46 degrees. Pounds per gallon 6.287 while **Distillate** has a Specific Gravity of .8136-Baume' 42.12 degrees-Pounds per gallon 6.778.

Volatility: The principal property of Alcoline is its volatility and the ability it has to carry heavier and cheaper fuels in suspension and so enable them to be used in the present gas engines, as it ignites easily and readily thereby igniting the less inflammable distillate and causing the whole to burn and produce heat from which the power is derived. -We found that the engine handled the same with the distillate and 5% Alcoline, and Kerosene and 6% Alcoline, as with Gasoline.

After a test run on pure Distillate which was accomplished by heating the engine, and the "stove" that was fitted to the engine, on gasoline and then changing to distillate, the igniters were so dirty that it was impossible to make a satisfactory test at all.

After a 4 hour run on Distillate and 5% Alcoline, the engine being allowed to cool one hour and 41 minutes, we were able to start off again without cleaning the igniters or disturbing the engine in any way.

Similarly a remarkable difference in the operation of Kerosene and 6% Alcoline from any previous experience we had had with pure Kerosene was that when we shut down to try the idea out, we were able to start up again without draining the carbureter and filling it with gasoline.

Priming: The fuel Alcoline can be used for priming combined with Distillate in the proportion of one-third Alcoline to two-thirds distillate in the same manner as gasoline and the commercial gas engines similar to those manufactured by the Acme Gas Engine Company start readily and voluntarily.

Similarly by mixing 2/3 Alcoline and 1/3 Kerosene we were able to prime the engine and start off.

Cost:. Taking Gasoline as a base of computation at the rated revolutions of 340 per minute and the price of Gasoline at 27.5 cents, one horsepower for one hour would cost 27.5 cents divided by 9.61 horsepower, making 2.862 cents per horsepower hour.

Reducing all units to a volume or gallon basis, one gallon of the mixture of Distillate 95% at 17.5 cents per gallon equals 16.625 cents plus Alcoline 5% at $1 per gallon equals 5 cents, makes a total of 21.625 cents per gallon for the mixture. This divided by 9.46 horsepower equals 2.236 cents per horsepower hour. According to the above figures, Gasoline is 25.2% more expensive to use than distillate and 5% Alcoline.

Again holding to the rated revolutions and using the mixture of 94% Kerosene at 16.5 cents per gallon makes 15.51 cents and 6% Alcoline @ $1 per gallon makes 6 cents, a total of 21.51 cents per gallon. This divided by 8.87 horsepower to the gallon gives 2.425 cents per horsepower hour. This makes Gasoline 18% more expensive to use.

With a mixture of 95% Kerosene at 16.5 cents per gallon makes 15.675 cents and 5% Alcoline @ $1.00 per gallon makes 5 cents, a total of 20.675 cents per gallon. This divided by 8.87 horsepower to the gallon gives 2.331 cents per horsepower hour. In this case Gasoline would be 22.78% more expensive to use.

Fuel passing the Pistons: In none of the tests did we find any trace of Alcoline passing the pistons into the drainskirts on the bottom of the cylinder.

Operation: A trial with widely different adjustments of the carbureter showed that the best results were obtained from a slightly smoky exhaust and more air was required for any combination of Alcoline with other fuels.

The table shows that at the lower revolutions the horsepower derived from the engine is practically equal for both Gasoline and 95% Distillate, plus 5% Alcoline. This is explained by the fact that on all the marine engines the inlet pipe is made too small so as to get a good "breeze" through the intake manifold to hold the unvaporized part of the fuel in suspension. The vapor from the heavier fuels being more dense requires larger pipe if it is vaporize to the same extent which condition is met by passing les of it through the manifold. If the pipe is made larger, experience has shown that wher maneuvering the boat at the landings the engine floods and stops.

We found every indication that with Alcoline in the fuel that it would be possible to start the engine under all circumstances without fear of interruption from dirty igniters.

On the test where Kerosene was used it was mixed with 6% Alcoline by volume merely for the reason that we had used 5% Alcoline with Distillate of 42.12 degrees Baume' and the Baume' of the Kerosene showed on the Hydrometer 39.8 degrees Baume', eventually proving up 39.5 degrees Baume'. The idea was to bring the fuels as close together as possible (weight per unit volume) for better comparison.

	Quantity of Fuel Used		Gross Residue from Pistons		Residue from Pistons, Gals.		Fuel Residue from Pistons Percentage of Fuel Used
	Lbs., Ozs.	Gals.	Lbs., Ozs.	Gals.	Lubricating Oil	Fuel	
Gasoline	76-0	12.0444	2-0	.2548	.2456	.0092	.076%
Distillate	60-6	8.9075	3-8	.4575	.3509	.1066	1.197 %
95% distillate and 5% alcoline	61-6	9.0787	2-4	.2921	.2348	.0573	.63 %
94% kerosene and 6% alcoline	64-12	9.4502	2-9	.3422	.1985	.1437	1.52 %

From the above table it will be seen that there is 89.6 per cent more fuel passing the pistons with pure distillate than with 95 per cent distillate and 5 per cent alcoline.

Efficient Cooling Compound Feed System

IN a recent visit to the Cleveland plant of the Steel Products Company, the writer witnessed a somewhat unique system for delivering oil or water to drill presses, lathes, tapping machines, centering machines, screw machines, etc., a large supply being constant to the latter whether the machines were running forward or in reverse.

The pumps used were a new type Ross "two - way" centrifugal pump manufactured by the Ross Manufacturing Company, also of Cleveland.

A single pump provided a three-eighth-inch stream for six high - speed drill presses. Another handled the supply for twenty - one high - speed drill presses, a third handled six tapping machines, a fourth six centering machines, and so on throughout the shop, ranging down to individual installations hooked to machine countershafts.

Where a battery of machines was cared for by a single pump a reservoir was placed in the main distributing line with an overflow, thereby providing gravity feed for normal use, and where pressure was required the overflow was plugged.

In connection with the use on many types of machines it is common knowledge that for this class of work the ordinary pumps soon wear out and fail to hold their prime. Do you picture a man sucking the end of a pipe to prime one of these only to receive a mouthful of dirty compound?

The Ross pump needs to be primed only when installed.

It appears that this pump was the first centrifugal pump designed to deliver a flow of liquid from the same outlet regardless of direction of rotation of the impeller blade. And from this ability to reverse instantly comes the name "Two-Way." With machines which run in both directions, such as screw machines, the pump must work in "two ways," otherwise the machine will be without cooling compound when running in one direction.

Although the Ross pump is light, compact and neat, it gives a large and constant volume of any liquid, bringing the stream to the work without pressure. However, if pressure is required, the outlet nozzle is reduced in size and the pump speeded up.

S. L. KREIDER
SHIPPING

Gen'l Agent
TOYO KISEN KAISHA
WILLIAMS S. S. CO., INC.

At Los Angeles
375 Pacific Electric Building
At San Diego
239 Spreckels Building

MAINTENANCE OF PORTABLE ELECTRIC DRILLS

By E. L. CONNELL, E. E.

Chief Engineer Van Dorn Electric Tool Company

HE portable electric drill is
essentially an electric motor
and should be given all the
tection and consideration
ally required for such ap-
atus. The small sizes in
mon use are equipped with
niversal motor and drive the
ck through a train of gears
ch reduce the speed from 5
25 times. The power is sup-
d through a flexible cable
h lamp socket connection and
controlled by a switch con-
iently located on the handle
the drill.

he capacity of electric drills
ased on the power and speed
uirements of a carbon steel
l drilling in 20 to 30 carbon
el. It is evident that the ca-
ity of such a machine will
y with the material, also that
speed for maximum produc-
n will change with conditions,
by standardizing on the
ve method of rating the
nufacturers have done much
aid the prospective purchaser
comparing and selecting the
l. The maker can readily
commend the proper tool for
cial applications such as
od boring where the capacity
the tool may vary widely
m its rated capacity in steel
cording to the material, depth
hole, etc.

Speed and Load

The speed appearing on the
me plate is the free running
ed and bears no definite ratio
the speed under load. The
ed will drop from 25 to 50
r cent. or more under load. It
not generally appreciated that
is characteristic automatically
justs the speed of the ma-
ine to correspond with the
e of drill being used and the
rdness of the material. An
erator who has become ac-
ainted with the tool will have
use for a two-speed machine
th gear shifting mechanism.
e greater simplicity and rug-
dness of the single speed tool
uld even justify some sacri-
e if a compromise were nec-
sary. The important factor in
taining the best performance
om an electric drill is the feed
essure. The feed pressure re-
ired for drilling in steel to the
ll capacity of the tool is great-
than can be exerted by hand
r all except the smallest sizes
d even in the small sizes made
the leaders of the industry
ere is enough power to oper-
e the drill under all the pres-
re a heavy man can exert. A
ressure of 500 pounds is sol-
m too much for a ½" ma-
ine drilling in steel. A feed
rew is therefore usually sup-
lied with the larger sizes.

The minimum drilling perfor-
ances of a universal drill with
arbon steel drills in .20 to .30
arbon steel should be as indi-
ated in the following table.

MINIMUM DRILLING PERFORMANCE OF UNIVERSAL PORTABLE ELECTRIC DRILLS

Carbon steel drills in .20 to .30 carbon steel.

Capacity of tool and size drill	Speed	Rate of feed. Inches per minute.	Horse power at 1 HP per cu. in. metal removed per minute.*
¼"	800	1½	.08
5/16"	650	1-3/8"	.10
3/8"	525	1-1/4	.13
½"	375	1	.19
5/8	300	¾	.23

*Extensive tests have shown this to be a reliable basis for determining power requirements.

The operating speed represents a cutting speed of 50 feet per minute.

The free running speed will be about twice the speed given in the above table except where the tool is designed for a lower cutting speed.

Motor Capacity

The capacity of the motor should appear on the name plate in amperes and the motor should be capable of carrying this load for 30 minutes without over heating. Insofar as the motor is concerned the temperature reached in this time may be 50 degrees Centigrade (90 degrees, Fahrenheit) above the room temperature. The high armature speed gives an excellent opportunity to make use of forced ventilation and with a well designed fan the cooling system is very efficient. The nature of the work is such that full capacity of the motor is never required for 30 minutes without relief, so if the tool will stand this test there will be no objectionable heating.

The ampere capacity is not always given, in which case a test by competent engineers is the only method of checking the power and heating characteristics. The efficiency will vary between 40 and 60 per cent., according to size and design, at a load which reduces the speed to about the figure given in the table above. An approximate check may be made on this basis.

In checking the performance of a universal motor the test should always be made on 60 cycles alternating current. A motor of this type is similiar to the direct current series motor in its characteristics, but its construction is altered to permit operation on alternating current. These structural differences include lamination of the field magnetic circuit, often a slotted field design with the winding distributed in slots, a high ratio of armature to field turns, and a large displacement of the brushes from neutral position. These special features are all used to reduce the reaction of the windings and maintain the power on alternating current. The power on alternating current will always be less than that obtained with the same direct current input. Manufacturers of this type of motor usually do not recommend them for use on frequencies over 60 cycles because the efficiency drops very rapidly with increasing frequency. The lower the frequency the more nearly do the characteristics on alternating and direct current coincide. It will be found that when the machine is operated on high frequency circuits the power will be deficient and the heating excessive.

Brushes

The brushes used on such motors are chosen after exhaustive tests on the part of the maker to obtain the best performance and the longest life. It is therefore imperative that only such brushes be used as are furnished by the maker for the particular machine. The life of the brushes cannot be stated in ordinary terms because of the very great variation in the use of the tool. However, it is best to examine the brushes before the expiration of 200 hours actual running time, and it will be a help to clean the commutator with fine sand paper several times during the life of the brush. The tension on the brushes should be uniform and just sufficient to prevent arcing on a smooth commutator. A tension of at least 4 pounds per square inch of brush contact is usually necessary. Should the commutator become rough the armature should be removed and the commutator refinished by taking a very light cut on a lathe.

Stalling

All reputable tools of this type have enough power to absolutely prevent stalling except under accidental circumstances. When this does happen through bending a drill or other accident the power should be cut off as soon as possible. Momentary stalling of this kind will not injure a well designed machine. The part most apt to fail under these circumstances is the switch, which must them act like a circuit breaker. Quick break and generous contact area are very important requirements. Some tools are equipped with fuses for such emergencies, but as the operator usually replaces them with copper wire because a fuse is not immediately available, their practical value is rather doubtful.

Sometimes when drilling sheet metal the lip of the drill will catch as it breaks through, stalling the machine. This trouble can be prevented by grinding the drill especially for this work. The angle of the point should be reduced to give a longer point, 59 degrees is the standard angle, and the sharp angle at the cutting edge should be ground off slightly to give the same result as a smaller angle of the spiral flute to the axis of the drill. This latter procedure alone may also help to prevent "grabbing" in soft material and will allow high feed pressures without chipping the cutting edges in very hard material. For drilling in wood the type of drill will depend upon the condition and kind of wood and the depth of the hole. Very deep holes require the ship auger. When drilling green wood the hole should be cleared several times if the depth of the hole is many times the diameter. In soft, dry wood the speed and size of hole which can be drilled with these little machines is amazing. This matter of choosing and conditioning the drill is a very important one and can best be solved by the mechanic on the job.

Lubrication

The better class of tools are grease lubricated which means maximum cleanliness and minimum attention. It is good practice to replenish the grease supply as often as the tool is cleaned or inspected, which on account of the brush wear should not exceed 200 hours of service.

All reliable machines have ball bearing armatures. These armatures operate without load at from 10,000 to 18,000 revolutions per minute and a poor bearing would mean destructive vibration. On the slow speed members, the compound gear shaft and chuck spindle, plain bronze bearings of ample size have given perfect service, but there is a tendency toward the use of ball bearings on these members as well. The danger in this move is in the overloading through lack of room to use bearing of sufficient capacity. The thrust is an important item which must be taken up in a ball bearing of the direct thrust type or of the angular contact type capable of carrying both thrust and radial loads.

Armature

The armature is the delicate part of any motor of this type and it is the first part to examine should the machine show signs of distress. Very often a motor is completely burned out through neglect of symptoms of trouble developing. If severe sparking appears at the armature the machine should be taken out of service at once and sent to a competent electrician for inspection. These motors are subject to the ordinary diseases of electric motors which may be detected in the usual way. Grounds may be detected with the magneto ringer and if no ground is detected in the armature, the field, switch and cable connections should be tested. An open circuit in the armature will be shown by burning between the commutator bars to which the open coil is connected. A short within a coil will burn out the shorted turns and a short between commutator bars will overheat the bars so shorted. A case of short between bars may sometimes be repaired if discovered before the coil is burned by removing the foreign substance between the bars, but an open or shorted coil requires a re-wind. If the armature is built with open slots and form wound coils the repair can be made more economically by the average repair man if he purchases the repair coils from the maker. If the armature is built with semi-closed slots it will probably be best to return to the maker for re-wind. The maker's guarantee of correct re-wind is quite valuable, hence it is strongly recommended that the maker be asked to make repairs.

Fields

The fields are not apt to fail, but occasionally they are burned out by operating the tool after the armature has failed. A shorted coil will cause overspeed or flashing when the switch is closed. Re-winding the field coils is simple, providing the coil is kept within the dimensions of the original and properly fastened into position. The best tools have windings treated with an impregnating varnish by an elaborate process which is a very good reason why a re-wind by the maker is preferable. This feature is perhaps more important in the armature than in the field.

Gears

The gearing of the best machines seldom gives trouble, but they are wearing parts and should be renewable with the least trouble and expense. The removable armature pinion is a very valuable feature, since it permits renewal of this part without the cost of a new shaft and re-wind, which is the case when the pinion is integral with the shaft. This objection is still worse when the commutator is built upon the shaft.

Cable

The cable connection is very often abused by using it to drag the tool around, running trucks over it, etc. Some cable is better than others, but all of it requires reasonable consideration, and where the tool is used in one position on production work it is recommended that the tool and cable be suspended from above with a counter weight. The machine is then always accessible and free from cable abuse. Some tools are provided with terminal screws at which a new cable can be attached without the aid of a soldering iron.

The weight of portable electric drill is an important consideration, but the lightest tool may prove to maintain. Weight is reduced by increasing the armature speed, by the use of aluminum housings and by tl use of the best steels proper treated. A radical armatu speed will shorten the life the tool and the only assu ance of proper design and m terial in the gear train is tl reputation of the maker. should also be borne in mi that the aluminum housin may be crushed by poundi or dropping the tool. To tl reader such caution may be u necessary, but it is appalli what abuse some tools recei in this manner.

The portable electric drill manufactured by the recogniz leaders in the industry shou not be classed with the vacuu cleaner and other domestic a pliances. They are built to m chine tool accuracy of the fine materials and distributed in manner that gives the purchas much more for his money th is possible in the aforesa lines. They are built by m chanics for the use of mecha ics; they are a practical, ru ged machine that will save ma hours in miscelaneous drilli operations and are indispens ble in production where t drill must be taken to the wor

G-R REGENERATIVE COMPRESSOR

THE Griscom - Russell Company of 90 West Street, New York, are placing on the market a unique patented apparatus known as the G-R Regenerative Compressor. This apparatus is designed for installation on Reilly evaporators, self-scaling, and its use during periods of reduced evaporator capacity permits evaporator operation at an efficiency much greater than can be secured by the evaporator operating alone, single effect.

It is customary to install evaporators on board ship of a size suitable for the maximum distilled water requirements at full speed, but it is evident that there are many occasions when this maximum evaporative capacity is not required; as, for instance, when a vessel is operating under reduced speed or is in port. During these periods the distilled water requirements are often as low as 25 per cent of the rated evaporator capacity. It is during the time when the evaporators are operating at capacities less than rating that the G-R regenerative compressor may be utilized to largely increase the evaporator efficiency.

This increase in evaporator efficiency is accomplished by compressing and delivering to the evaporator coils a portion of the vapor taken from the evaporator. This vapor, together with a certain amount of boiler steam, makes up the total steam required for evaporator operation and without the use of the G-R regenerative compressor all of this steam would have to be supplied by the boiler.

The apparatus is essentially a jet flow compressor the function of which as described above is to entrain and compress by means of live steam a part of the vapor produced by the evaporator and this entrained vapor is in turn led to the evaporator coils together with the boiler steam.

High pressure boiler steam from the boiler (not to exceed 250 pounds per square inch pressure) enters at the steam inlet, the valve being set so as to close the compressor by-pass. This allows the steam to pass through the strainer and then downward through the steam nozzle. The steam leaves this steam nozzle at high velocity and enters the diffuser nozzle.

Part of the vapor from the evaporator passes through a valve and through the vapor inlet of the compressor into the body of the compressor and then through the annular space between the steam nozzle and the diffuser nozzle.

By reason of the high velocity of the steam passing fro the steam nozzle, the vapor drawn into the diffuser nozz and compressed to a pressu considerably above the pressu of the vapor in the evaporat The mixture of steam and v por passes from the diffus nozzle through a valve and the into the coils of the evaporat where it gives up its latent he to the brine in the evaporat shell, thus producing vapor a completing the operation.

If it is desired to by-pa compressor and operate t evaporator in the usual mann at rated capacity, the vario valves may be adjusted accor ingly. There is an orifice plat inserted in the path of the co pressed vapor, the size of t orifice in the plate being d signed to insure rated capaci of the evaporator. This orif plate insures a steady outp from the evaporator and r duces the tendency to prime.

HYDE STEVEDORING AND SHIPCLERKING CO.

SINCE its reorganization in August, 1920, the Hyde Stevedoring & Ship Clerking Company, 311 California Street, San Francisco, California, has made notable progress, and has come to the point where it has practically decided to enlarge upon its present field of activity.

Operating alone, Mr. J. C. Hyde, who has been known along the San Francisco waterfront for years, built up an enviable little business in the exclusive handling of vessels engaged in the copra trade, and he is therefore considered as an authority in the economical working of this class of cargo.

When, by reason of a decline in the copra market and the advance in overland freight rates, it became necessary to reach out for other business, L. J. Fahy and N. S. McNulty were added to the organization with this in mind.

This marked a new era in the activities of the firm, and necessitated the acquisition of adequate gear to handle full Oriental and Atlantic cargoes, since the bulk of the resulting business developed along these lines. Cargoes of scrap iron and railway equipment from Mexico and Central America, together with products from the West Coast, augmented the business, and these, as with the others mentioned, were also clerked by the same concern.

It is pointed out that while the present high overland import and export rates make Atlantic competition a very serious menace to the foreign trade movements, which San Francisco has heretofore enjoyed, recent reductions in several rates have had a tendency redivert the flow of a fair pr portion of the business to th port.

This is noted particularly connection with certain commodities in which the Hyde o ganization and its clientele a interested, for in addition straight stevedoring and cler ing, the firm is engaged in th loading of cars with impo freight, and discharging thos for export, and they report marked increase in the volum of business so handled.

SAN FRANCISCO FIRM INVADES EAST COAST

New York Plant of the American Marine Paint Company of San Francisco

COMPLETELY reversing the usual order of things in American manufacturing, the American Marine Paint Company, San Francisco, has established a factory at Commerce and Richards streets, Brooklyn, at which the demand of the Atlantic for the company's products will be met. This action is contrary to most precedents because the usual course of manufacturing is westward, Eastern companies, that is, opening branches on the Pacific Coast to supply the Pacific market. That a Western company has established itself in the Atlantic field is, therefore, something out of the ordinary.

A large business in products of the American Marine Paint Company has been built up among Atlantic shipbuilding yards and repair plants, which the new factory is designed to supply. The factory is regarded as being the most efficient erected in America for the manufacture of paints and varnishes. It is three stories high, of the fireproof, reinforced concrete type, and occupies 30,000 square feet of ground. The building faces on three streets, and receives excellent light and ventilation from the fourth side as well. Railway tracks and the waterfront are close at hand, so that good transportation facilities are afforded.

A contract for the construction of the building was let August 16, 1920, and within four months, on December 15, the work was done. Immediately thereafter the installation of machinery was begun, so that no time would be lost in production.

The factory is provided with electrical power working in individual units governing the various machines. On the top floor are two rows of large mixers served with automatic measuring devices; on the second floor are two batteries of Buhrstone mills; and on the ground floor are the agitators and the finishing and shipping equipment. Ball bearings are used, where feasible, in the shafting and all machines. The control is automatic.

Supported on the steel superstructure are large tanks, which carry all ingredients used in the manufacture of the company's paints and varnishes. These ingredients flow by gravitation through the different departments. So completely up-to-date is the machinery that dry materials alone are touched by human hands during the entire process of manufacture.

Hereafter the original factory of the American Marine Paint Company, situated at Bryant and Rincon streets, San Francisco, will devote its entire production to the Pacific Coast and Oriental trades. The American Marine Paint Company was founded in San Francisco by J. M. Botts in 1903. During the succeeding eighteen years it has developed a world-wide market for its well-known Germicide anti-corrosive and anti-fouling composition for steel and iron surfaces and its Cape Cod copper compound for wood. Sales offices are maintained in New York, Baltimore, Norfolk, New Orleans, San Francisco and Seattle and at other ports throughout the world.

GLIDDEN ORGANIZATION EXPANDS

R. W. Levenhagen, Vice-President of The Glidden Company, in charge of auxiliaries.

MR. R. W. LEVENHAGEN, prominent in paint and varnish circles from coast to coast, through his long identification with the Sherwin-Williams Company, has joined the rapidly expanding organization of the Glidden Company, Cleveland, Ohio, as vice-president in charge of auxiliaries.

Mr. Levenhagen has spent the greater part of his life in the paint and varnish industry and is among the best known men in the trade. He started with the Sherwin-Williams Company twenty-five years ago. During his many years of service, he rose steadily until he finally occupied the position of secretary, which position he held until his recent Glidden connection. Besides being secretary of the Sherwin-Williams Company, he was vice-president and general manager of the Detroit White Lead Works, of Detroit, and vice-president of the Martin-Senour Company of Chicago for a number of years.

Mr. Levenhagen's ability as an organizer will be given its real opportunity in his new connection. The Glidden Company, with its fast growing auxiliary organizations, requires a man of Mr. Levenhagen's caliber to properly direct them. It is confidently expected that under his capable supervision, these auxiliaries, already of national prominence, will take on even renewed vigor.

M. F. Emrich, formerly vice-president and general manager of the Campbell Paint & Varnish Company of St. Louis, a subsidiary of the Glidden Company, has recently been appointed general sales manager of the industrial division of the Glidden Company, with headquarters at Cleveland, Ohio.

Mr. Emrich has been connected with the Glidden Company for many years and in various capacities. His experience covers every phase of the paint and varnish industry. During his many years of service with the Glidden Company he has shown exceptional ability and has advanced steadily.

The industrial division of the Glidden Company is one of the most extensive in the paint and varnish industry and the Glidden finishes are used on products of every description that require a finish of the highest grade. In this division are experts not alone on proper marine finishes but on the method of application as well.

M. F. Emrich, General Sales Manager of the Industrial Division of The Glidden Company.

THE SAL LOG

Repeating Speedometer and Distance Recorder for Sal Log installations. This board is usually mounted in pilot house

THE SAL Log utilizes the principle of the Pitot tube which indicates the dynamic pressure exerted by water due to its velocity. There is no water running through any part of the apparatus. The pressure of the water only controls the diaphragm and mechanism by means of which the speed is indicated.

Construction

Projecting below the bottom of the ship is the Pitot tube, the lower end of which is plugged. Just above this plug on the side facing forward is a circular hole, the Pitot aperture. At some distance forward or on one side of the Pitot tube is another opening in the hull of the ship, the static aperture. Because of the forward movement of the ship, a certain pressure, the speed pressure, is formed in the Pitot tube. It is, however, to be noted that not only in the Pitot aperture but also in the static aperture there exists another pressure due to the draft of the ship, the draft pressure.

Thus both the speed pressure and the draft pressure in the Pitot tube and in the Pitot aperture exert certain forces upward on the bottom of the diaphragm or bellows of the pressure transmitter. The direction of these forces is indicated by the arrows FT and FD. The draft pressure in the static aperture is conveyed to the top of the bellows and exerts a downward force in the direction of the arrow FD. Consequently, the draft pressures from the Pitot and the static apertures exert equal forces in opposite directions and counteract each other; in other words, the apparatus is independent of the draft of the ship.

Speed Indication

It is obvious that only the speed pressure can effect any movement on the bottom of the bellows, and that, in the direction of the arrow FT. This movement is transmitted to the mechanism by means of a rod, which actuates a bent lever. The lever is connected to a pointer, the movement of which will be proportional to the speed corresponding to the speed pressure in the Pitot aperture. In order to counteract the friction in the bellows and its connecting rod, two so-called tightening bellows are used.

Distance Recording

The speed-indicating pointer, by means of an eccentric segment attached to it, moves a truckle which guides the mileage counter upon a cone revolving at a constant speed by means of clockwork. The mileage counter is thus turned faster or slower corresponding to its position on the cone which is determined by the speed of the ship.

Repeating Instruments

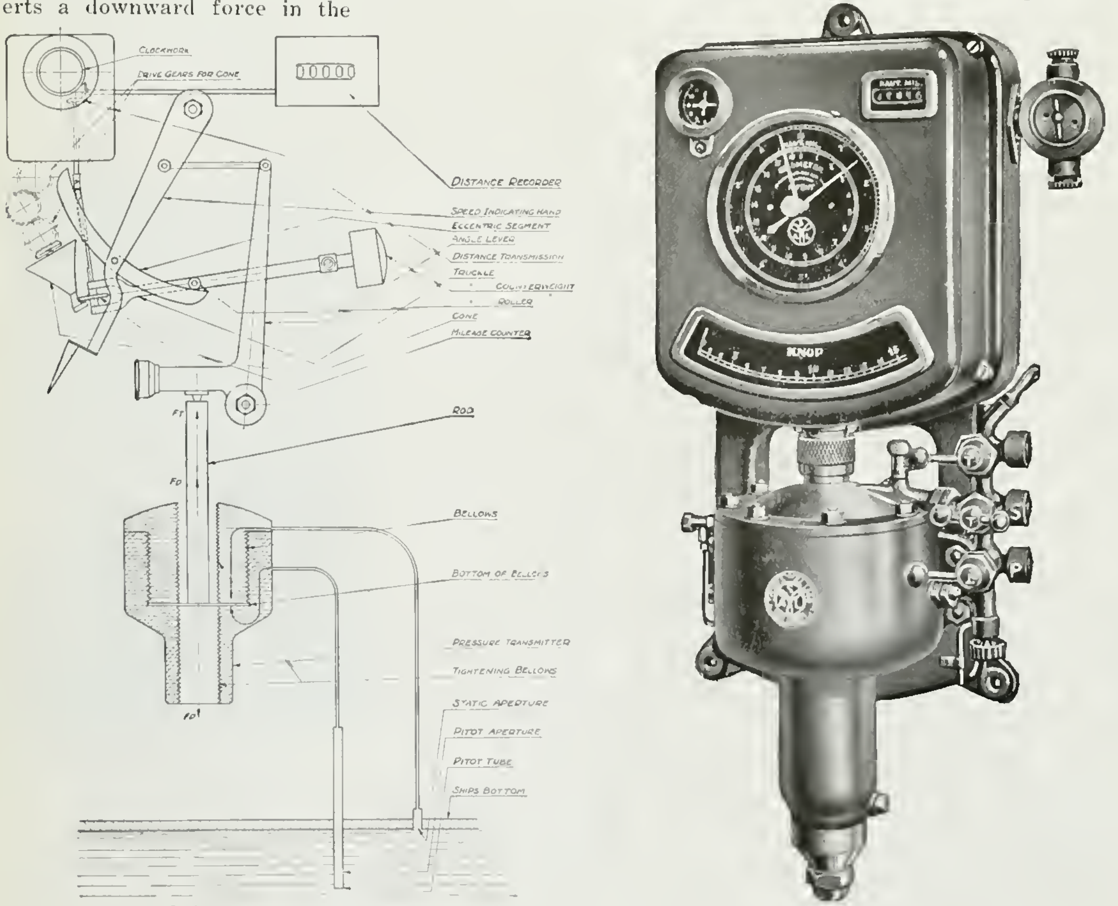
In order to obtain the reading of the speed and distance traveled in other places aboard ship (pilot house, bridge, etc.) the log is provided with electrical repeating instruments. The illustration below shows one set of a repeating speedometer and distance recorder with the voltage regulator, as mounted in the pilot house.

The accuracy of the SAL-LOG has been demonstrated to be within 1 per cent of the distance covered. It is to be observed moreover that whenever this error is once determined it remains constant.

The SAL-LOG requires no attention beyond the daily winding of the clock work, and the recharging of the storage battery after every 15,000 nautical miles.

The SAL-LOG is especially valuable, if not indispensable, when traveling in shallow or ice-filled waters, when the taffrail log cannot be used. It allows the location of the ship to be accurately determined irrespective of fog, darkness or other circumstances which prevent observations.

The SAL-LOG has been installed on more than 100 merchant marine and yacht crafts throughout the world.



Left—Diagrammatic sketch showing working principles of Sal Log. Right—Sal Log Recording Instrument

TELEPHONE POST HOLE AUGER

New Power-Driven Earth Drill Develops Interesting Uses for Pacific Gear and Tool Product

THE Pacific Telephone and Telegraph Company has recently equipped several of its heavy four-wheel drive trucks with an interesting attachment for boring holes for telegraph posts, guy snubs, and braces. This device consists of an earth auger with a long stock and suitable gearing for turning and feeding, mounted on a frame at the front end of chassis and driven through a clutch, shafting and gear train from the transmission of the truck.

The driving mechanism is so mounted that holes may be drilled at any angle up to 45 degrees on both sides of the vertical. Upon stalling at any obstacle the auger automatically reverses and backs out of the hole.

The gears through which this unique tool is driven were manufactured at the Pacific Gear & Tool Works. In a future issue Pacific Marine Review will describe these gears and the method of their manufacture in fuller detail.

(Section continued on page 106)

Pacific Marine Review

The National Magazine of Shipping

Los Angeles Steamship Co.'s S.S. Yale
As completely rebuilt, refitted and
furnished by Los Angeles Shipbuilding
and Dry Dock Co.
See page 329.

SAN FRANCISCO
PUBLIC LIBRARY

JUNE
1921

Marine Review, Vol. 18, No. 6. Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.

Behind the locomotive—*Linde*

FEW people realize the enormous work done by Linde in keeping the wheels turning on our railroads.

The recent National transportation tangle would have been a thousand times worse but for the quick and permanent repairs on rolling stock and rails made possible by the oxy-acetylene process.

Linde Oxygen, because of constantly uniform purity and unfailing deliveries, is used for this highly important work by almost all railroads of standing.

Whenever time is a weighty factor in repair work Linde Oxygen and Linde Service are indispensable.

Seventy-five plants and warehouses centrally situated, place Linde quality and Linde Service at the disposal of every oxygen user.

THE LINDE AIR PRODUCTS COMPANY
Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco

THE LARGEST PRODUCER OF OXYGEN IN THE WORLD L-505-21

Pacific Marine Review

CONTENTS

JUNE, 1921

Port Any, U. S. A. 325

A De Luxe Express Passenger and Freight Service 329

Three-Deck Cargo Steamers 331

Editorial 334

The Marine Wage Situation, by Admiral W. S. Benson 336

The Shipping Strike, by J. C. Rohlfs 337

A Testimonial to Charles M. Schwab 340-A

The Bohemian Club Launching 340-B

"Full and By" 340-C

In the Far East 340-C

Oil Engines and Motorships 340-D
  Electric Deck Machinery on the Kennecott; Motor Shipbuilding in Europe; The Diesel Engine, VI; Marine Oil Engines—Some Suggestions for Improvement in Their Operating Appliances, by Theodore Lucas.

Self Insurance as Conducted by the Moore Shipbuilding Company, By W. D. Edwards 349

Stabilizing the Shipbuilding Industry, II, by Letson Balliet, M. E. 352

European Marine Notes 357

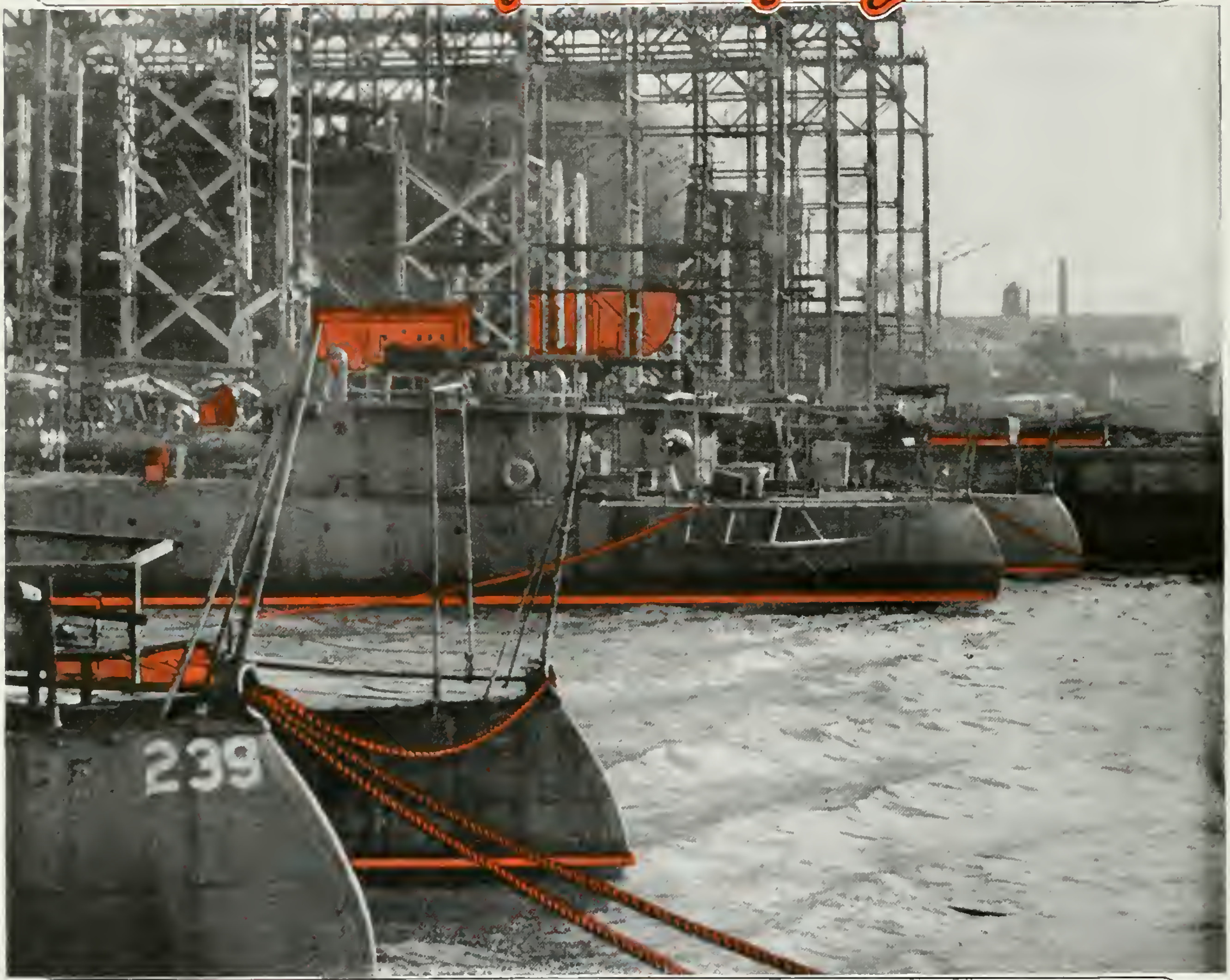
Hints on the Care of Auxiliaries, by Sea Flame 358

Marine Insurance 362

Pacific Machinery 367

Full Speed Ahead 373

Character - Service
Craftsmanship



Service—What It Means

An organization including men fitted by actual experience to appreciate problems of design from the point of view of the shipowner as well as of the builder.

A research department constantly studying ocean freight conditions for the benefit of all our clients.

A keen realization that what is for the benefit of the shipowner is also in the long run for benefit of the shipbuilder.

NEW YORK SHIPBUILDING CORPORATION
Camden, N.J.

Pacific Marine Review

The National Magazine of Shipping

June, 1921

Copyright, 1921, by J. S. Hines

PORT ANY, U. S. A.

TAI MING told me this tale as we sat at tiffin on board the China Mail Steamship Nanking tied up at a San Francisco wharf on account of the strike action which a large part of her crew had taken the day before. Our friend, whom we will call Ming, for short, is a merchant prince of Canton. One of a line of merchant princes, he is well educated, having traveled around the world more than once and crossed this continent many times.

A Chinese Steamer Tied Up

Ming had been at Washington on a rather diplomatic mission concerning our foreign trade relations with China, and on his return to San Francisco had secured passage on the Nanking and gone aboard the day before, expecting to sail. Upon being informed of the strike situation, Ming determined to sleep on board in his cabin rather than make new arrangements with a hotel on shore or bother again any of his San Francisco friends. Retiring early, he fell immediately into a sound sleep from which he was awakened some time later by a series of remarkable happenings, which we will let him tell in his own words:

A Strange Chart

Tai Ming Sees a Strange Vision

"I awoke some time before midnight to find my cabin invaded by a dim and strange light. The cabin was finished in white, and on the wall opposite me as I lay in the bunk there appeared some strange black lines which presently took on more or less the form of these 'Get There' maps which are so often used to introduce the travelogue pictures in your theatres. I was very much astonished, as you may well guess, by this apparition and undertook at once to discover what might be the cause, thinking that perhaps some of my friends on board were staging a joke. I could, however, discover no source of any projected light and yet the lines plainly came from some projecting power, for when I placed my hand over a line on the wall, the line plainly showed on the back of my hand.

"Being of a philosophical turn of mind, I said to myself, 'Perhaps Providence, your ancestors, or whatever power sends dreams and visions, is trying to show you something for your own good. You had better lie still and watch this thing.' So I lay quietly and watched what might appear, and presently the lines began to move and work into a more coherent shape, and a legend appeared in the upper right-hand corner of the chart showing the printed words, 'Port Any, U. S. A.' I then saw that the black lines were forming an outline somewhat resembling the shores of San Francisco Bay immediately adjacent to the Golden Gate, but names began to appear at the various points which were entirely unfamiliar to me. For instance, at the southern side of the gate there was printed the name 'Aisu Head,' while on the north side the name 'Meba Point' appeared.

A Curious Chart Appears

Shoals and Flats

"Just outside of these heads toward the ocean appeared a sort of dotted area covering almost the entire entrance, which seemed to be a sort of shoal or large seaweed growth and was marked on the chart as 'Follette Shoals.' Inside the entrance again there seemed to be a sandbar or muddy obstruction marked 'Andy's Flat.' Leading into the Gate from the inside of the bay were two passages well defined by dotted lines which coalesced in the entrance, came to an abrupt end in Follette Shoals, and were almost completely obstructed at a point inside the Gate by Andy's Flat. These passages were marked respectively 'Sen Sound' and 'Con Channel.'

Sen Sound and Con Channel Are Badly Obstructed

The chart now became animated, and I could see various ships proceeding from their berths in the harbor into either of the two channels and making for the Gate or coming in from the ocean to various berths. The movements of these ships were all accompanied by very strange phenomena.

Mud Grubbing Gentlemen

"But first I must tell you that on Andy's Flat a large number of men were constantly at work apparently doing nothing but grubbing for worms or some other animals in the sand or mud of which this flat was composed. Strangely enough, these men were exceedingly well dressed for their occupation, some of them even wearing frock coats and high silk hats. Occasionally one would discover the end of a very long, and apparently very tough, worm of a vivid red color. Whenever this happened he would call to his companions to come to his assistance and they would pull this worm out of its lair in the mud, carefully wind it up into a huge roll, and cast it with due ceremony into either Con Channel or Sen Sound.

Strange Actions of Men on Andy's Flat

Activities of the Great Red Worms

Whereupon the worm would immediately fasten one of its ends to the sides of either one of these passages and devote all its energies to fastening its other end upon some ship that might be passing.

The Red Worms

Difficulties of American Ships

"Now, as the ships came and went, I observed that whenever an American flag appeared upon a ship there was a greatly increased activity among these worms, and only the most powerful and most efficient American ships were able to break away from the hold that the worms placed upon them. Many of the others and practically all of the smaller ones were diverted by these worms to the mudbanks on the sides of the passage. There they would lie with red worms clambering all over them. These ships seemed gradually to break up and disappear under the action of the worms, and as they did so there appeared to be a constant increase in the size of the two headlands on each side of the entrance.

"Ships with foreign flags had not so much trouble in Sen Sound or Con Channel, but after passing through the entrance and coming into the region marked as Follette Shoals, it was very noticeable that their progress was hindered to a considerable extent and that they only passed through this obstruction after the waste of much energy and with their bottoms badly fouled and in no fit condition for proper voyaging at sea.

Curious Headlands

American Flag Lost

Port Entrance Closed

"Now, I observed, as the ships came and went through the Gate, that for every passage of a ship the headlands on each side of the Gate seemed to come a little closer together and that whenever an American ship passed through, if it could at all get by the red worms in the two passages inside, there would be a decided jump of the two headlands. And as I watched one great American liner with a magnificent spurt clear the passage, these two heads came so close together as to scrape all the paint off her sides, and as the stern passed the outer entrance, the two heads crashed together, completely blocking the entrance and nipping off the flagstaff and the American flag that projected from her taffrail.

Strange Structure of Port Any

"The harbor entrance now being closed I had more leisure to observe some of the details of the harbor itself. The men were still busy on Andy's Flat, the red worms were still enveloping the ships on the mudbanks, but the crashing together of the two headlands seemed to have made a decided difference in the appearance of those promontories as if they were disturbed by some pressure from underneath, and it became apparent that these headlands were not of the ordinary earth variety or of rock, but that on the south was composed largely of old slop chests, bits of oakum, spun yarn, old rigging, canvas and tarpaulins, while that on the north was built up of steam cranks, engine castings, bilge pumps, rusty boilers, old stacks, and the various other metal parts which go to make up the machinery of the ordinary steamship. It was evident that there was a very decided underground connection between the work of the red worms on Andy's Flat and the building up of these two headlands.

Evidence of Underground Channels

Great Dredge Pub Op

First Appearance of the Great Stone Common Sense

"Suddenly my attention was attracted to a very decided noiseless activity going on in the southern part of the harbor, and here I saw an immense floating dredge which was named Pub Op Dredge No. 1. She was accompanied by numerous barges and a fleet of small tugs, and on her deck and on the barges at her side were huge blocks of dressed stone, each of which was named, some of the names being Common Sense, Straight Business, Direct Dealing and so on. On the forward end of the dredge on either side of the spud frame were two large iron balls marked 'Pub Op TNT Dangerous.' This dredge and her barges were being noiselessly worked up the bay by the tugs, which bore the initials 'C. P. U. T. & T. Co.'

Men on Andy's Flat Quit Work

"When the dredge Pub Op arrived opposite to the south end of Andy's Flat, she began laying the huge dressed stones around the edge of that flat in what appeared to be a retaining wall, and it was very strange to me that this work could go on without any apparent notice or knowledge thereof from the men who were digging worms on the flat. The dredge slowly progressed up the east side of Andy's Flat, laying the wall as she came until she had completely blocked the east end of Con Channel. Then she suddenly swung out one of the great black balls to the top of the spud frame. The shadow of this ball in its ascent fell athwart the workers on the island. When these men, turning to see what had come between them and the sun, aw the work that was going on, they all with one accord dropped their implements, and rushed for the wall. Clambering on top of the stones they began dancing and waving their hats and shouting merry greetings to the men on the dredge just as if they had been a group of children whom the dredge was coming to take on a nice picnic.

Rage of Overseer

Overseer Becomes Indignant

"Their overseer, enraged at this action, rushed around trying to get them back to work, but they paid no attention to him whatsoever, and finally in disgust he got into a small boat, rowed over to the mainland of Aisu Head, and climbing to the topmost point thereof, sat down very dejectedly with his head in his hands.

"Now the dredge began digging a wide, straight, beautiful channel through the upper end of Andy's Flat, and it was amazing to see the activity with which the great red worms tried to interrupt this work, but they were powerless in the face of the huge bucket wielded by the dredge, whose knives clipped them into short sections and deposited them on top of Andy's Flat on the other side of the stone wall, where they soon curled up and expired.

"As soon as the channel was cut through

A New Channel and Great Explosion

the flat, which happened in an incredibly short space of time, the dredge whistled up one of the small tugs and loading on her the other great iron ball, sent her over to the inside of the blocked entrance. Then the man on top of Aisu Head became wildly excited. The tug steamed up to the beach at the inside of the heads and depositing the large iron ball steamed away. The man ran down the bluffs and climbing astride of the black ball defied the men on the dredger to do their worst.

"Then suddenly came a great upheaval, and the air above the entrance to the harbor was filled with old slop chests, canvas, tarpaulins, engine castings, and whatnot, until the sky was black.

S. S. American Good Will

The Departure of American Good Will

"Now, while this was still going on, a great steamer, which had been waiting with all fires properly primed, tore out of the entrance at a terrific pace. Streaming from one of her masts was a large pennant bearing the words 'American Good Will,' and almost before the noise of the explosion was over she had disappeared over the horizon. As the debris and blackness began to disappear from the atmosphere above the Gate and I could see more clearly, it seemed as if the headlands had suddenly become thickly populated with human beings as if they were arriving in great numbers constantly, apparently coming down from the air. Running about among these two great crowds were several individuals who were buttonholing men at every turn and were evidently trying to interest them in some story which they had to tell, but they could get no attention for every eye in both of the crowds was riveted on the spot on the horizon where the great steamer had disappeared, as if they were expecting her return. All of the people in both crowds seemed to be very much disturbed mentally and physically, some of them suffering great pain apparently from some unknown cause.

Great Distress of the People

"Freezone"

The Return of American Good Will

"Now, as I lay and watched in this dream or vision, there came from the ocean the shriek of a great siren, and the big liner reappeared steaming into the harbor. Rigged up on her forecastle were two great nozzles, and as these came into the entrance of the Gate there burst from them a huge volume of very fine spray. Whatever this material was that was being sprayed, it covered the crowds on both sides of the Gate and seemed to give them relief from their sufferings. Wherever it touched the ground the grass seemed to grow better, the trees took on a more healthy aspect, and in many places houses began to spring up.

The People Are Relieved

"Coming further into the harbor, the steamer turned south from the end of the straight channel which the dredge had prepared and steaming to a point perhaps seven miles southward of the inner entrance to this channel, she dropped anchor and turned both nozzles on the shore at this point. Whereupon there suddenly sprang up a new city filled with workmen's houses, great factories, and modern terminals with handling machinery of all sorts. Over this new development on the chart appeared the word 'Freezone.'

A New City Called Freezone

"Then the crowds of men on Aisu Head and on Point Meba began to bestir themselves, evidently with some great purpose in view. They worked with pick and shovel, looking for something in the ground, and when they found what they sought it proved to be some sort of flexible tubes connecting these headlands with other parts of the harbor. The men began pulling on the tubes, and I could see that the surface of Andy's Flat began to recede and that Follette Shoal was in a state of great agitation. As the men on the headlands were able to get more purchase on the tubes, the flat and the shoal began to disappear until in less time than I take in telling about it both sides of the harbor entrance were entirely clear, except for the stones which had been around Andy's Flat.

Discovery of the Underground Connection

The Circle of Stones

A Useful Circle of Stones

"These stones, as the flat disappeared, had formed a slowly decreasing circle, compressing between them all the red worms and apparently also (although I would not be positive on this circumstance) imprisoning quite a few of the gentlemen in frock coats and silk hats. When this circle of stones was complete and had contracted until the red worms were practically a solid mass, it moved over to a point opposite the center of the channel opening and became established there, having a tall flagstaff at its center with the Stars and Stripes at its peak and, underneath, a great pennant bearing the legend American Good Will.

"And now there was a great activity in the harbor. The ships of all nations came and went unhindered, and prosperity and happiness reigned everywhere around the shores of the bay. Occasionally, as a big American liner passed close by the ring of stones, the end of a red worm would wriggle frantically for a moment, but always the great stone Common Sense would squeeze a little tighter, and with a groan the worm would subside.

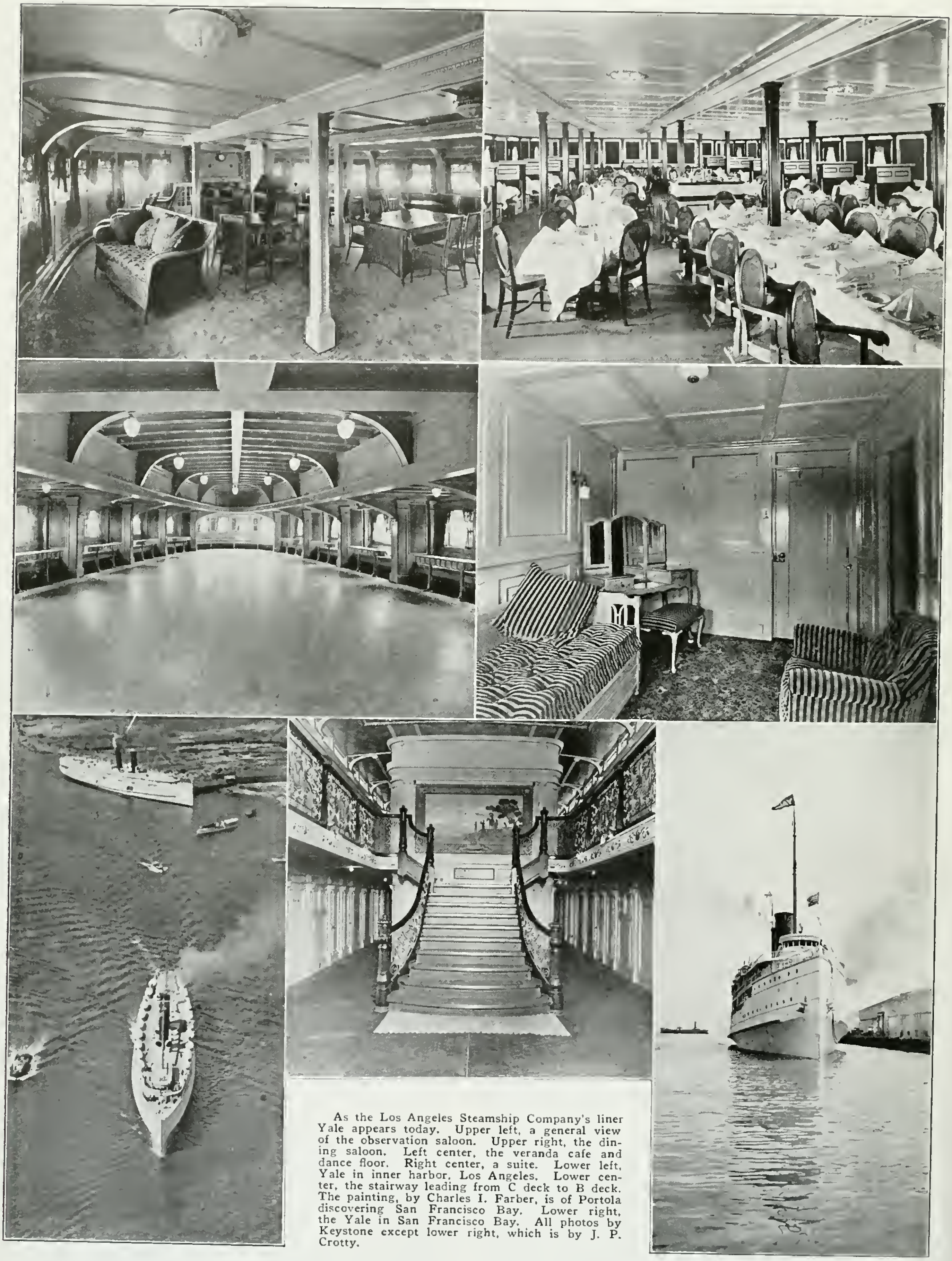
Prosperity and Happiness Reign Among the People

"This scene was very good to look upon, and I felt that I would have liked to lie there and study it for a long time, but the lines gradually faded and I awoke to find the sun rising."

Here Ming folded his long-nailed fingers together across his capacious paunch, and looking at me with that slow, inscrutable, Oriental smile, asked, "What do you think, my friend? Was this vision sent to show me the geological formation of San Francisco harbor? Was it foretelling some future event? Or has it anything to do with the present situation in maritime affairs?"

I pass the questions on to you, good reader. What do you think?

THE RECONDITIONED STEAMSHIP YALE



As the Los Angeles Steamship Company's liner Yale appears today. Upper left, a general view of the observation saloon. Upper right, the dining saloon. Left center, the veranda cafe and dance floor. Right center, a suite. Lower left, Yale in inner harbor, Los Angeles. Lower center, the stairway leading from C deck to B deck. The painting, by Charles I. Farber, is of Portola discovering San Francisco Bay. Lower right, the Yale in San Francisco Bay. All photos by Keystone except lower right, which is by J. P. Crotty.

A DE LUXE EXPRESS PASSENGER AND FREIGHT SERVICE

WHEN the Los Angeles Steamship Company undertook the reconditioning of the steamers Yale and Harvard for passenger and freight service between Los Angeles and San Francisco, they held up before themselves the ideal of presenting to the people of those two great centers of population on the Pacific Coast a service which would be, in the highest degree possible, one which would combine great speed with comfort and cuisine up to the best modern standards.

War Service

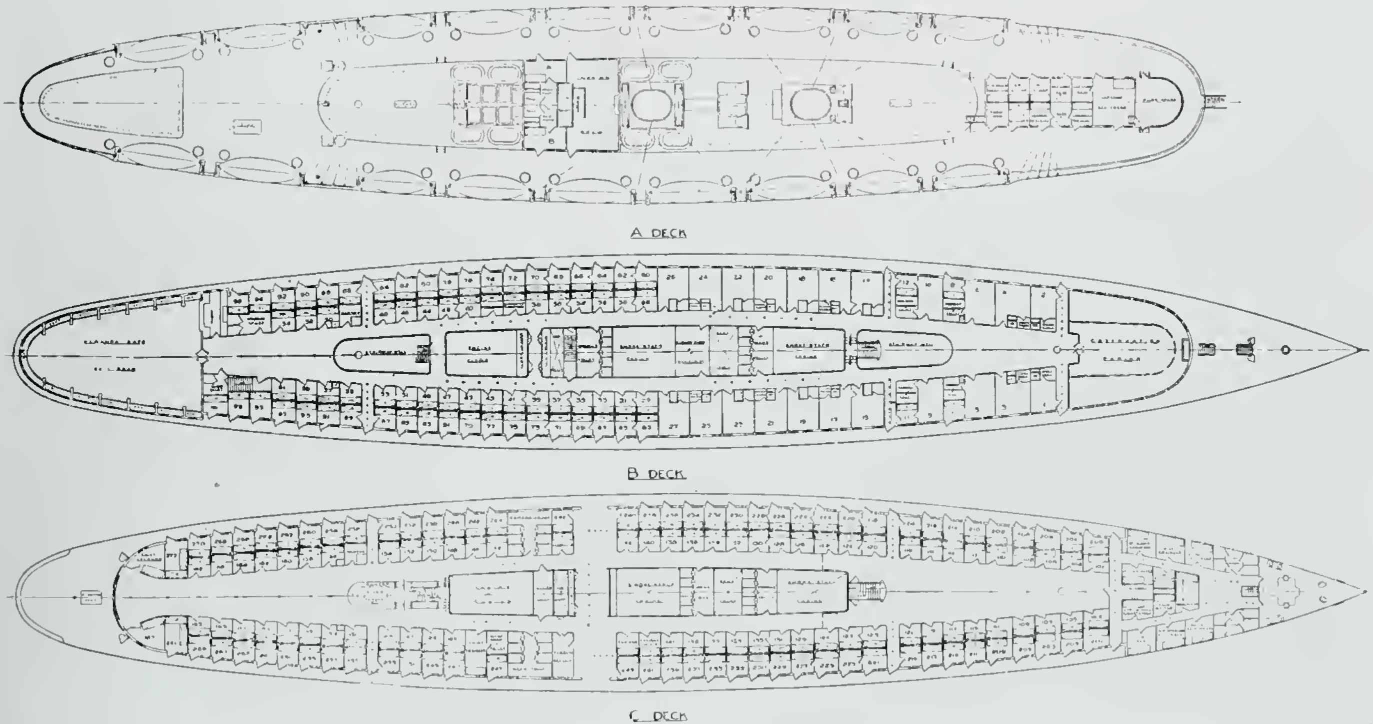
The Yale and Harvard had been used during the war by the United States government in British Channel ferry service and had been hastily re-adapted for that work by the tearing out of cross partitions, the removal of all bunks and other stateroom fixtures, and the substitution therefor of ordinary benches. The great speed of these turbiners made them ideal for the short trips across the Channel, and in this work they did yeoman service in the transfer of troops from the training camps in Britain to the French coast. On being delivered to the Los Angeles Steamship Company by the government, it was found that in this work so much of the superstructure had been removed that it was necessary to practically rebuild that part of the vessel, and this was perhaps fortunate in that an opportunity was offered for replanning and rearranging the passenger accommodations so as to give the greatest possible degree of comfort and convenience and also greatly add to the stability of the vessel.

The specifications and plans for this work were drawn up by officials of the Los Angeles Steamship Company and the work itself undertaken by the Los Angeles Shipbuilding & Drydock Company, who deserve great credit for the masterly way in which they have carried out this rebuilding and alteration work. In fact, when the two vessels shall have been completed, this will stand as one of the most extensive and important reconditioning jobs ever undertaken by a shipyard on the West Coast. The work was done under the personal supervision and inspection of General Manager A. J. Frey of the Los Angeles Steamship Company, who was also personally responsible for the selection of the furniture and fittings.

Structural Changes

These vessels have an over-all length of 407 feet, a beam of 61 feet 3 inches, and a molded depth of 20 feet 2 inches. As originally designed and built, they had only one steel deck, which was not continuous but stopped in line with the forward boiler room bulkhead and from there was continued as a wooden deck. In the rebuilding, this deck was carried out completely as a steel deck, thereby greatly stiffening the hull structure, and in rebuilding the superstructure steel channel frames were carried up from the steel framing of the hull through the superstructure work in such a way as to greatly strengthen and stiffen the topsides of the ship. In fact, some 275 tons of steel structural material were added to the hull, and it was found on trial later that the addition of this material was very well justified in the practical elimination of the vibration which was formerly so objectionable on these ships.

The propulsion plant of the Yale remains unchanged in its principal characteristics. It consists of twelve Scotch marine boilers supplying steam to three Parsons turbines, each directly connected to a propeller shaft. This machinery was all thoroughly overhauled, readjusted and put in prime condition for fast express work. The principal change was in the installation of the Coen oil-burning system in the boilers. This, with the stiffening of the hull, made it possible on trial to obtain a speed for the Yale of 24.6 knots per hour, and it is thought possible by her operations that she will eventually in calm water be able to produce a speed of 26 knots, or better than 30 miles per hour.

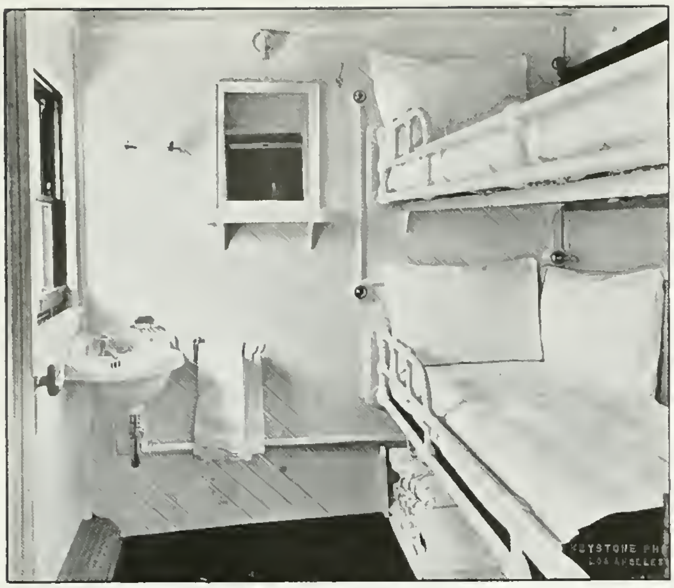


A DECK

B DECK

C DECK

A, B and C decks of the steamship Yale



A standard stateroom of the Yale

This makes the Yale the fastest passenger vessel on the Pacific Coast. On her two round trips she has averaged about 22.5 knots an hour at sea.

Passenger Accommodations

The plans of the Los Angeles Steamship Company called for a passenger service including meals, and a great deal of thought was given to the re-arrangement of the galley and pantry spaces and main dining saloon so as to give the greatest degree of service with the least expenditure of human energy. In working out the scheme the spaces were so arranged and the mechanical devices so planned that the progress of food from galley to pantry to dining saloon and all of the used dishes to dishwashers and back to galley and pantry was in a continuous direction cycle without any interferences or reverses in the flow.

At one end of the main dining saloon, as will be seen in the plans, are situated the hot pantry on one side and the cold pantry on the other, connected by electric dumb waiters with the galleys below. At the other end of the main dining saloon are the electric dumb waiters taking care of used tableware, which is delivered directly to the electric dishwashers on the deck below, then travels along the deck to the service end of the galley space, where it is in line for re-use and for elevation to the pantries by the dumb waiters there.

The accommodations were worked out for 480 individual passengers. The hold spaces were re-arranged and enlarged so as to accommodate 1000 tons of freight. With this number of passengers and tonnage of freight it is planned to maintain a schedule calling for a seven-hour turn-around at San Francisco and a five-hour turn-around at Los Angeles, eighteen hours being consumed in each direction on the round trip, so that when both ships are in service there will be daily sailings from each end for five days during the week, the week-end interval being used for overhauling of ship.

The pictures accompanying this article give an excellent idea of the arrangement, furnishing and finish of the principal interiors. All of the interior finish is in wood painted, the panels being stippled in an excellent imitation of plaster, which gives a very much softer tone and more pleasing effect than does the highly polished surface ordinarily used in such interiors. The lighting in the majority of the large open spaces is on the indirect system, which greatly aids in this soft, pleasing atmosphere and gives to the whole ship a homelike, comfortable, satisfactory appearance.

Freight Service

The freight service given by these liners is equivalent to that of a high-class express business. Freight leaving San Francisco on the Yale was delivered in the wholesale district of Los Angeles within twenty-four hours of its time of delivery at the wharf in San Francisco. This sort of service will prove to be very valuable in the case of many Central California products, for which Los Angeles has been providing a good market, notably in the case of deciduous fruits.

In order to facilitate the handling of freight and baggage and enhance the comfort and convenience of passengers, special arrangements have been provided at the San Francisco dock of the Los Angeles Steamship Company which are very simple and yet very effective.

From the waiting room opening off the Embarcadero an enclosed passage of ten feet wide leads by an incline to an elevated ramp which can be adjusted for the tidal conditions so that the passengers board or leave the vessel to or from the "C" deck at a point opposite the main entrance to the purser's office and the passenger accommodations. This passage clears the freight doors of the pier, and below it four adjustable ramps are arranged 12 feet wide and 30 feet long, spaced to meet the side ports of the ship. Two of these are used exclusively for freight, one for freight and baggage, and one for stores. These ramps are set for the tidal condition so as to be immediately available as the ship berths at the pier and so freight, passengers and baggage can be discharged simultaneously without interference or inconvenience. All this is in line with the ideal of a "De Luxe Express Service."

AN IDEA FOR THE BOOSTERS

In San Francisco these days practically everyone you pass on the street is wearing a white button with the initials "B B" in red thereon. "B B" stands for "Be a Booster" and also for many other things which may suggest themselves to the fertile imaginations of our readers.

The idea of boosting San Francisco is a very splendid idea indeed, if it can be carried out in a constructive sense, and we would like to suggest that for every committee put up by the "B B" boosters to advertise the city of San Francisco there be a complementary committee appointed to put over some constructive improvement so that there will be a constant addition to the material backing for the city's advertising program.

Along this line we would like to make a suggestion for an improvement that might be made with very little expense and with very great results in the favorable first impressions upon visitors to San Francisco.

The great bulk of our visitors from outside the city come in through the gateway of our beautiful Ferry Building. The appearance of this building from the waterfront and the appearance of the waterfront surrounding it leaves very little to be desired as far as neatness, cleanliness and simple elegance are concerned. When, however, the visitor has left the city side of the Ferry Building and is being propelled up Market Street on either the Municipal or the United Railroads street car systems, or is marching up on foot, there are many objectionable sights which meet his eye that could be removed or more pleasant sights substituted therefor, not only with little expense to the city but possibly with a positive revenue added to the city treasury.

THREE-DECK CARGO STEAMERS

ON February 24, 1921, at 10 a. m., there was launched at the plant of the Los Angeles Shipbuilding & Drydock Company, San Pedro, California, the steamship West Lewark, this being the thirty-first vessel launched at this plant for the United States Shipping Board Emergency Fleet Corporation, and on the same day the keel of the thirty-fifth vessel, the steamship West Chopaka, was laid.

The above are the first and last of five sister ships building at this yard for the Emergency Fleet Corporation and the West Chopaka is the final hull to be laid down for the United States Shipping Board under existing contracts in the United States of America.

A description of the steamship West Lewark will, we believe, prove of especial interest to the readers of Pacific Marine Review, as this ship and her sister vessels are the only freighters of this particular type built for the United States Shipping Board.

Principal Dimensions

Length over-all	455′-9″
Length between perpendiculars	430′-4½″
Depth molded to second deck	29′-9″
Depth molded to upper deck	38′-3″
Draft, load (designed)	28′-11¼″
Deadweight, about	11,500 tons
Cubic capacity, grain	578,874 cu. ft.
Fuel oil capacity	1650 tons
Coal bunker (perm't and reserve) cap'y	1371 tons
Feed water	250 tons
Fresh water	8000 gals.

Development of Design

The Los Angeles Shipbuilding & Drydock Company had contracts with the United States Shipping Board for a total of forty vessels of 8800 tons deadweight capacity. Thirty of these vessels have been constructed at this yard and a large number were completed and delivered prior to the end of the war. There was also a very large percentage of the materials on hand for ten more ships of this size at the time the armistice was signed.

With the cessation of hostilities and the consequent slowing up of the United States Shipping Board's building program, the government began to consider the building of larger vessels. With a view towards utilizing the materials on hand and at the same time obtaining an increased deadweight capacity, the Los Angeles Shipbuilding & Drydock Company prepared a modified design which was a development of the 8800-ton vessel and which was submitted to the United States Shipping Board for approval.

In the modified design the same lines were used as for the 8800-ton ships, with the addition of 20 feet 3 inches in the length of the midship body, making the length B. P. 430 feet 4½ inches instead of 410 feet 1½ inches. In addition to this increase in length, the forecastle, bridge and poop decks were made continuous over the entire length, making a flush deck vessel, the upper deck being the strength deck.

The scantlings for the modified design were worked out in accordance with the rules of the American Bureau of Shipping and by making the upper deck the strength deck and relocating the other materials, it was found possible to utilize the steel which was already on hand for the smaller ships.

In the modified design about 600 tons more steel were required than for the 8800-ton vessels with an increase in carrying capacity of about 2700 tons.

Hull Construction

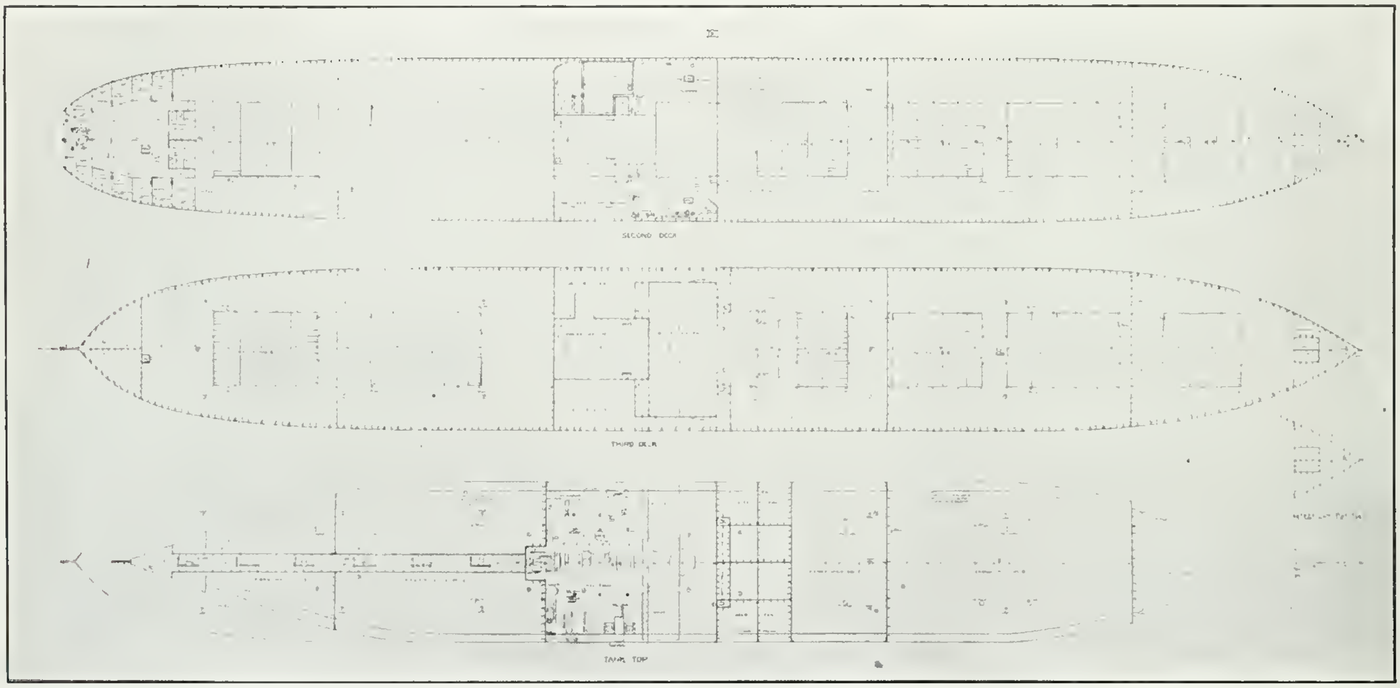
The midship section shows the type of construction

The 11,500-ton steamship West Lewark, first of five sisters building by the Los Angeles Shipbuilding & Drydock Company for the Shipping Board which was adopted for the larger vessels. Side stringers were eliminated by the use of deep framing, and the top side frames were decreased in weight by splicing on a lighter section at the second and third decks alternately. The open floor type of construction was also adopted in the double bottom tanks.

Wide spaced hold pillars are provided, with deep plate girders with single channel face bars in line with the sides of the hatchways. Pillars are located at hatch corners only. The hold pillars are of the built-up cylindrical type, while those in the 'tween deck spaces are of steel tubing. This pillaring makes the five cargo holds particularly spacious and free from obstructions. The fore hold is provided with two large hatches, and each of the remaining holds is served through one large hatch.

Cargo Handling Gear

The cargo handling gear is of particular interest. It will be noted from the profile and general arrangement that fourteen derrick posts are provided, located between and outboard of each hatch, each derrick post serving two hatches except the two at the after end of hatch No. 6. These derrick posts are fitted with five-ton booms, ranging from thirty-seven to forty-four feet in length. In addition there is one thirty-ton steel boom serving hatch No. 2 only, and which can be stepped at either port or starboard derrick post. The derrick posts are stepped on the second deck and designed to serve as ventilators for the lower 'tween deck spaces. The usual vent trunks are provided for the remaining spaces.



General arrangement of the West Lewark class

The foremost and aftermost pairs of derrick posts are connected at the top by a lattice bridge. On these bridges topmasts are stepped to carry the wireless antennae, halyards, etc.

Deck Machinery

To serve these derricks there are twenty 8-inch by 9-inch steam winches for the five-ton booms, and two 9-inch by 9-inch steam winches for the derrick posts at which the thirty-ton boom is stepped. The cargo winches as well as the 8-inch by 8-inch steam capstan, located aft, and the 10-inch by 12-inch compound spur geared horizontal anchor windlass were designed and built by the Los Angeles Shipbuilding & Drydock Company.

The steering gear is the Hastie type, consisting of a vertical 9-inch by 9-inch twin cylinder engine with worm and gear drive, operated from the bridge by means of a hydraulic telemotor. The hand steering gear is located on the upper deck and is directly connected to rudder stock through right and left hand screw gear. An emergency tiller is provided to be worked with blocks and tackle from the capstan.

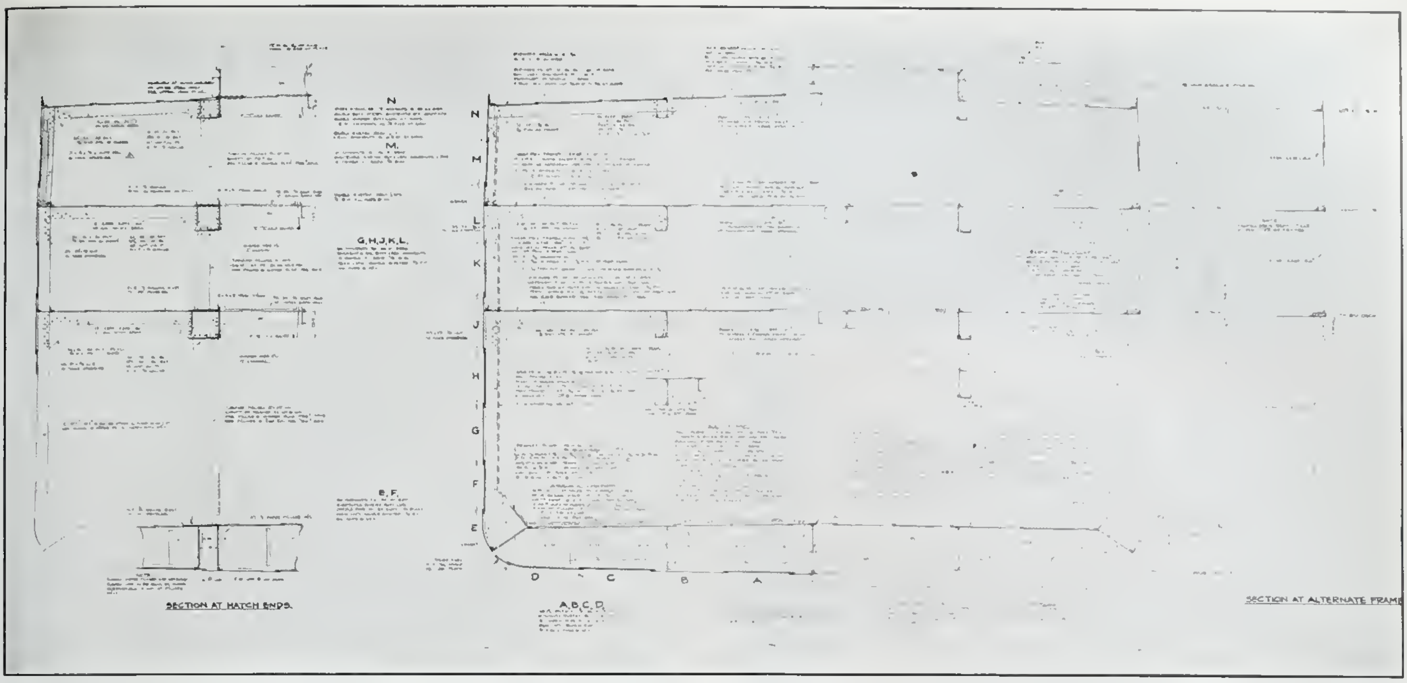
Living Quarters

Reference to the general arrangement will show a very convenient arrangement of quarters, those for the officers being located in a double deck bridge amidship. The officers' saloons and all mess rooms are located adjacent to the galley, there being separate dining saloons for deck officers and engineers. The forward end of this space is used to accommodate stewards, cooks, carpenter and boatswain, deck engineers and storekeepers, oilers, water-tenders, mess boys and two cadets. On the upper bridge are housed the captain and officers, the chief and assistant engineers, supercargo, wireless operators, quartermasters and cadets. The captain's and chief engineer's quarters are particularly roomy, comprising in each case a stateroom, office and bath. Located on the flying bridge above is a steel pilot house with a rounded front and a chart room adjoining on the after end.

The firemen and seamen are located aft on the second deck. Instead of being housed in the usual type of forecastle, separate well-lighted and ventilated state rooms are provided, each being occupied by two men. Caulked decks are laid on top of houses in way of the living quarters amidships.

Propelling Machinery

The vessels are fitted with a triple expansion engine having cylinders 28½ inches, 47 inches and 78 inches in diameter by a stroke of 48 inches. This engine was designed and built by the Los Angeles Shipbuilding & Drydock Company and is the same engine which this company has already built and installed in twenty-two of the 8800-ton freighters built for the United States Shipping Board. The engine is rated



Amidship section of the West Lewark

at 3500 i. h. p., but is generously proportioned and has developed over 4000 horsepower on the loaded sea trials of some of the 8800-ton ships.

Boilers

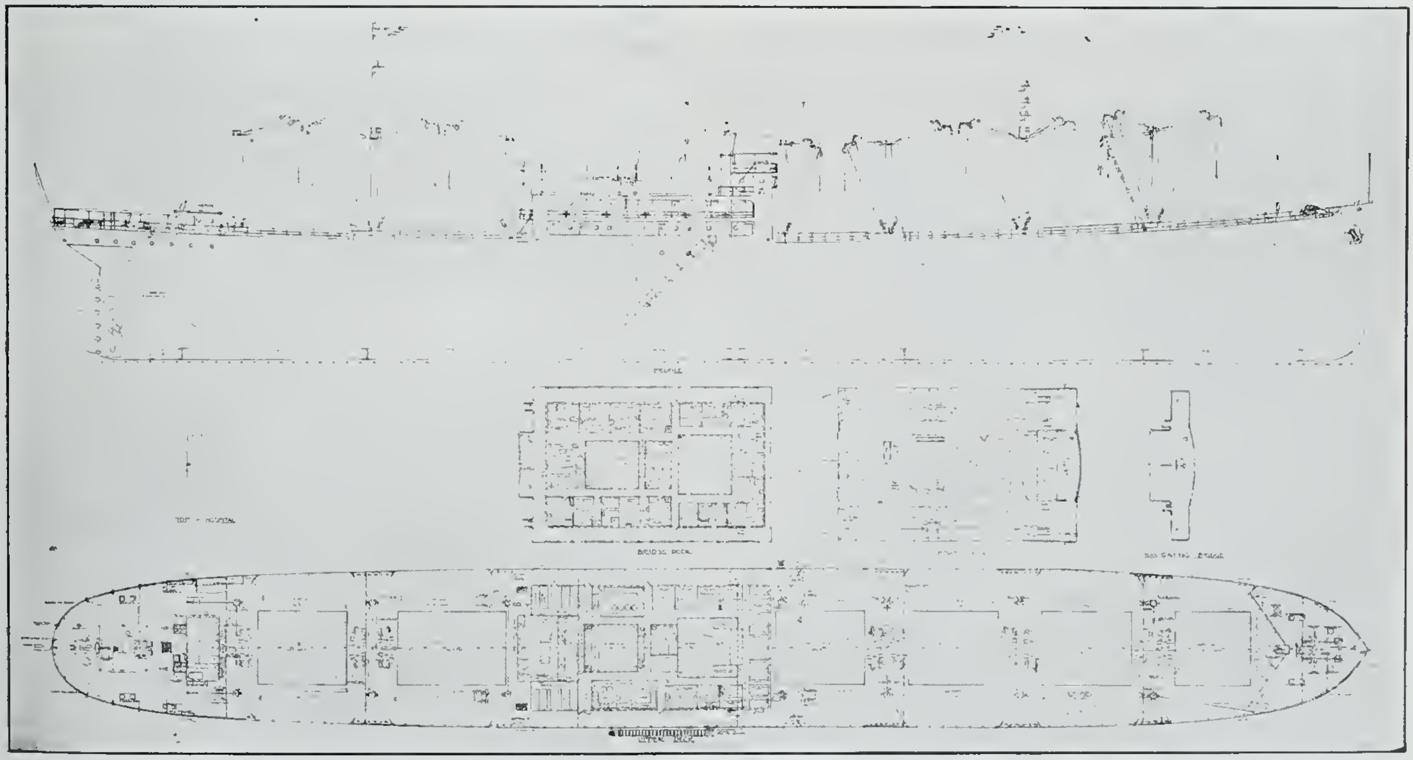
There are three Scotch marine boilers 15 feet 6 inches in diameter with a total heating surface of 3243 square feet. These boilers are built for a working pressure of 220 pounds. Boilers are fitted with Foster superheaters for about 50 degrees of superheat and are also fitted with the John Reed system of forced draft. Provision is also made for burning either coal or oil fuel.

Auxiliaries

There is a main condenser of about 4500 square feet of cooling surface and also an auxiliary condenser of approximately 1000 square feet. The air pump for the main condenser is of the Edwards type and is driven from the intermediate crosshead of the main engine. There is a main circulating pump of the centrifugal type driven by an independent 10-inch by 10-inch engine.

Instead of the usual combination air and circulating pump, the auxiliary condenser is fitted with independent pumps for this service, consisting of an independent centrifugal circulating pump and a vertical twin beam air pump.

These vessels are equipped with a complete evaporating and distilling plant, also a two-ton refrigerating plant for cooling the refrigerating room and also for manufacturing ice.



Inboard profile, bridge and upper deck of the West Lewark

Pacific Marine Review
The National Magazine of Shipping

576 Sacramento Street
SAN FRANCISCO, CALIFORNIA U. S. A.

Official Organ of the Pacific American Steamship Association

Subscription Price, per year (Domestic) $2.00
(Foreign) $3.00
Single Copies . . . . 25 cts

J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor

NEW YORK OFFICE
339 at 30 Church Street
M. B. STEWART, Manager

Pacific Marine Review is sold at all leading News Stands
Entered as second class mail matter at Postoffice
San Francisco, California

Published on the First of Each Month. Copyright
1921 in the United States by J. S. HINES

GERMAN COMPETITION

FOR some months back there has been a growing evidence in foreign trade of the return of German competition in markets which had been largely taken over during the war by United States firms. This competition is taking the same forms that it assumed prior to the war and is becoming a very rapidly increasing factor in the foreign trade situation.

Perhaps we can best illustrate what we mean by a story that came to us very recently concerning a bid for a Diesel engine generating set for a Peruvian mining company. United States representatives of the mining company called for bids in this country, and quite a number of American manufacturers tendered for this installation, making their bids on a basis of F. A. S. San Francisco or New York. After an appropriate period of time had elapsed, hearing nothing from their bids, some of them inquired and found that the job had gone to a German bidder and that this German firm had bid on a basis of delivery at the mine, together with the services of a guarantee engineer for one year to instruct the employes at the mine in the care and operation of the apparatus, and that the German bid under these conditions was $3000 less than the lowest American bid.

The point to this story is not so much that the German bid was lower than any American bid, as that might very easily be accounted for by the exchange situation. The point is that the German firm attached conditions to its bid which would be very desirable for the Peruvian mine operator and which would at the same time put the German firm in touch with all the conditions necessary to establish itself in getting inside information in a friendly way about all Peruvian conditions, the German guarantee engineer being, of course, a German foreign trade agent while residing in Peru.

This method of doing business on the part of a German, or any other competitor, is not only entirely legitimate but it is highly praiseworthy, and we will find ourselves obliged to copy such methods, if we expect to stay in foreign trading as a permanent growing business. In foreign trade it is not the business which you can do today or this month or this year that counts, but it is the possible growth of your business during the next twenty-five or fifty years, and that may and often does loom so large when foreign trade is properly handled as to offset and alleviate all of the periods of industrial depression which may and often do occur in the home market.

In other words, we have got to get rid of the American obsession that the foreign market is simply a convenient dumping ground for whatever surplus we may happen to have on hand and learn to put in the place of that obsession the constructive idea which has been forced upon our European competitors for a century or more that foreign trade is in the nature of a great reservoir, by the filling of which we are continually increasing its capacity and making our own position safe and secure in the industrial world.

AMERICAN MARITIME POLICY

THE American maritime world has learned to look forward with interest to the utterances of James A. Farrell, chairman of the National Foreign Trade Council, and it will certainly not be disappointed at the tone of his address on the subject, "American Maritime Policy," at the opening of the National Foreign Trade Convention at Cleveland.

The greatest stress is laid in this address on the importance of getting the American government out of active operation of ships. In line with the slogan, "Less government in business and more business in government," he suggests the continued withdrawal of Shipping Board vessels from business until such time as the market will allow of their being chartered either on a bare boat basis or on time charters. He suggests, as we have often done in these columns, that the government missed its marketing opportunity for the ships of the fleet when it failed to place them on the markets of the world immediately after the armistice. He intimates that at least $800,000,000 in the potential value of the fleet was lost by failing to take advantage of this opportunity. We would think that this was a very conservative estimate of the loss to the government in not selling "when the selling was good."

As a means of rectifying the present deplorable condition in world shipping, Chairman Farrell makes the very constructive suggestion of an international conference of the maritime nations to stabilize the shipping situation, the idea being that such an international conference could formulate a "laying-up program on the basis of relative percentages of tonnage owned and establish conference rates on a parity from all countries." This, in Mr. Farrell's opinion, would "largely solve the problem by limiting the total tonnage of ships in employment to the cargo available." He intimates that this conference would have to be a conference of practical shipowners — "a maritime league of nations would probably surround this economic principle with a maze of entanglements which would destroy the main purpose to be achieved."

Mr. Farrell takes a rap at the American importers and exporters in this country who do not seem "to desire to support an American merchant marine on an equal basis." He advocates thorough revision of our shipping laws so that American operators would be put on an equality with foreign operators in respect to regulations affecting practical operation in the foreign trade.

We are hoping that when President Harding shall have found a chairman for the Shipping Board he will be a man able to work out with the Secretary of Commerce a constructive program of remedial legislation for the American merchant marine which will be definite enough and broad enough to form a good foundation for all future development of our overseas carrying trade.

GOVERNMENT SERVICE TO BUSINESS

AT the ninth annual meeting of the Chamber of Commerce of the United States, the following resolution, which we heartily endorse, was adopted:

Events during the past eighteen months have made clear to the American business men the vital importance of accurate economic facts. The lack of correct and comprehensive data on the fundamentals of production, of stocks of raw material and fabricated goods, and of the facilities of distribution, contributed substantially toward the painful financial losses of the still continuing period of business depression. These losses have adversely affected not only wide sections of our business community, but also the great body of producers, consumers, and the general public.

A proper function of government is to render service to business where such service cannot adequately be provided by individual initiative. The obtaining of basic nation-wide and world-wide data on commerce and industry is an example of such service.

The data hitherto collected has never been adequate for American needs, nor has it been promptly or effectively presented for actual business use. The duty of gathering such facts now rests with an almost incredible number of widely scattered bureaus. The facts are brought together for a variety of purposes, few of which have any bearing upon the practical requirements of business. Much information, of immeasurable value to American trade and industry, lies almost unused in Washington because it is in such form as to render difficult its practical use, or has not been made use of because business men have not been properly advised as to the kind of service which more than four score bureaus are prepared to render them if they will approach each one in turn and study its stock-in-trade and facilities.

The Department of Commerce is now charged with the primary duty of rendering the fullest possible service to American commerce, both foreign and domestic. It has no inquisitorial or regulatory powers and is accordingly free from the equivocal duty of restraining business with one hand while it attempts to offer service with the other.

This department is in a peculiarly favorable position to obtain, co-ordinate and distribute vital commercial information, carefully safeguarding all confidential facts. It can render invaluable service through the development of commercial standards and specifications, the absence of which is costing the American people at the present time hundreds of millions of dollars needlessly expended.

The chamber strongly recommends that the facilities of the Department of Commerce be broadened to meet the actual and economically proper demands of the business of this great nation.

The chamber believes that the prompt consummation of this plan will give a decided impetus to the revival of business, both domestic and foreign, at a time when such revival is proving a slow and arduous process; and that the service thus made available to American business will contribute substantially to reducing the suddenness and intensity of future business depressions through establishing a more accurate and reliable basis of available facts bearing upon the entire business situation, both domestic and foreign.

THE SAN FRANCISCO HARBOR BILL

THIS bill, which would have placed the control of the San Francisco waterfront under three harbor commissioners appointed by the mayor of San Francisco, has been defeated in the State Legislature, and we are unaffectedly glad of that defeat. Whatever arguments there may be in favor of San Francisco owning and controlling its own waterfront, the bill in question was so loosely drawn and afforded so many opportunities for municipal political incompetence that all true friends of the San Francisco waterfront rejoice in the failure of the bill. When the San Francisco municipal government can show as efficient and as business-like an administration of the general affairs of the city as the Board of State Harbor Commissioners have shown during the last ten years in the administration of the affairs of the waterfront, it will be time enough for San Francisco to ask the state to hand over to its management this $50,000,000 property.

If there had been any complaint from any source about the management of the harbor by the present Board of State Harbor Commissioners, there might have been an excuse for such a bill, but it is agreed on all sides, even by the proponents of the bill itself, that there is no better managed harbor in the United States than the harbor of San Francisco, and the shipping men of the harbor, practically as a unit, take the ground that the harbor is so well managed that it would be a crime to attempt any change at the present time.

When a business, such as San Francisco's harbor, is paying all its own operating expenses, paying interest on all of its bonds, and setting aside each year a sufficient sum to provide for the liquidation of those bonds upon maturity, and in addition to that, is providing a considerable amount each year for permanent improvements, so that $8,000,000 of bonds authorized by the people of the State of California are in reserve unsold and need not be touched unless some emergency arises—when a business, we say, performs in this fashion on fees which are agreed by all shipowners and masters to be less in proportion to the service given than those charged in any other port in America, "we'll tell the world" that San Francisco's harbor is all right and that the present Board of State Harbor Commissioners, under the able leadership of John H. McCallum, deserves the hearty thanks and best support of every citizen of San Francisco.

If any citizen is at all troubled about the idea of the city not owning its own waterfront, we invite said citizen to take his stand upon any day in the week in the middle of the footbridge spanning the Embarcadero from the foot of Sacramento street to the Ferry building and thoughtfully consider the appearance of the two sides of the Embarcadero, the one controlled by the Board of State Harbor Commissioners, the other controlled by the city administration of San Francisco.

THE MARINE WAGE SITUATION

By ADMIRAL W. S. BENSON

This statement was made by Admiral W. S. Benson, chairman United States Shipping Board, before Labor Conference of Marine Organizations, Steamship Men and Shipping Board Representatives at Cosmos Club Auditorium, April 27, 1921, at 10 o'clock a. m.

Among the organizations represented at this meeting were the following: Marine Engineers' Beneficial Association; International Seamen's Union; Marine Firemen, Oilers and Watertenders' Union; Marine Cooks and Stewards' Union; National Radio Telegraphers' Association; Masters, Mates and Pilots' Association of America; Neptune Association; American Steamship Owners' Association; U. S. Shipping Board.

I HAVE always welcomed any opportunity to meet the men upon whom the permanent success of the American merchant marine actually depends.

On the present occasion we find ourselves endeavoring to meet the rapidly changing economic conditions resulting from the world war. It has affected the merchant marine in many ways. The movement of ocean freight has declined to a tremendous extent and this has resulted in the tying up of many ships and in the unemployment of many men. Competition for such cargoes as are available has become extremely keen. In land industry, too, the pressure of reconstruction has brought about wide price revision in most of the items making up the family budget. A general liquidation is taking place in all directions. All of us, whatever our status or connections, must do our parts in assisting in this general liquidation without which we cannot expect a permanent return to prosperity. So far as the liquidation of labor is concerned, one can hardly pick up a daily paper without finding reports of substantial reductions in wage scales in various industries. So far no change in this direction has taken place in the marine industry. How this labor liquidation might be best accomplished has been the subject of discussion between the committees representing the organizations of the various marine departments and a committee representing the steamship interests.

It may help us all to get a clear picture of the situation if we review some of the conditions of the last few years. During the war the drop in the purchasing value of the dollar became so serious as to necessitate radical readjustment of wages to meet the increasing cost of living. This condition is being overcome and the value of the dollar is definitely returning toward normal. The new economic conditions and the changes in living costs call for reductions in wages at least as great as the recent drop in the cost of living which reflects the return of the dollar toward its normal value. Since 1914 wages aboard American ships have more than kept pace with wage increases in other industries. When the government became the largest American owner of ships it participated in these wage increases and it is now a party to the present working agreements which will expire on May 1 and August 1, respectively. You will recall that in February last the Shipping Board with other shipowners invited representatives of the seafarers into conference to discuss a voluntary revision of wage scales in order to meet the new economic conditions. The men made no concessions. On the other hand, the Shipping Board has insisted that under these circumstances the terms of the existing agreements be strictly observed. As a result no changes in wages have been made.

Anticipating the expiration of the present marine agreements on May 1, the Shipping Board has throughout the present negotiations sought an orderly readjustment of wages and working rules in line with present conditions. It believed, and still believes, that all concerned would meet in a spirit of simple fairness and realize the absolute necessity of readjustments for the common good. The Shipping Board does not desire arbitrary wage reductions based solely on the present industrial depression, which might except the seafarers from the preserved higher American standards of living. In making readjustments it proposes to stress the same factor which was so largely considered in making increases—the return of the purchasing value of the dollar toward its normal value as reflected in the percentage drop in the cost of living.

I understand that the recent negotiations have not resulted in the meeting of minds that had been hoped for, and that a break has actually come between the steamship interests and the marine labor organizations. It is in the effort to clear the situation that I have thought it best to ask you gentlemen to meet me this morning so that I might put before you my views as to the reasonable basis of readjustment required in the present situation and state to you the course of action which the Shipping Board finds it necessary to take under the present circumstances.

In order that I may be perfectly clear, I understand that the Marine Engineers' Beneficial Association desires to continue the present agreements both as to wage scales and working conditions. I understand that the unlicensed personnel have presented these points on which they ask favorable assurance before they are willing to discuss wage scale and working conditions. These six points I understand are as follows:

(1) The abolition of the Sea Service Bureau.
(2) The enforcement of Section 13 of the Seamen's Act, especially the language clause.
(3) The enforcement of Section 14 of the Seamen's Act, covering life-saving equipment, especially on foreign ships.
(4) The enforcement of Section 2 of the Seamen's Act, covering the division of watches.
(5) Preference to be given in employment to union men, which it is contended would develop efficiency.
(6) The union to examine the men and not to admit to membership any not reasonably qualified.

Taking up first the six points above noted, I would say that the Shipping Board cannot consent to the abolition of the Sea Service Bureau for reasons which have been expressed in recent press statements, nor can it assent as a government institution to points five and six, involving union preference. The Shipping Board as a government institution must stand for that equality in its relations to the government which is guaranteed to every citizen by the Constitution of the

United States. So far as points two, three and four are concerned, it is my opinion that any act of Congress, until definitely repealed or modified, so long as it stands upon the statute books, should be enforced by the department charged with such enforcement.

We now come to the point of determining what is a reasonable basis for readjusting wages and conditions in the merchant marine. I have given much thought to this matter. I want to be fair to the interests of the men and officers who are manning our ships, to the operators and owners who are running them, and to the people of the United States who look to the Shipping Board to protect their interests in the merchant marine. All of us should consider the interests of the private shipowner in foreign trade who is manfully carrying the burden of competition unassisted by the government. I have weighed this matter carefully and long, have taken advice freely, and have come to a mature and well considered conclusion. I might come to you with figures in excess of those which I think should really be put into effect in order that we might trade together. This would not only be impossible when you are dealing with the government, but would also be repugnant to my sense of fairness. I will, therefore, tell you that I am convinced that the economic conditions at the present time fully warrant a reduction in marine wages. I am convinced that the amount of this reduction must be not less than 15 per cent of the present wage scales. I am convinced that the maintenance of overtime which has been subject to such notorious abuses and which is so foreign to the spirit and customs of the sea is improper and that it should be virtually eliminated. I am convinced that the continuation of the night deck and engineer officers is not warranted and that there should be also a substantial reduction in the subsistence allowance, and such other modifications of the working rules should be made as will make for efficiency and economy of operation.

These are my views of a reasonable adjustment of this present matter and the basis on which the Shipping Board must and will act.

These matters, so vital to the success of our merchant marine, should be considered and adjusted on a reasonable basis. What I have stated above represents the Shipping Board's views of what constitute a reasonable basis. The Shipping Board, as trustee of the money of the people of the United States, cannot compromise a vital principle. It must insist upon equitable readjustment of the present wage scale and working conditions in order to efficiently operate its ships. The United States is determined to have a merchant marine and the Shipping Board, so far as is possible, is endeavoring to have its ships American-manned. I make an earnest appeal to all of you who have the interests of our merchant marine at heart to come with me and the Shipping Board in making the above basis effective and in co-operating to secure a readjustment of these conditions in line with those of other American industries.

THE SHIPPING STRIKE

By J. C. ROHLFS

ENORMOUS losses in the operation of the American merchant fleet, running in the case of the Shipping Board to $14,000,000 or $15,000,000 a month, and in the case of private operators to large amounts, though considerably less than the government's losses, were the reasons why a reduction in wages May 1, which led up to the strike of the maritime unions, was imperative. That the Shipping Board was losing much money, which must come from the pockets of American taxpayers, has been notorious, but that the losses were approximately $180,000,000 a year was not so well known. The American taxpayer is the man most concerned, and in complete analysis of the strike, the issue is drawn squarely between him and the men employed aboard the steamships. That anonymous individual, the taxpayer, therefore, no less than those immediately engaged in steamship operation, will be interested in the following account of the negotiations at New York that immediately preceded the strike of May 1.

Unions Stand Pat

What small prospect of success the New York conference would have was foreshadowed by the failure of the Pacific Coast operators to arrive at any understanding whatever with the unions. Despite the palpable fact that the merchant marine, with relatively few exceptions, was not paying expenses in foreign trade, and that, therefore, reduction of expenses was imperative, the unions positively refused even to consider any wage reductions, and, in fact, brought forward proposals for modifications of working rules that would make the burden of the operator even heavier than it had been. This attitude, together with the approach of the New York conference, forced a halt on the Pacific and threw the whole subject upon the Eastern meeting.

There the attitude of the unions, as manifested on the Pacific, was maintained consistently. They continued to refuse to consider wage reductions, although the shipowners did modify their own policy considerably, and eventually decided to make much smaller reductions than were first contemplated. The unions, besides, pushed forward what became known as "Furuseth's six points," which will be considered more in detail later; and all in all left the operators with no course open except to make a 15 per cent reduction effective May 1.

It is not generally known that the tank steamship owners and the general cargo owners were not in complete accord as to the amount of reduction, the former holding that 15 per cent would be sufficient, while the latter held for 25. This difference of opinion (it scarcely can be dignified by calling it a disagreement) doubtless arose in large part from the fact that the shipping depression has been felt more severely by the general cargo steamship, for as is commonly known an actual shortage of tanker tonnage existed up to the first part of this year and the spectacle of idle vessels of that character has been rare until lately. Despite the different cuts suggested, all owners agreed to stand together if the unions declined to consider reductions.

The attitude of the operators being as outlined, the first meeting with representatives of the unions was held April 13, William S. Brown, president of the Marine Engineers' Beneficial Association, heading the delegates of that body. They were presented with a tentative wage scale, which (and this point is to be noted particularly) was not to be regarded as final, inasmuch as the owners were willing to discuss the justice of wages and working conditions as laid down. Two days were allowed for study of the scale by the engineers, and they reappeared April 15.

"Even More Burdensome"

Their reply to the operators was a submission of the old scale, which would expire May 1; they proposed, besides, a new set of working conditions "even more burdensome," as a commentator put it, "than those of the past." The engineers said that they were quite willing to "trade" on the working rules, but that they would not discuss any reduction of wages. This statement led the owners to enunciate a policy of discontinuing any attempt at negotiations if the engineers would not consider a reduction. The engineers reiterated their attitude and the delegation withdrew.

When the oilers and firemen appeared they had something new: Mr. Furuseth's "six points." These are worth quoting in full:

"1. Abolition of the sea service bureau.

"2. Enforcement of Section 13 of the Seamen's Act, especially the language clause.

"3. Enforcement of Section 14 of the Seamen's Act covering life-saving equipment, especially on foreign ships.

"4. Enforcement of Section 2 of the Seamen's Act on American vessels covering the division of watches.

"5. Preference in employment of union men for the purpose of developing efficiency.

"6. Unions to examine men and not to admit any men for ratings for which they were unqualified—this for the purpose of getting efficiency."

The effort of the union to abolish the sea service bureau of the Shipping Board is not new; it took form almost a year ago. On the other hand, the discussion of the Seamen's Act has been going on for several years. Clauses 5 and 6 were considered by the shipowners to be practically demands for closed shop aboard ship.

Must Accept Six Points

Before the oilers and firemen would agree to discuss wages and working conditions, the owners must go on record as willing to enforce, or attempt to enforce, the Seamen's Act, but especially as regarded the six points. No discussion was held at that time, inasmuch as the labor committee of the American Steamship Owners' Association felt it necessary to refer the points to a general meeting.

When the association was advised of the attitude of the engineers and firemen, it decided to put into effect May 1 the wage scale and working conditions of the labor committee unless the unions agreed to a discussion.

On the morning of April 20 Andrew Furuseth and others appeared for the Sailors' Union. Mr. Furuseth submitted the same "six points"; he was advised that the shipowners would not consider them; and he and his delegation thereupon departed. On the "six points" the stewards and cooks also stood pat, but offered to submit them and the proposal of the owners to a vote of the members. The Pacific representative of the cooks said, however, that no wage reduction would be considered, although working rules alone would be discussed. The labor committee replied that the owners intended to ask for a $15 reduction for each man; this, said the delegation, was out of the question.

Engineers Always Underpaid

At the second meeting with the engineers April 25, Mr. Brown said, in substance, that he did not consider that the engineers were working for war-time wages; that they were always underpaid and even then were not receiving the wages they should; and that if the condition of shipping were not so depressed they would ask for more. Their attitude made further discussion useless. On the same day the firemen and sailors insisted upon acceptance of the "six points" before they would even discuss wages and rules; the meetings ended; but a request by Mr. Furuseth to Admiral Benson that a general conference be held in Washington being granted by the admiral, the discussion was then transferred from New York to Washington.

On the morning of April 27 the admiral met the owners and union representatives. He read a prepared statement, which precedes this article. In this statement the admiral dealt briefly but forcibly with the "six points," and then proposed a reduction of 15 per cent in wages.

"Overtime Shamefully Abused"

Speaking extemporaneously, after the conclusion of his prepared statement, Admiral Benson said: "I am not considering wages in regard to what foreign shipowners and others pay. I would rather not have an American merchant marine at all than to have one that was manned by American seamen not properly paid and housed and looked after; but the time has come when an adjustment is necessary for economic reasons. Overtime has been shamefully abused."

Thereupon the union representatives spoke:

Engineers—No wage reduction.

Sailors—Mr. Furuseth did not commit himself definitely as to the admiral's proposal, but said that he had one final suggestion to be disclosed later.

Firemen—Agreement with sailors.

Stewards — Mr. Griffin said that cooks and stewards should not have their wages cut 15 per cent, inasmuch as they had not received the same percentage of increases as other men. If his men were reduced, he said, they would simply be less efficient, which would amount to more than the 15 per cent reduction, and if they did not know how to get even with the shipowners he would tell them how.

Radio Operators — No decreases; considered that they were underpaid in view of their long hours.

Deck Officers—Nothing to say at that time, their agreement not expiring until August 1.

Owners Accept Benson's Plan

The attitude of the shipowners was in marked contrast. Although they had decided upon a decrease of 25 per cent, they signified their willingness to accept Admiral Benson's proposal. Then Admiral Benson made a statement that is of great interest to every American citizen:

"Fifty per cent of the government ships are laid up, and the nation is losing approximately $15,000,000 per month, which is a taxpayer's burden. The private owners are not making money, but may be losing less than the Shipping Board."

Another meeting was held the same afternoon and a final conference was called by Admiral Benson for April 29. Prior to that meeting, however, the American Steamship Owners' Association, the Pacific American Steamship Association and the Shipowners' Association of the Pacific Coast gathered in New York and passed a resolution in part as follows:

Resolution of Owners

"Whereas, the American Steamship Owners' Association, the Pacific American Steamship Association and the Shipowners' Association of the Pacific Coast, after careful deliberation have heretofore declared in favor of a reduction of approximately 25 per cent in the wages of seamen, and still believe that present conditions fully warrant such reduction, together with a revision of the working rules relative to seamen, to eliminate the abuse of overtime, and

"Whereas, the American Steamship Owners' Association, the Pacific American Steamship Association and the Shipowners' Association of the Pacific Coast are not unmindful of the crisis through which the American merchant marine is now passing; now, therefore,

"Be it resolved, That as a compromise, with full realization of the fact that the proposed scale does not enable American vessels successfully to compete with foreign vessels, but in deference to the views and wishes of the chairman of the United States Shipping Board, the American Steamship Owners' Association, the Pacific American Steamship Association and the Shipowners' Association of the Pacific Coast will put into effect on May 1, 1921, the wage schedules and classification submitted to them by the United States Shipping Board on April 27, 1921, instead of the 25 per cent reduction heretofore contemplated by the foregoing associations."

$15,000,000 Loss a Month

Admiral Benson stated, in opening the meeting of April 29 in Washington, that the board was running from $14,000,000 to $15,000,000 behind each month; that he had gone to Congress asking $170,000,000 to keep the merchant marine going until July 1, 1922; that he could not ask for this sum until he had reduced costs all possible: and that overhead, supplies and repairs having been cut, he had approached the wage question last. In conclusion he said that he had no other figure to submit.

Mr. Furuseth asked the admiral whether American citizens could be given the first opportunity of shipping, followed by men who had declared their intention of becoming citizens, priority of papers to govern; he also wished the language clause of the Seamen's Act enforced. He inquired also as to the meaning of the 15 per cent reduction: if Admiral Benson meant 15 per cent of the wages stipulated in the articles, then it would mean in some instances 40 and 50 and 60 per cent reduction because of the elimination of the overtime. If that was the meaning of the proposal it would take the sailors back to 1900.

Admiral Benson replied: "I can answer your first question by expressing preference for American citizens if they are efficient and fully come up to the standards required. We cannot have a real merchant marine without a proper personnel. Second question—By 15 per cent I mean 15 per cent of the wages they are paid. For instance, if a seaman's pay is $100 per month he will have the first of May, 1921, $85 per month. Overtime has been greatly abused and we all know that it has. It is bound to be as long as it is carried on at all, but we must have within reason a certain amount of it. Work piled up at sea to induce overtime is theft. There is no other name for it. Overtime should be based on the fundamental wage received."

W. A. Thompson, speaking for the owners, said that he stood for American men on American ships, but that he would not be bound by any rule contrary to law. In view of this and the fact that owners had been getting their men from the union, he replied "No." Mr. Fur- union, he replied "No." Mr. Furuseth, pursuing the same general course, asked whether the owners would agree to a three-watch system, and, when that had been ruled out of order, asked for the right of his men to visit vessels as they were doing then. The admiral said that the question should be included in the working rules and therefore was out of order; nevertheless, he discussed it, saying that it indicated a lack of confidence and a desire for interference, and that he did not see why leaders of unions should be permitted on board ships to interfere directly with the men employed there.

A Bit of Dialogue

Mr. Fursueth: "If I understand that correctly, it means that no representative of any association can interfere between the officers of the vessel and the men, and should not in the interest of good discipline be tolerated."

Admiral Benson: "You do not understand it right, and there is no foundation for your remark."

The engineers asserted that the inclusion of a new Class F would result in some wage reductions as great as 33 per cent, and Mr. Brown read a statement to the effect that the reduced cost of living had not extended to the small purchaser, that there was no necessity of reducing wages and that therefore the engineers could not agree to a reduction. He would be willing to place the question before his men for a referendum vote, but, he added, the engineers would not work with the mates as long as the engineers' wages were less.

Admiral Benson replied that the figures for the engineers still left their pay in excess of that of normal times and that he was merely trying to bring about a practical business readjustment. If his sympathies lay with one side more than the other, they were with the men, with whom he wished to deal justly, but the engineers should not ask the board to break its agreement with the deck officers.

Mr. Furuseth then proposed that the whole question be submitted to the President, whose decision would be accepted. To this Admiral Benson replied vigorously: "We are supposed to be supporters and the aids to the President of the United States. We are supposed not only to carry our own burdens but to help him carry his; and I for one will not add one single iota to the burden that he is already carrying. We are responsible, and it is for us to aid the President. When the President appointed me chairman of the United States Shipping Board, I assumed that he expected me to handle that problem, and we cannot get away from our personal and individual responsibilities. In attempting to carry this question to the President you are shirking your responsibilities and duties as American citizens."

Mr. Furuseth Departs

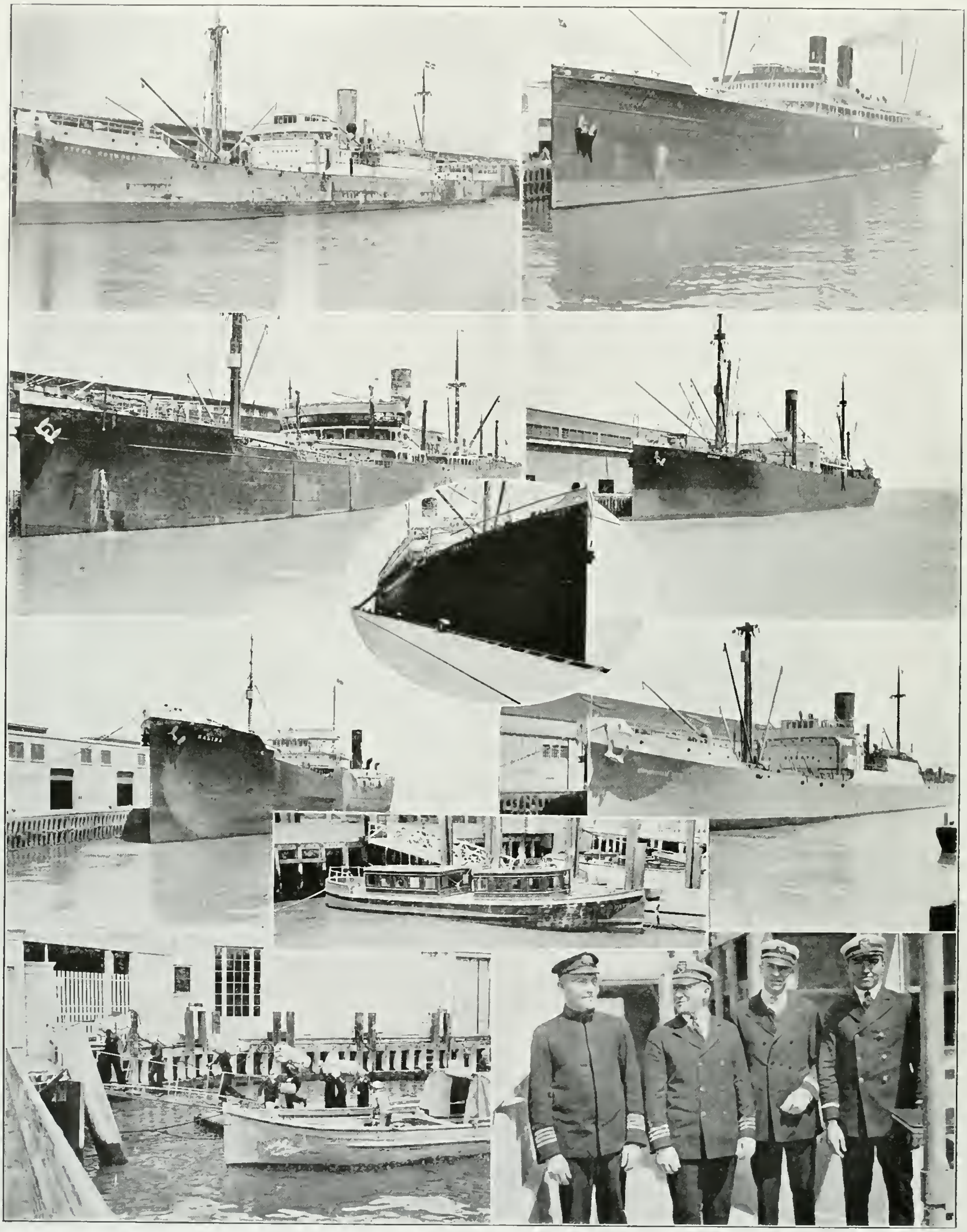
Mr. Thompson for the owners also rejected the proposal. Admiral Benson thereupon brought up the question of wage reduction, to which Mr. Furuseth replied: "Our answer is 'No.' There is nothing else for us to do but to get out of here and appoint a committee to see the President, and that is what we are going to do." He departed, and with him all the maritime union delegations.

Back in New York again the owners declined to submit the "decision of vital issues involving the success or failure of their business undertakings, particularly in the present depressed condition of the marine industry," in hands other than their own, which foreshadowed the failure of Secretary Hoover's suggestion of a commission.

One last effort through the Department of Labor was made by the engineers. They asked a twelve-month agreement at the shipowners' scale, a guarantee of an hour's overtime each day, a committee to go into the question of a bonus scheme, similar to that of the Standard Oil Company of New Jersey; preservation of the old classification was demanded, etc. Admiral Benson declined to consider some points; the shipowners decided against all.

Thus the strike came. As to the merits of the shipowners' case, the reader may judge best from the statement of Admiral Benson.

SNAPS ALONG THE WATERFRONT



On the left, from top to bottom, Steel Voyager, Isthmian Line; Meerdyk, Holland-America; tanker Salina, Shipping Board, operated by Struthers & Dixon; and sailors of the Pacific Fleet landing. On the right, top to bottom, Nanking, China Mail; Ohioan, American-Hawaiian; Birmingham City, Isthmian; and officers of the North Atlantic & Western steamship Yalza, who are, left to right, Captain E. J. Madden, First Officer W. B. Watson, Second Officer H. Spalding and Third Officer H. C. Ringer. The upper insert is the Oceanic steamship Ventura; the lower the motorboat Patrol, a 12-knot vessel designed by R. Z. Dickie of San Francisco and built by William Cryer of Oakland. It is powered with a 4-cylinder Atlas engine. The engineer is J. T. Lattmore of the San Francisco police department. Photos by J. P. Crotty. Photographs of officers of other steamships will appear in a later issue.

A TESTIMONIAL TO CHARLES M. SCHWAB

CHARLES M. SCHWAB was the guest of honor at a dinner given by shipowners, ship-operators, shipbuilders and past and present officials of the Emergency Fleet Corporation at the Waldorf-Astoria Hotel, New York, the evening of May 6. The time had come for "the responsible people to become articulate," said one speaker in praising Mr. Schwab for his work of "energizing 180 shipyards," and in saying this stated forcibly the purpose of the dinner, which was to convey to Mr. Schwab an evidence of the esteem in which he was held by his associates and of their complete disbelief of the veiled charges made against him at the Walsh committee hearings. These charges, it is worth recalling, were thrown out by the committee and Mr. Schwab was vindicated.

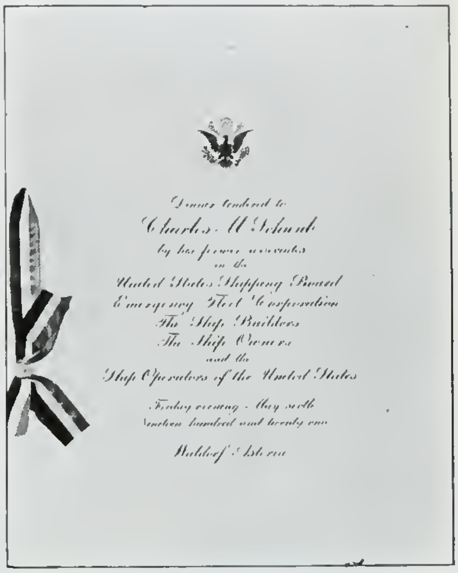
Homer L. Ferguson, president of the Newport News Shipbuilding & Drydock Company, spokesman for the builders, praised Mr. Schwab for "energizing and vitalizing" the 180 yards that launched 587 vessels prior to the signing of the armistice. W. A. Thompson, Jr., president of the Texas Steamship Company, spoke on behalf of the American operators. Admiral Francis T. Bowles and General George W. Goethals, both of whom were formerly with the Shipping Board, followed Mr. Thompson. The general roused a laugh when he said that "the one service I did for the Emergency Fleet was to get rid of myself and Mr. Denman." Charles E. Piez dwelt upon the necessity of assigning the whole direction of the Shipping Board to one man, and, referring to the attacks upon the Emergency Fleet Corporation, read two portions of the Walsh report, one of which completely exonerated Mr. Schwab and the other called the work of the Emergency Fleet Corporation "the greatest shipbuilding effort in the history of the world."

Mr. Schwab

Mr. Schwab promptly followed Mr. Piez by saying that if he were President Harding he would make Charley Piez chairman of the Shipping Board.

On the dais with Mr. Schwab were: Chester Cuthell, who served as chairman; H. H. Raymond, president of the American Steamship Owners' Association; General Goethals, Admiral Bowles, Mr. Piez, Eugene G. Grace, president of the Bethlehem Shipbuilding Corporation; W. W. Atterbury, Darwin P. Kingsley, Bernard Baruch, Senator William Calder, Howard Coonley, Paul D. Cravath, Hower L. Ferguson, William Fellowes Morgan, John D. Ryan, Paul M. Warburg and Commander R. D. Gatewood of the Shipping Board.

The unusual incident of the evening was the presentation of a model of a 7500-ton vessel to Mr. Schwab, a photograph of which appears on this page.

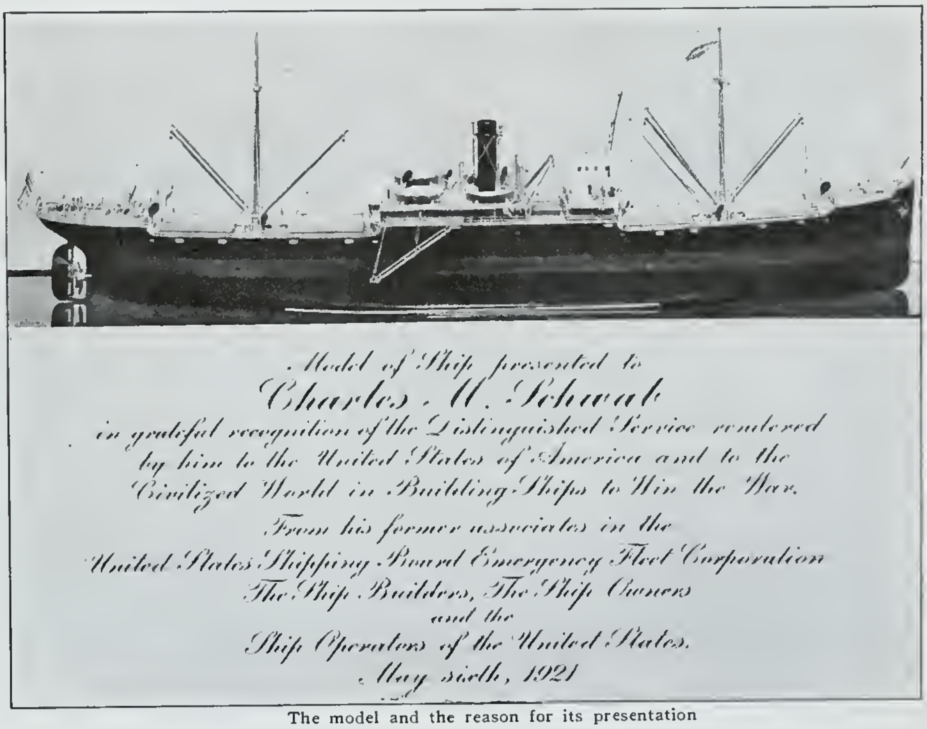


Dinner tendered to
Charles M. Schwab
by his former associates
in the
United States Shipping Board
Emergency Fleet Corporation
The Ship Builders
The Ship Owners
and the
Ship Operators of the United States

Friday evening · May sixth
Nineteen hundred and twenty one

Waldorf Astoria

A page from the program



Model of Ship presented to
Charles M. Schwab
in grateful recognition of the Distinguished Service rendered
by him to the United States of America and to the
Civilized World in Building Ships to Win the War.
From his former associates in the
United States Shipping Board Emergency Fleet Corporation
The Ship Builders, The Ship Owners
and the
Ship Operators of the United States.
May sixth, 1921

The model and the reason for its presentation

THE BOHEMIAN CLUB LAUNCHING

THE Bohemian Club of San Francisco and the Moore Shipbuilding Company staged a launching of remarkable brilliance and color when the 10,000-ton tanker Bohemian Club, built for the Shipping Board and named for the well-known organization of San Francisco, slid down the ways on the evening of May 14. The fact that the club probably was the first of its nature ever to be honored by having a vessel named for it put the members on their mettle to make the occasion one to be remembered.

When the spectators, 5000 or so in all, gathered at the building way, they saw a giant owl standing on the amidships section of the vessel; about the sponsor's stand were clustered flags of many nations; and on the stage were the red-robed members of the Bohemian Club chorus. On one of the boilers, ready to be placed in the hull, were painted the words: "The Heart of the Bohemian Club."

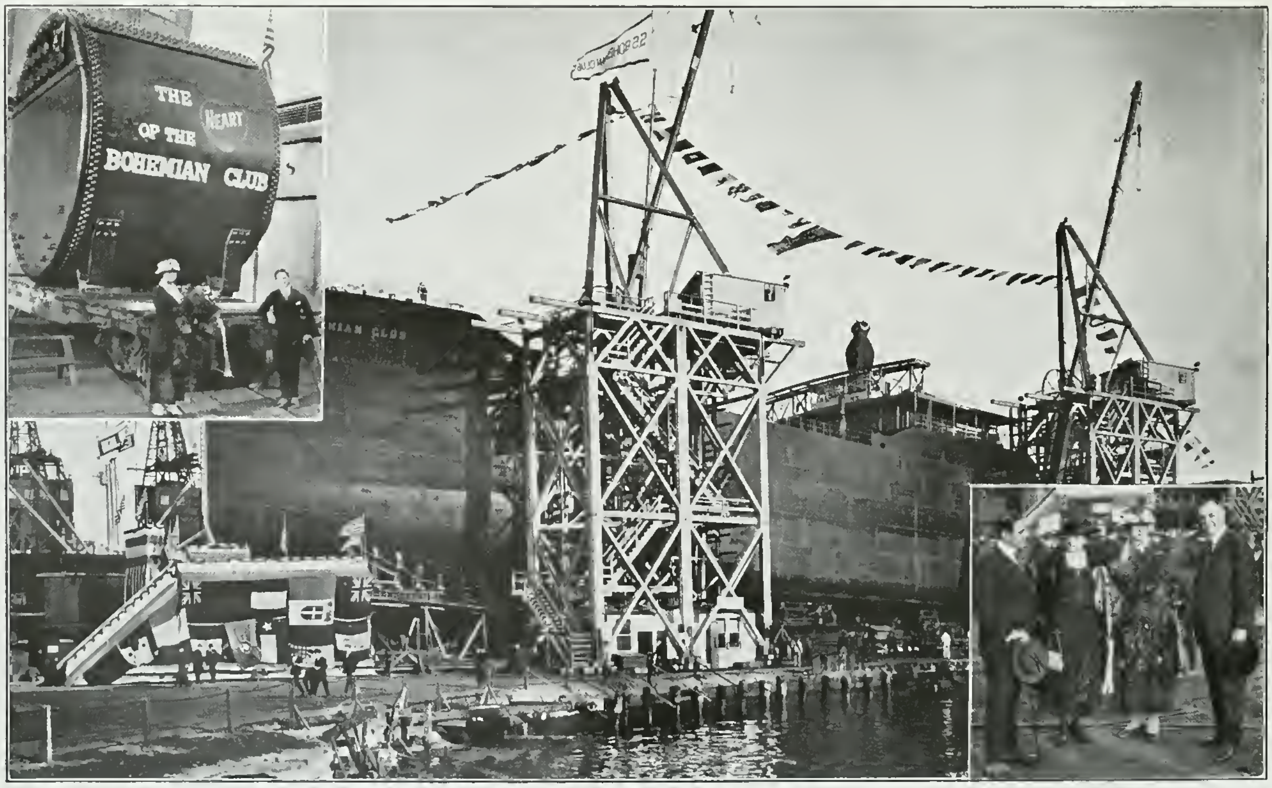
Mrs. Haig Patigian, wife of the president of the club, christened the vessel. As the hull began to move the chorus broke into a song and on the bow appeared the figure of St. John of Nepomuck, the patron saint of the Bohemian Club.

After the launching 1200 persons were guests of the Moore yard at dinner in the mold loft. Frank Deering, as toastmaster, introduced members of the "Shipping Board" of various nations, each of whom was greeted by an air associated with his native country. Joseph Thompson was the Scotch member; Jack Leighton, of Palestine, spoke of the four dreadnoughts needed by his country's navy, which he urged Robert Moore to build, namely, Insurance, Liability, Bankruptcy and Dissolution. Richard Hotaling gobbled his speech in appearing for Turkey; Frederick Myrtle, of the British board, was inclined to deprecate the launching, as it meant more competition for John Bull; Edward Cameron was the Frenchman; and Roy Folger was from China, with Louis Steiger his secretary. Back of the toastmaster hung two paintings by Ferdinand Burgdorff, which will be placed in the officers' messroom of the vessel as gifts of the club.

Addresses were made by Mr. Patigian and Robert S. Moore. A music program followed, and then the guests went out to view the hull of the Bohemian Club, from which rose clouds of steam illuminated by searchlights. Two gondolas, manned by singers of the club, rounded the bow and sang old songs of the sea, closing the ceremony.

The launching committee was composed of McKenzie Gordon, chairman, and F. A. Denicke, Frank P. Deering, Charles K. Field, Joseph Redding, J. Brenton Brady, Robert S. Moore, Joseph A. Moore and Frank L. Mulgrew, the last three of whom are members of the Moore organization. Ray Coyle and Edward Duffy had charge of the illuminations.

The members of the club went to the Moore yard in a special ferryboat. Landing at the yard at 5:35 p. m., they were met by the Moore band and were entertained for a half-hour with music and boxing bouts and songs by Thomas Gosland of the yard. After this had been finished the crowd moved to the building way for the launching.


THE HEART OF THE BOHEMIAN CLUB
MIAN CLUB

At the Bohemian Club launching. In the lower right inset are, left to right, Haig Patigian, president of the Bohemian Club; Mrs. Robert S. Moore; Mrs. Haig Patigian, sponsor; and Robert S. Moore. Mr. and Mrs. Patigian also appear beneath the boiler in the inset, upper left.

"FULL AND BY"

UNDER the title of "Full and By," the Waterfront Employers' Union of San Francisco has issued a booklet reviewing the labor history of the San Francisco waterfront during the last few years, with especial attention to the longshoremen's strikes of 1916 and 1919, the first of which was brought on by a breach of faith by the Riggers' & Stevedores' Union and the second by an actual violation by that union of its own constitution.

The following excerpt from the booklet speaks for itself:

From the days of the clipper ship comes that rich phrase of the sea—"Full and by!" Somewhat romantic, possibly, to apply to the industrial situation of our waterfront, yet, just as the stout ships swung free and true with all sails set, so has our good ship San Francisco—still dealing in pardonable fancy—following prolonged industrial storms along her waterfront, swung to her course at last.

"Full and By"
A Message from The Waterfront Employers Union

Leaders in business thought of San Francisco and other Western cities, have too little appreciated the bitter effort that has been made on our waterfront, not only to destroy our port commerce, but to plant here and propagate here seeds of Bolshevism and anarchy.

The Waterfront Employers' Union, over a period of years, has consistently opposed the forces that have sought by the entering wedge of our waterfront, our community destruction; a long drawn battle marked, as it has been, by brutal attacks, maimings, riots and murder; by prolonged periods of lawlessness, such as have not disgraced the streets of any other American city.

It is our judgment that the situation that has prevailed on our waterfront during the past years can never again arise. But assuming that radical groups may again attempt to conduct their propaganda and organized effort for the disruption of our port commerce and our community life, it is desirable that a complete understanding be had by the community at large of conditions on the waterfront and the work of the Waterfront Employers' Union.

Particularly at this time when the entire thought of San Francisco, California, and indeed of the West, is devoted toward the development of Western industry, resource, commerce and trade, this brief message is offered as a resume of the contribution made by the Waterfront Employers' Union in stabilizing conditions on San Francisco Bay in preparation for the uninterrupted flow of that commerce through our port that all earnest citizens confidently look forward to.

IN THE FAR EAST

"Requiescat" for the Merger

Evidently the time has come to write "requiescat" over the grave of that great Japanese shipping merger, the shadow of which fell across a startled world six months ago. Both the Osaka Shosen Kaisha and the Nippon Yusen Kaisha have said "no," politely enough, but none the less firmly; and lacking those companies a Japanese shipping trust would resemble the Allied battleline of 1917 without the British and French armies. In a statement published in Tokyo, the Nippon Yusen Kaisha characterizes the amalgamation as an "empty dream." On the one hand, the proposal to liquidate companies and surrender all or some properties would have several ill effects, among which is the difficulty of preserving the strength of the several companies, as footholds in various trades might be destroyed, and the N. Y. K. also argues that an amalgamation would tend to invite jealousy in foreign countries. As to the proposal that a syndicate purchase control of the various lines the N. Y. K. holds that all companies are not of uniform strength and the stronger would be sacrificed for the weaker. The O. S. K., without going into the subject so thoroughly, also opposes the plan. The fact is that the amalgamation was designed and fostered primarily with the intent of bolstering up the weak companies; in view of this, the refusal of such lines as the N. Y. K. and O. S. K., which can hold their own with anything in the world, is quite to be expected.

Nevertheless, the Department of Communications continues to work toward a merger, but of the smaller companies alone. At the middle of April, says one statement, 300,000 deadweight tons of shipping, or 10 per cent of Japan's total, was tied up, this condition making amalgamation the more imperative. But a man who cannot stand alone scarcely is able to support another. The government might help, of course, provided the Japanese taxpayer retained his customary smiling equanimity. What if he should become tired?

The Japanese Subsidies

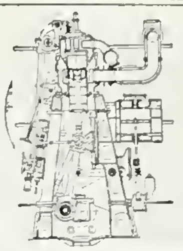
That taxpayer is somewhat heavily burdened now. (He is not, however, paying out $180,000,000 a year, the present losses of the United States Shipping Board). The marine expenditures of the Department of Communications for the current fiscal year will amount to yen 7,269,300, a decrease of yen 1,290,651 as compared with the expenditures of the preceding year. A saving of yen 700,000 was made by substituting a regular mail rate for the N. Y. K.'s subsidies on the Antwerp, Australian and North American routes, and other subsidies have been reduced automatically. Some coasting services, but no off-shore lines, will receive new subsidies. The San Francisco line of the Toyo Kisen Kaisha will receive yen 1,164,137, the largest amount paid to any.

Some Earnings

For the six-month business term ending December 31, 1920, the O. S. K. has reported a net profit of yen 5,212,425, after yen 5,000,000 for reserves and depreciation had been deducted. A dividend of 10 per cent and an extra dividend of 5 per cent were declared and yen 1,424,761 was carried forward. At the end of the year the company owned 145 steamships of 439,152 gross tons; in the inventory, however, the fleet is car-

(Continued on Page 54)

Oil Engines and Motorships



ELECTRIC DECK MACHINERY ON THE KENNECOTT

IN the motorship Kennecott, whose maiden trip was described in last month's issue of Pacific Marine Review, there are no steam pipes for transmitting power. All machinery, aside from the main engines, in all parts of the ship is electrically driven.

The electrically-driven deck machinery is one of the most noteworthy features of the ship and attracted as much attention on the trial trip as any other item of the vessel's equipment. It consists of anchor windlass, capstan, eight electric cargo winches and the electro-hydraulic steering gear. It was all designed and manufactured by the Allan Cunningham Company of Seattle, who specialize in this sort of machinery and whose equipment is now being installed in motorships and steamships all over the world.

The anchor windlass is situated on the foc'sle head and is of the Cunningham electric self-contained type with a combination spur and worm gear. The worm gear is of phosphor bronze with forged steel worm with ball thrust bearings. The main gear reduction is steel spur-gearing and the bearings are all adjustable bronze shaft-bearings. There are two cast-steel wildcats for 2-1/16 inch chain and two quick-warping heads on the intermediate shaft. The windlass is sufficiently powered to heave both anchors at once in 70 fathoms of water.

The electric capstan is on the poop deck and has an 11½-inch barrel. It is fitted with handbar head for hand operation in emergencies. The base is divided into two compartments, one of which carries all the gearing which runs in a bath of oil. The other compartment contains the motor and control apparatus, all of which is completely enclosed in the water-proof compartment. The capstan bearings are all adjustable bronze.

Six of the eight electric cargo winches are of the Cunningham patent self-contained hollow-base type and carry all the control apparatus in the base of the winch. The controllers are operated by a pump lever which is raised to hoist and pushed down to lower in the same way as a throttle-reversing steam winch. This enables one man to operate two winches in accordance with usual Pacific Coast practice. The winches are driven by 25-horsepower General Electric compound marine type motors and have a lifting capacity of 4000 pounds at 250 feet per minute and heavier loads at corresponding rope speeds up to a maximum lift of 15,000 pounds. The winches are double reduction; the first gear reduction is cut herring bone gearing running in a bath of oil in an oil-tight gear casing; the second or main reduction is machine-cut spur-gearing fitted with substantial and close-fitting flanged gear-guards. Both main and intermediate shafts run in adjustable bronze bearings. A waterproof magnetic-disc holding-brake, fitted with simple external adjustments, is fitted to the armature shaft of each motor. This brake is merely a safety holding device, however, and is not used in lowering, the lowering control being accomplished by a system of dynamic braking which gives a range of speed control in lowering from creeping to practically free dropping speed. The winches are provided with safety devices to prevent accident from any possible cause.

The two winches on the bridge deck are designed for remote control on account of the fact that it was impossible to arrange winches at this hatch close enough together for operation by pump-levers. The two controllers are mounted in a waterproof control-box which stands right against the hatch combing so that the operator can look down into the hatch while manipulating them.

The powerful deck machinery and cargo booms are a notable feature of this boat and she has been equipped to handle not only the heaviest kind of ore, but also machinery or mine locomotives if necessary. The hatches are also of unusual size. There are four hatches on the main deck and four below on the 'tween decks, the largest ones being 18 by 28 feet and the smaller ones 18 by 24 feet.

One feature that has attracted great attention is the Cunningham electric steering gear. This is a new type of electro-hydraulic gear controlled from the bridge by a duplex ram type of hydraulic telemotor of the McTaggart-Scott design as built by the Allan Cunningham Company, the McTaggart-Scott United States licensees. The steering gear itself is of the geared-spring quadrant type in which a tiller is keyed solidly to the rudder stock and the tiller in turn is fastened to a floating quadrant by means of compression springs. The perimeter of the quadrant is fitted with gear-teeth which are fastened to it in blocks of five teeth to the block. The gear quadrant meshes with the driving pinion of the steering engine which in turn is driven through worm-gearing by a 15-horsepower General Electric motor through a Waterbury hydraulic variable speed gear. The motor is controlled by a contactor type controller with automatic re-starting device and numerous other safety devices which prevent damage to the steering gear and insure its immediate return to normal operating conditions in event of temporary interruption of the current or abnormal variations in voltage. The steering gear is extremely silent in operation as well as being unusually efficient and its remarkable performance on the trial trip of the vessel excited very favorable comment from the numerous engineers and marine men present.

The vessel is also provided with a Cunningham towing chock and foundations have been provided for an electric towing machine which will be installed later.

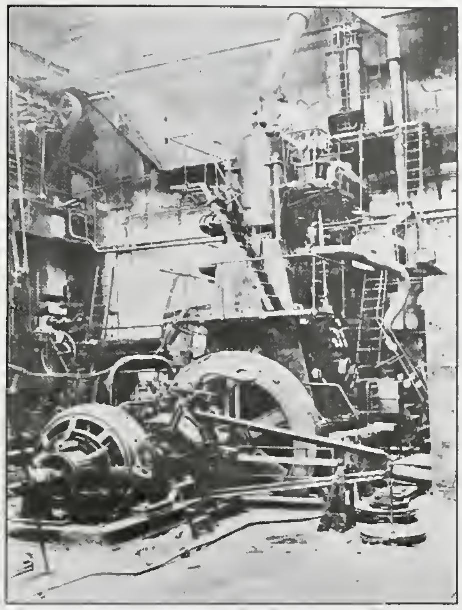
MOTOR SHIPBUILDING IN EUROPE

Exclusive Correspondence Pacific Marine Review

THE recent coal strike in the United Kingdom has served as another object lesson of the value of motorships and it is clear that these periodical upheavals in the coal industry are causing shipowners to turn greater attention to the possibilities of internal combustion engined vessels. While steam driven ships were being held up at ports owing to difficulties in getting coal during the strike, motorships were able to proceed on their way without any delay. It is of course customary for all motor vessels trading from Europe to take on their oil supplies at some distant port close to the oil fields so that there is never any need for them to bunker at the home port.

In the majority of cases, and particularly with ships trading between Europe and the western coast of America, enough oil is taken on for the round voyage and in addition several hundred tons are frequently sold at the European ports, at high prices. It is stated that certain vessels, notably those belonging to the Johnson Line, are able to make sufficient profit on the oil sold in Scandinavia to pay for the total amount used on the outward and homeward journey of the ship itself.

At the present time no ships are being ordered in British shipyards, but a good many inquiries are being sent out and in almost every case it is noted that shipowners ask for alternative quotations for Diesel and steam machinery. As soon as the slump is over and orders once more come in there is scarcely any question that more than half of them will be for motor vessels, especially in view of the fact that owing to the improvements in work organization that have recently been carried out some Diesel engine manufacturers are now able to quote prices for Diesel machinery practically equivalent to those charged for double reduction geared turbines. The original objection to the motorship therefore, that the cost of the machinery was too high, has now almost entirely disappeared, although this does not apply to those firms who are now building their first sets. The cost of Diesel engines can only be brought down by a very extensive system of standardization, but in works such as Harland & Wolff's, where there are facilities for manufacturing about twenty 3000-horsepower engines annually, the cost has been brought down to a relatively low figure.

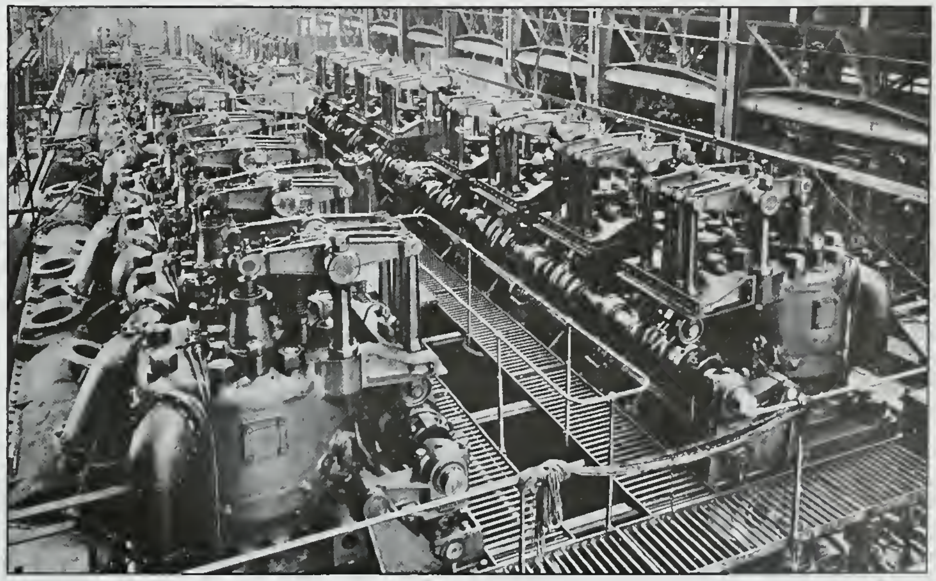


The experimental 350 H. P. Still-Diesel engine in Scott's Works at Glasgow. A 6-cylinder engine of this type developing 2100 B. H. P. is being built.

Record Diesel Engine Output

Had it not been for the slump the output of Diesel engines at Harland & Wolff's yard in Glasgow for 1921 would probably have been higher than that of any engine builder on the Clyde, whether steam or oil. When it is remembered that the Clyde has always been notable for large steam engine output it will be realized what a tremendous advance is now being made in oil engine construction. The work organization in the Harland & Wolff factory has improved to such an extent that a couple of 3200 i. h. p. standard sets can be completed in seven weeks from the laying of the bedplate.

The idea of the motor passenger liner is gradually gaining ground and two or three more vessels of this class are now under construction but have not yet been recorded. One of the most interesting is for the Elder Dempster Line to trade between Liverpool and the west coast of Africa. It will be remembered that this firm purchased the motorship Glenapp some time ago and are now having her converted to a mixed cargo and passenger ship with accommodation for two or three hundred passengers. In addition, they decided to build a completely new motor passenger liner on which considerable headway is now being made at Harland & Wolff's yard at Greenock. In order to fall in with Harland & Wolff's idea of standardization, the dimensions of this ship are exactly similar to those of the standard 14,000-ton cargo motorships built for the Glen Line, but instead of accommodation only for twelve passengers being provided there will be the necessary cabins and saloons for 300 or 400 passengers, first, second and third class. The length of this boat will be 502 feet, the beam about 60 feet, and when equipped with twin screw machinery of 6400 i. h. p., a speed of about 14½ knots will be attained. This ship will undoubtedly be one of the finest passenger liners afloat, but owing to the joiners' strike, which still continues, and to the general depression, it is not likely that she will be completed before the beginning of 1922.



View in the erecting shop of the North British Diesel Engine Works showing a number of twin sets for Diesel passenger liners

Another motor passenger vessel identical in size with that for the Elder Dempster Line is almost ready for launching at the same yard. This is for the Holland-America Line and will be the first motorship to be constructed for that firm. It is something to the credit of British shipbuilders that these prominent Dutch shipowners should have come to Scotland for their first motorship in spite of the fact that Diesel engine construction has reached an advanced stage of construction in Holland. Altogether out of seven ships on the slips at Harland & Wolff's Greenock yard no fewer than six are motor vessels, while in addition four motorships that have already been launched from this yard are fitting out. Besides these ten craft, motorships are being constructed at other shipyards owned or controlled by Harland & Wolff, who have easily taken the most prominent position in the world in motor shipbuilding.

Generally speaking, this firm constructs only two types of motorship, one 425 feet in length, carrying about 10,000 tons of cargo on a speed of 11 knots, and another 502 feet in length, carrying 14,000 tons of cargo at a speed of 14 knots. It will probably surprise most people to learn that these designs and the engines for their installation were decided upon by Lord Pirrie before the war and he arranged for his engine works and shipbuilding yards to be laid out especially for their construction. This accounts for the fact that they can be built comparatively cheaply, and for the rapidity with which they can be turned out. It must be admitted that it needed a man of great courage to adopt a policy such as this some eight or nine years ago, when very few people believed in the possibilities of the internal combustion engined vessel.

A New British Oil Engine

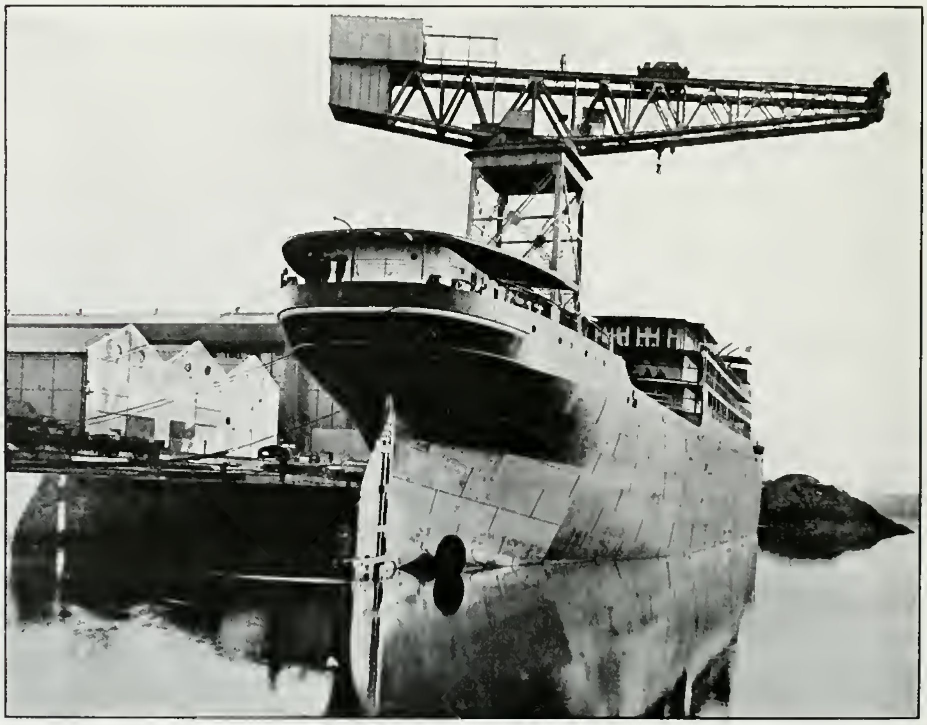
The engines are now being installed in the first motor passenger liner for the British India Steam Navigation Company — namely, the Domala. The motors are of a new type built by the North British Diesel Engine Works, Ltd., at a factory especially equipped for the construction of large marine oil engines. It is not possible at this time to introduce entirely novel features in a new design, at any rate so far as general principle is concerned and the difference between the North British Diesel Engine and the other standard types mainly lies in details. It is a four-cycle machine and develops 2300 i. h. p. in eight cylinders 26½ inches diameter and 47 inches stroke. The cylinder construction is something of a combination between the Werkspoor and Burmeister & Wain designs, the stresses from the cylinder being taken from long vertical tie rods. The cast iron framing is therefore comparatively light and on it is a sort of entablature in which the cylinders are dropped.

The chief novelty lies in the reversing mechanism, which, although similar in principle to the arrangement almost universally adopted with four-cycle motors, is worked out in a very unusual manner. The starting, fuel, exhaust and air inlet valves in each cylinder cover are all actuated from cams on the horizontal camshaft and for each valve there are two side by side cams, one for ahead and one for astern running. This necessitates the camshaft being moved longitudinally when reversing and the novelty in the system lies in the method by means of which the valve levers are taken out of contact with the cams when the camshaft is moved. The whole camshaft is carried in bearings which are themselves fixed in trunnions swinging on fixed pivots. When it is required to reverse, the camshaft is lowered through the action of a Servo motor so that the cams are no longer in contact with the valve levers. The camshaft is then moved fore and aft and finally lifted so that the cams are brought into contact again with the valve levers.

The whole of this movement is effected from one lever operating the air motor and after the cams have been set in their right position the engine is started up on compressed air in the usual way, two levers being fitted, one for each group of four cylinders. The control lever that admits starting air to the cylinders also brings the fuel valves into action as soon as it is started up. No air compressor is fitted to this engine, as the compressed air is supplied from a separately driven machine. The object of this is to allow the maximum shaft horsepower to be developed, but it must be admitted that the arrangement is costly since it needs the installation of two 400-horsepower, six-cylinder Diesel engines, each driving an air compressor. It is somewhat doubtful whether the same arrangement will be employed when experience has been gained with the engine and larger cylinder dimensions become possible.

A 5000-ton Auxiliary Diesel Ship

There was recently launched at Leith an auxiliary motorship named the Kobenhavn constructed for the East Asiatic Company, which represents a new development in auxiliary trading vessels and should be of interest to shipowners on the Pacific Coast. She is one of the largest ships of this class that has ever been built, having a cargo capacity of no less than 5000 tons, and, although it is her main purpose to serve as a trading ship, nevertheless



The motor passenger liner Domala at the outfitting wharf. This vessel will carry 150 passengers and 10,500 tons of cargo in the service of the British India Steam Navigation Company she will be used very largely by the East Asiatic Company for giving their future officers training both in engineering and navigation and particularly in the operation of Diesel machinery to which the East Asiatic Company has now pinned its faith.

The Kobenhavn is a five-masted schooner, 390 feet in length over-all, while the beam is 49 feet. An exceptionally large sail area has been provided so as to give the ship a good sailing speed. The engine to be installed is a 600 i. h. p. Burmeister & Wain set constructed at Copenhagen, and this is used to give the embryo engineers some insight into the operation of internal combustion engines. One of the difficulties which motor shipowners experience at the present time is in obtaining satisfactory engineers for their ships and usually it is necessary to give them a somewhat long and expensive training in the Diesel engine builders' works before they can take charge of a motorship. The East Asiatic Company hopes that by training their men on this auxiliary that they will overcome the trouble that has previously been encountered.

The Still Cycle Engine

Some time ago it was announced that the well-known Clyde shipbuilders, Scotts Shipbuilding & Engineering Company, had acquired a license for the construction of the Still combined steam and oil engine. The experimental cylinder which they have constructed has been running in their works for some time and has, according to the builders, proved what they set out to demonstrate, so that they will now manufacture it on a commercial scale, building six-cylinder engines of the same type as the single-cylinder experimental set. This engine, which has a diameter of 22 inches and a stroke of 36 inches, develops 350 b. h. p. at 120 r. p. m., and the standard six-cylinder engine will be rated at 2100 horsepower. The motor operates on the now well-known Still principle, the cooling water being maintained at a high temperature (over 300 degrees Centigrade) and circulating around a boiler where steam is given off. This steam is used on the under side of the piston and adds power to the cylinder, so that a given size cylinder will develop about 20 per cent more power than an ordinary Diesel set. The exhaust gases are used to gain additional heat in the feed water and it is claimed that in this way all heat losses are reduced to a minimum and thermal efficiency approaching 50 per cent is obtained. The Still engine operates as an internal combustion motor on the two-cycle principle, and moreover has solid injection, fuel being supplied to the cylinder through an automatic valve at a pressure of approximately 6000 pounds per square inch. Scavenging air is delivered to the engine from a separately driven electric turbo blower and an important novelty is introduced in the operation of the steam inlet and exhaust valves on the under side of the cylinder by oil pressure instead of by slide valves or in any other similar system. The result is a considerable degree of simplification. Maneuvering and reversing are carried out solely on steam and the internal combustion cylinder does not come into operation until a certain speed has been reached under pressure. The working pressure of the steam is generally under 100 pounds per square inch, and it is first supplied to a high-pressure cylinder driving a separate crank on the crankshaft. From there it passes to the under side of the big cylinder, which thus acts as a low-pressure cylinder. In a six-cylinder engine there would be no separate high-pressure cylinder, as two of the working cylinders would form high pressure and the remaining four, low-pressure cylinders for the reception of the steam. Mr. Still claims that he has attained a fuel consumption of 0.35 pounds per b. h. p. hour with the experimental set, and if this can be maintained it is obviously a good deal better than anything that has yet been achieved by other types of internal combustion motor.

THE DIESEL ENGINE

Its Development, Design and Construction, Particularly as Applied in Marine Propulsion

VI

WORKING cylinders and cylinderheads of Diesel engines are exposed to pressure and temperatures considerably higher than the same parts in steam engines, and for this reason not only the design of these parts but also the selection of the materials used demands very careful attention and much experience. Neither the design nor the material used today in the construction of these parts seems to represent the ultimate solution of the problems involved.

a. Construction.—Of the great variations in the construction of these parts the following five groups represent some of the usual arrangements:

Group 1. Cylinder, cylinder liner and cylinderhead cast in one piece. See Figure 34.

Group 2. Cylinder and liner cast in one piece, cylinderhead separate. See Figure 35.

Group 3. Cylinderhead and liner cast in one piece, cylinder (jacket) separate. See Figure 36.

Group 4. Cylinder, liner and head, each separate. See Figure 37.

Group 5. Engines without cylinderheads, opposed piston types with cylinders and liners cast in one or more parts. See Figure 38 and Figure 39.

The working stresses in these parts are the result of the following conditions:

1. Working pressures.
2. Difference in temperature.
3. Shrinkage.
4. Tensional stresses where no tie rods between top of cylinder and bedplate are used.

Construction according to Group 1 should be considered only for engines of small bore. For larger marine engines this design has only been used by one German firm. Aside from being a very difficult problem for the foundry, this construction seems to be out of question for practical marine purposes on account of inconvenience in overhauling, repair and expensive replacement.

Group 2 avoids some of the difficulties, but with large cylinder dimension the stresses caused from uneven expansion of inner and outer shell—the former being exposed to combustion temperatures, the latter to the cooling water—are very apt to cause trouble.

Group 3 offers many advantages for the foundry and in practice also insures effective cooling around top of liner and valve ports, but it necessitates provision for the removal of pistons from below.

Construction according to Group 4 is no doubt the most commonly used. It makes the replacement of parts less costly and permits removal of pistons from above.

Group 5 avoids the cylinderhead but offers no doubt somewhat increased difficulties in the construction of the longer liner with ports for scavenging and

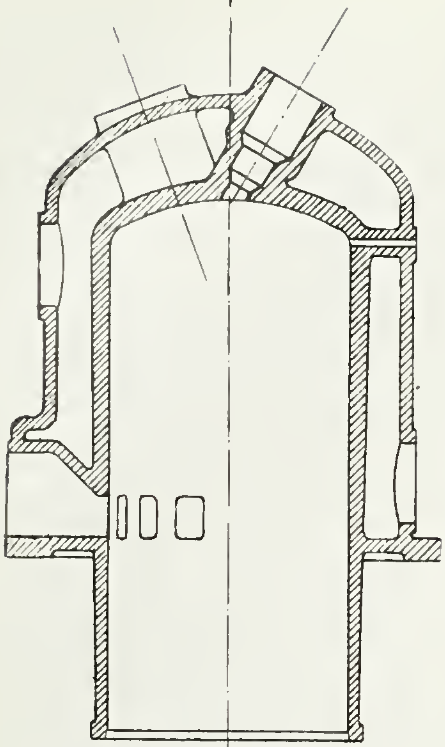


Fig. 34.

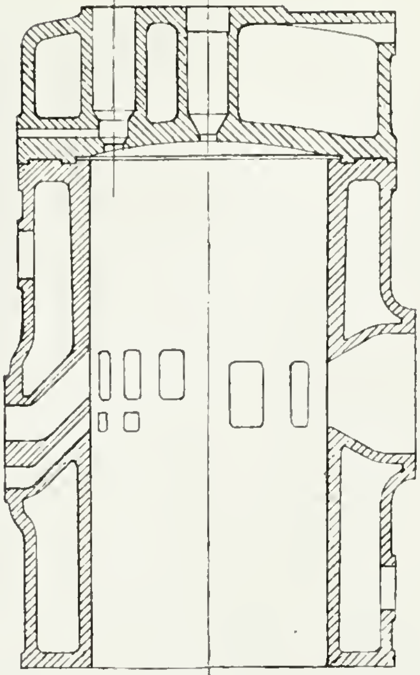


Fig. 35

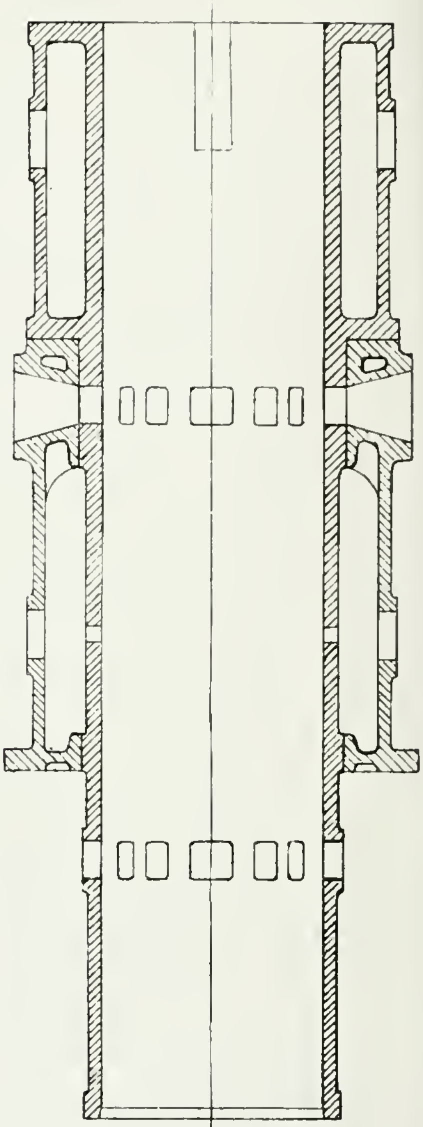


Fig. 38.

exhaust and centrally located fuel and starting valves.

(b) Heat Transmission and Stresses. The failures caused by abnormal heat stresses in cylinders and cylinderheads are the most troublesome experience in marine Diesel practice, and it seems that up to the present there is hardly a design which insures absolute immunity.

High stresses and consequent failures are caused by the high temperature of the cylinder walls due to faulty design, unsuitable material, insufficient cooling, overload conditions, or sudden changes in temperature in the combustion chamber, as, for example, during starting periods.

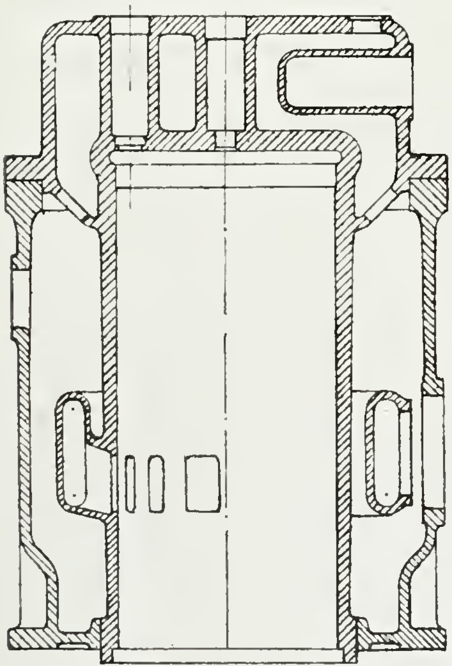


Fig. 36.

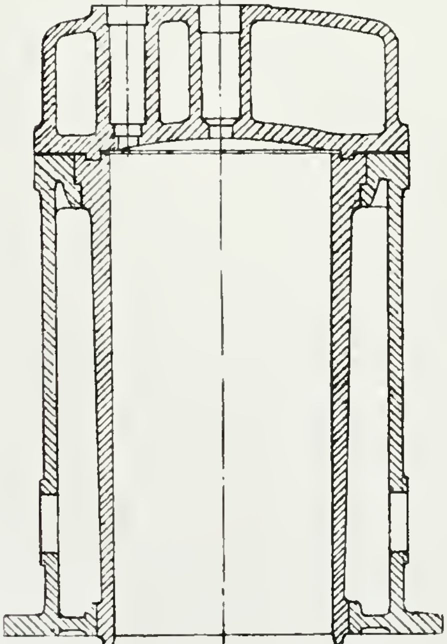


Fig. 37.

It is in the nature of the Diesel process that the side of the cylinderhead forming part of the combustion chamber is exposed to the highest temperatures. For this reason it is up to the designer to provide the most efficient possible cooling of this part, possibly increasing the velocity of the water; also to avoid congestion of material and abrupt changes of wall thickness. There is no doubt that the utmost simplicity of design will give the highest production and insure the utmost reliability. Figure 40 represents unuestionably the simplest of cylinderhead construction with but one central opening for the combined fuel and starting valve cage, and no doubt this design can be considered as safe and reliable as any other part on the engine.

With regard to heat conditions and heat stresses of cylinder walls, it is interesting to note the results of inestigations by Professor Junkers. According to these, an absorption or transmission to the cooling water of 670 B. T. U. per square inch per hour of combustion space surface must be assumed, which means that with a wall thickness of 1-9/16 inches there would be a temperature difference of 360 degrees Fahrenheit between the outside and inside skin of the cast iron wall.

The stresses caused by this difference in temperature combined with the stresses from the maximum possible pressures, which Professor Junkers assumed to be 780 pounds per square inch with a 23.6 inch cylinder bore and a 1-9/16 inch wall thickness, amount, according to his figures, to about 18,500 pounds per square inch. This figure exceeds by far the elastic limit for cast iron; in fact, reaches the breaking point which for this material lies between 17,000 and 21,000 pounds per square inch. For this reason Professor Junkers states in his work on these conditions: "If one considers the high stresses which must exist according to the tests and investigations, there is little to wonder about in the numerous failures; as a matter of fact, they show these failures are only the natural result of the conditions, and it is here that the real problem in the construction of the large Diesel lies."

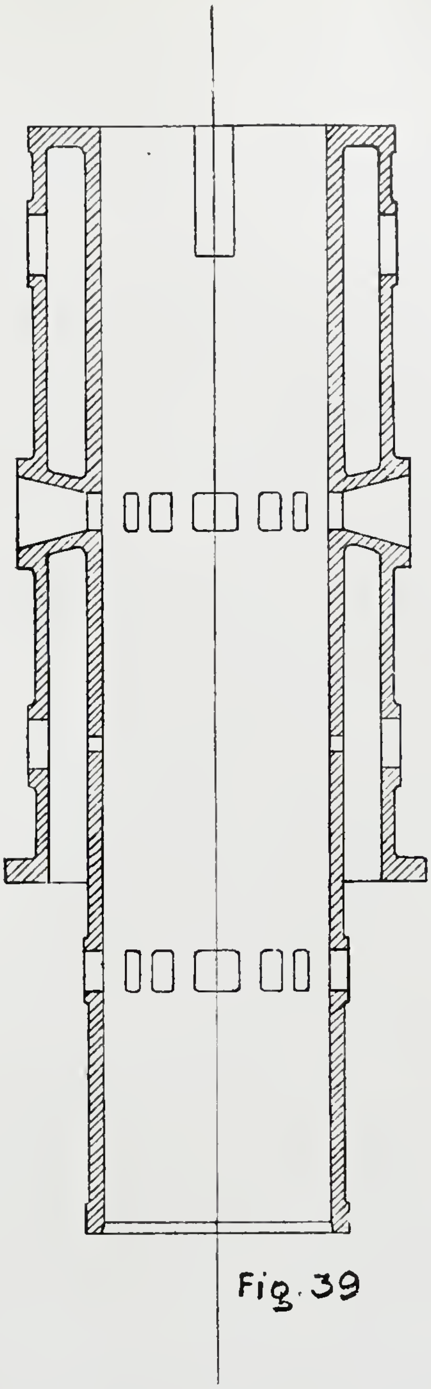


Fig. 39

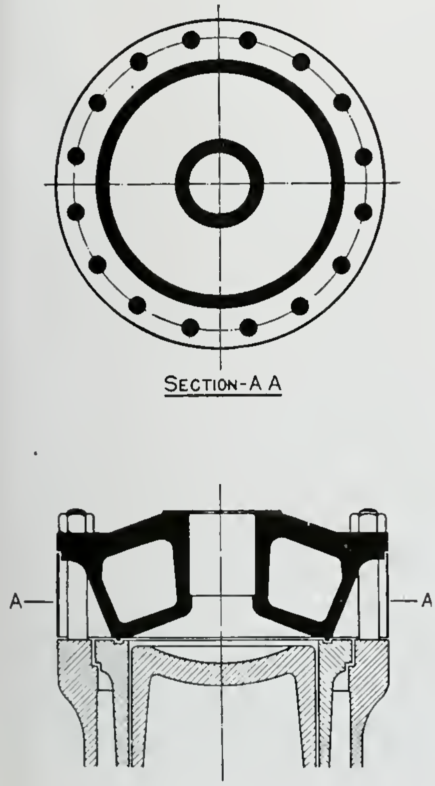


Fig. 40

Besides the high stresses caused by the above conditions, practice has proven that the changes in cylinder temperatures during maneuvering or those caused by sudden variations in load conditions are extremely harmful.

In operating practice doubtless many of the failures are caused by sediment in the cooling water space or also by steam and air pockets, which prevent effective cooling. For this reason great care should be taken in the arrangement of the cooling passages, especially where the type necessitates a complicated cylinderhead design. The passages should allow as far as possible a direct flow without dead corners in order to prevent the above-mentioned sources of trouble. Where increased wall thickness demands more effective cooling, the areas for the water space should be made so as to insure a greater velocity of the cooling medium. But all sudden changes in the direction of the flow and in areas should be carefully avoided, as the resulting changes in velocity and pressure may cause the formation of steam or air pockets.

It is also very important that the operating engineer keep very careful watch that the mean effective pressure under which the engine is to operate is not exceeded in any cylinder. This means that while under way diagrams should be taken from time to time and the output of each cylinder measured and all cylinders made to carry an equal share of the load. Should it become necessary to cut one cylinder out, the engine should not be forced up to normal speed, unless absolutely necessary, as this increases the load and, in consequence, the temperatures of the remaining cylinders.

A tough and closed grained cast iron has proven to be the best suitable material for cylinderheads. All efforts to increase the strength by the use of steel castings have been unsuccesful up to the present. Many tests have been made in order to find the most suitable cast iron mixture. It was found that a special close grained iron with about three percent carbon, of which 2.4 to 2.5 percent is free carbon, is the best to withstand high temperatures and stresses and changes in temperature. But it is absolutely essential that in connection with the use of the proper cast iron the cylinderhead be of suitable design.

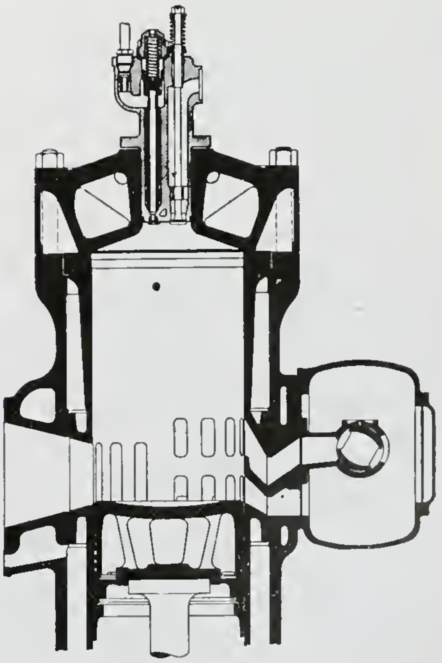


Fig 41

MARINE OIL ENGINES

Some Suggestions for Improvement in Their Operating Appliances

By THEODORE LUCAS

THE full development of the marine steam engine was marked with the perfection of the auxiliary handling arrangements as almost without exception furnished upon the cylinders of such engines. It is through these that the engines are able to start in any position, either ahead or backing, that they can be drained, warmed up and put into or kept in full service condition upon the shortest possible time of notice to the engineer.

If the large internal combustion engine of the Diesel or solid injection type shall prove its superiority in all directions, it must also have operating appliances of such type and form and construction as will insure its immediate response to any demand by the engineer. It is not sure that the period of experimentation to determine what is the best equipment that the cylinders of internal combustion oil engines can receive, is already concluded. It is quite likely, in fact, that many good points will be learned as the rapidly extending experience with these engines at sea will indicate the desirability for additional or modified fixtures to those we are having at the present time. The starting of oil engines is still somewhat difficult and most of the appliances that are fitted at the present time are devoted to the purpose of rapidly gaining an impulse upon any or all of the pistons in the engine with effective crank angles that can turn the propeller. The appliances desirable upon the cylinders of marine oil engines of multicylinder type are:

Compressed air starting valves.

Electric incandescent starting coils and oil spray from main valve gear.

Compression release and safety valve.

These are in addition to the usual oil fuel valve scavenging valves, if any, for two-cycle engines, or the normal admission and exhaust valves for four-cycle engines, and the necessary cooling water inlet and outlet opening as well as drain cocks and cleaning openings.

For operating purposes it is occasionally considered desirable to be able to regulate the flow of the cooling water by special throttling valves. Also it might be advisable, mainly with independent scavenging auxiliaries, to make provision for a regulation of the flow and the pressure of the scavenging air. This is of considerable advantage in two directions and may help in making the operation of the engine more reliable and of a wider range.

If the engine runs under light load and the scavenging air is throttled, less of it will go into the cylinder and more hot exhaust gases will be retained. If then only a small amount of oil corresponding to the air admission is burned and, according to the small power demanded, the cylinder still will retain its heat and avoid the danger of misfires.

This same practice of handling light load and slow speed conditions can be employed with four-cycle engines by throttling the air admission inlet.

The second possibility of advantage in regulating the scavenging air supply lies in speeding up the blower or independent scavenging auxiliary and furnishing more air at a higher pressure for over-load conditions.

The only logical method of overloading a marine oil engine can be in no other way than to increase not only the fuel oil supply, but also to increase correspondingly the supply of combustion air.

By an independent scavenging auxiliary the operating engineer has it in his power to provide the right amount of air and oxygen at the right pressure for light load, full load or over-load, and then regulate the oil injection until he obtains just the proper and most efficient combustion without misfires, back fires, carbonizing or black smoke.

With an independent scavenging blower pressure may be varied from one pound to six pounds gauge pressure and capacities from 40 per cent to 125 per cent giving thus a very wide range of adaptation to the power requirements.

Compressed Air Starting

Starting the main engine by compressed air offers a certain number of difficulties, particularly on account of the fact that it is not advisable to have oil injection at the same time that compressed air enters.

The cylinder at the time of starting is cold and the compressed air for starting purposes is also relatively cold, and there is therefore no element that contributes very much to the heating of the cylinder walls and the head, except the compression of the aircharge. If the compressed air is turned on at the top dead center, the highly compressed air charge will expand into the piping system of the starting air, thus losing pressure and heat that should be employed for the purpose of igniting the oil. If the oil is injected under those conditions it finds no medium hot enough for igniting it, and as a Diesel engine has no other means except the compressed air for the purpose of igniting the oil, it is liable to remain in a fluid or more or less vaporized state. If it goes out now into the exhaust system, there may enter hot combustion products from one of the other cylinders that has already ignited, starting an explosion that may under certain circumstances be quite serious, due to a large amount of oil present in the exhaust system. It may be considered that the compressed air need not go in exactly at top dead center, but only after the normal explosion pressure has expanded to slightly less than the starting air pressure, thus preventing escape into the piping system of the starting air. This offers a safe possibility that the oil will ignite in the normal compressed scavenging air charge provided the engine will produce the full compression pressure of 450 pounds of the normal Diesel engine or at least of such heat and of such pressure as is sufficient to ignite any oil that is sprayed into the clearance space.

It is preferred usually to leave those cylinders that are going to receive starting air charges without any oil injection and turning the remainder to oil only when after several full compressions they are hot enough to make sure of a successful ignition of the oil. Then when a certain number are regularly igniting oil the starting compressed air can be turned off. It is due to these conditions that an engineer has to exert considerable care in the starting of the engines, making under all conditions sure that he has ample compressed air to start with. The usual practice is now to keep the starting pressure just as high as it can conveniently be obtained, usually from the second stage of the main engine air compressor at a pressure from 300 to 350 pounds. It should be pointed out that a cam as usually employed for the air starting gear even on large marine engines, does not very readily lend itself to such employment of the starting air as would be most useful and convenient for the purpose of applying the starting impulses to the pistons of the engine.

Starting air indicator cards very frequently have only a short period of admission and the card in general looks somewhat similar to the main engine oil card. Therefore, after the short impulse under the cam action has ceased, the expansion of the air is the only force that drives the piston further down for the rest of the stroke. It deserves to be pointed out that an indicator card like a steam engine card with a long cut-off would be very desirable for the purpose because it would then apply the impulse not only at the beginning of the stroke where the crank angles are unfavorable, relatively speaking, but also during the middle period of the stroke when the crank angle is very favorable for the purpose of accelerating the moving parts of the engine. It would be purely a question of design in the driving valve gear to realize such conditions and it would then be quite possible to employ air of lower pressure than is required at the present time and still realize a mean effective pressure at very much more favorable angles of the cranks. The marine oil engine has altogether copied too much of the stationary type of oil engines with their cam gears and it is not amiss to point out that a large amount of benefit can be realized from imitation of the excellent valve gears that for the last sixty to eighty years have been so very successful on marine steam engines. While perhaps the link gears of the Stephenson type are not so well suited for the internal combustion engine, at least the Marshall gear, the Joy gear and the Fink gear are extremely suitable for application to internal combustion engines and most of all to the starting gears where with the greatest of advantage we could imitate steam conditions with long cut-offs and relatively low initial pressure. The analogy between steam and compressed air is practically complete, purely the range of heat being at variance.

Compressed air starting appliances are usually fitted in one or the other of two forms. One may be a cam and push-rod drive to a valve directly upon the engine and operated from the crank shaft. This is a frequent form that has all the advantages of durability of construction and of a direct drive without interposition of any complicated valves or parts. It is generally preferred for large engines and is considered the most reliable for sea-going service.

In some forms of marine engines an indirect drive has been employed which allows a contraction of the size of the gear by using a pneumatic transmission which leads from a little valve box below, operated from the shaft, by a small pneumatic pipe from each unit up to a corresponding unit on each cylinder. This in turn by a servo piston opens a relatively large valve that allows full admission opening for the starting air from the main line to enter the cylinder and exert its force upon the piston. This latter arrangement is convenient in so far that it does not obstruct the side of the engine very much. The pipes that lead from below to above are relatively small and can be easily fitted. The drawback is that a large number of valves and pipes have to be kept tight and that they not always will stay so under the normal service of marine conditions. Upon leakage, the air consumption may be excessive or may be unreliable in giving variable impulses to different cylinders, factors that are avoided in the direct drive of the first type.

Electric Starting

One of the disadvantages of the oil engine in the marine service is found in the fact that starting is more or less difficult or slow. An outside agent, usually compressed air, is needed for this purpose, and it is not always easy to get the engines started promptly. Aside from this there is the possible loss of the air pressure and then the engine is helpless to start through its own means.

For this reason considerable experimenting has been done in the direction of getting a starting device by electric means, and three different systems of electric ignition have been proposed:

1. High tension spark plug.
2. Low tension make and break plug.
3. Incandescent coil.

The first two have been tried upon gasoline engines with success and have been in use for a great many years. They are, however, not suitable for marine oil engines or any kind of engine which uses a liquid fuel directly injected into the cylinder. They must always have a medium which is already in either gas or vapor form, like the gasoline vapors which are sucked up by the air passing through the carburetor. It is only with such evenly distributed and readily inflammable fuels that these first two ignition systems are at all useful.

Some experiments were made by the writer for the purpose of using the second system for oil engines and bringing about a continuous shower of sparks instead of only a single make and break spark. For this purpose the piston rod of a little pneumatic vibrator, such as is used for all kinds of purposes in foundries, machine shops and bridge works, forms a point that touches and pulls away from the electrode at the bottom of the frame of the vibrator at a rate of probably more than 4000 reciprocations per minute, exactly in the same way as a chipping hammer is used in other places. While the spark produced was quite durable, it was not able, however, to ignite liquid fuel. Even if gasoline was poured on it, it would ignite this only after a certain amount had evaporated, thereby approximating the normal condition of a gasoline engine.

The only system of electric ignition that can be quite serviceable for liquid fuel engines is the incandescent coil system. This incandescent coil is made of a material which has high resistance to heat and electricity and is generally Nichrome wire. Some makers prefer to use a rather light wire less than one-eighth inch, while others find that a heavier wire up to one-quarter inch will stand up better and will prove more of a commercial success. This wire wound into a coil and placed into the clearance space of the cylinder is made incandescent by the discharge of a rather heavy electric current of relatively low voltage which can be derived from a small dynamo or from a storage battery of sufficient size. The arrangement can be very successful if the wire is continually kept glowing and is then splendidly in the position to evaporate and ignite any liquid fuel that touches it.

The writer has seen a small coil of no more than an inch in diameter and of about five coils of three-sixteenths inch wire immediately ignite a charge of sprayed heavy oil of about 22 degrees Baume. This coil ignited the charge in the entire sprayed area of about ten to twelve feet in diameter with a flash producing an immense heat and combustive capacity. It should be stated, however, that the oil was sprayed exceedingly fine under the steady pressure of nearly 4000 pounds per square inch from a hydraulic accumulator. The cylinder fuel oil nozzle was shaped after the example of the mechanical spray nozzles employed for oil burning under marine boilers in the arrangement of oil atomization by centrifugal whirling, with which the writer is identified, and was fully described and illustrated in the April, 1919, number of Pacific Marine Review. For Diesel as well as surface ignition engines an arrangement might prove of value that would enable the operator to spray his oil directly upon this glowing coil and ignite it promptly without regard to heaviness of oil or of heat of compression. A glowing coil in the Diesel engine cylinder would always insure that the oil would ignite and the starting compressed air if supplied would only aid the combustion and therefore the power impulse. Less starting impulses being needed, compressed air for starting purposes might be saved and the engine would be almost immediately available for propulsion purposes. Such an arrangement might overcome the delay and disadvantage that at the present time sometimes confronts the marine oil engine and it might eventually be possible to perfect the system to such a degree that powerful starting could be obtained by squirting a charge of oil directly on to the coils and thereby starting combustion without the assistance of the starting compressed air.

To supply the electrical current conveniently, quickly and abundantly without time limitation, the most reliable arrangement has seemed, at least to the writer, to provide a very small independent oil or gasoline engine direct connected to a very small dynamo, one or two kilowatt capacity. This small independent outfit could generate the necessary current for all the coils, so that they would be in serviceable glowing condition before the engine starts. Upon the first shot of the liquid fuel, therefore, all cylinders should successively receive an explosive impulse. The advantage of this arrangement is that it would hardly be necessary to have any additional electrical apparatus or instruments because the idea would be to keep them all permanently connected and realize thereby substantially the same resistance, the same voltage, and the same amperage as long as the little independent set runs at the same speed. As soon as the engine has generated sufficient heat of compression or of the hot surfaces, the independent outfit could be turned off and the whole thing would be exceedingly small care for the engineer, while offering him a very great convenience and quickness in the operating of the engine.

Also in maneuvering and entering harbors this electric starting gear would be of great advantage because under those conditions the set could be started and the coils could be kept hot all the time without interfering with anything else and the engine would never be in the position that it would be too cold for igniting the oil, as the electric coil with a full glow would be always ready as the pilot flame that would start the ignition of the oil. This would be in many instances a great safeguarding against accidents and remove a great deal of the uncertainty and doubt that engineers and owners of oil engine ships at the present time still have about the reliability of their engines.

Compression Release

Compression release valves have been found of considerable importance and convenience and they are perhaps not as regularly fitted at the present time as it might be desirable to do. One may recall the instance where one of the earlier vessels fitted with internal combustion engines entered New York harbor and under the necessity of reversing got the engines stalled, because a number of cylinders had retained a rather large charge at high compression and thus completely balanced and locked the engines until special means of releasing were employed.

The compression release valve is best employed in the form of a valve which opens inward into the clearance space of the cylinder, opening up a passage to the exhaust pipe or manifold. The valve is operated by a small piston which receives compressed air impulses on the upper side only, from a valve gear which may be either automatic from an engine part or manual from a lever operated by the engineer. The automatic or the manual gear operates small valves which allow a certain amount of compressed air to go to the pistons that operate the valves. A spiral spring under the piston will return the valve to its closed position when the release is effected and equilibrium established. When the handling gear is turned off it will with the proper connection allow the used compressed air to escape through a small vent hole. As there is no limit to the size of the operating piston and of the valve, it is possible to realize a very powerful releasing effect.

It has appeared also that this powerful releasing could in addition be connected so that it would act as a safety valve. Internal combustion engines require a safety valve, but find a great deal of difficulty in providing them in sufficient size to allow sufficiently rapid escape of excess pressure. They are liable to be bulky and unwieldy and difficult of operation under the tremendous springs that are necessary to hold down a valve that opens outward.

The way contemplated combines the compression release with the safety valve by providing through the whole piston rod or valve stem an access to a small pilot valve which, being set at a maximum pressure of, say, 600 pounds per square inch, would lift and then allow the excess pressure from inside of the cylinder to go on the upper side of the air piston and through its excess air force this down and open the release valve, thus allowing an escape to the exhaust pipe or manifold. This arrangement has the advantage that the spring on top of the small pilot valve is very small, as it has to close only a very small valve area, and that the excess pressure itself is the agent which opens the release valve which may be of as large a diameter as it is convenient to fit it in the cylinder.

The pneumatic drive from below to the piston above is convenient and practical for this service because it eliminates the necessity of a great deal of heavy valve gearing. The service is at best rather intermittent and of short duration and the most practical solution seems to be this indirect pneumatic drive from a hand lever at the engineer's platform to above.

Where desired, a small valve box with operation from the crankshaft can easily be installed in addition.

Much careful designing is still to be devoted to appliances for handling and operating marine oil engines. The ready introduction of motorships can be accelerated through winning the confidence and faith of operating engineers and owners by demonstrating the absolute, never-failing reliability of marine oil engines, so that they may be judged just as good as the old steam engine.

SELF INSURANCE AS CONDUCTED BY THE MOORE SHIPBUILDING COMPANY

Accident Prevention, Surgical and Insurance Service Under One Supervision Reduces Accidents and Costs

By W. D. EDWARDS
Manager, Hospital and Safety Department, Moore Shipbuilding Company

THE Workmen's Compensation, Insurance and Safety Act of California places upon the industries of the state the responsibility of caring for and restoring to maximum function all victims of industrial accidents. Where death results from such accidents, provision is made for the financial care of the dependents. Where permanent disability results, the decreased earning power of the victim, due to loss of function, is compensated. In case of temporary disability the loss of wage is partially offset by the weekly compensation. This responsibility upon industry is two-fold to the extent that it requires industry, for its own protection, to utilize every method of preventing accidents, and also to use the most modern medical practice to cure and restore the victims of accidents.

This responsibility is usually delegated to an insurance company, but certain employers, because of their individual size or absence of special hazards difficult to control, find it decidedly to their advantage to assume the liability imposed by the law by becoming self insurers. When this course is adopted the relationship of the employer and employe with the Industrial Accident Commission is maintained by three departments: safety, insurance, and medical. These three departments may be operated separately, or jointly, as policy or conditions make desirable. But in any event, it is the function of the safety department to prevent the occurrence of accidents; of the medical department to restore the victim to physical fitness; and of the insurance department to take care of the compensation features of the case.

The Moore Shipbuilding Company of Oakland, California, has been a self insurer since January 1, 1919. The hospital and safety department administers the work arising out of industrial accidents under the law.

The personnel of the department consists of:

Insurance and Safety

1. Safety engineer and insurance adjuster.
2. Two safety inspectors.
3. One general clerk and stenographer.

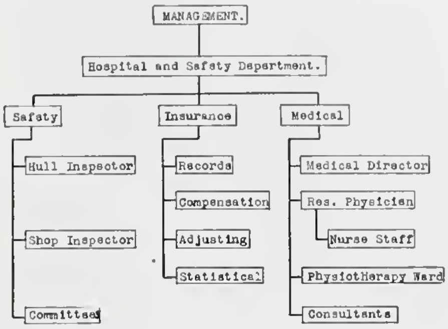


Chart showing the organization of of the hospital and safety department of the Moore Shipbuilding Company.

4. One record clerk.

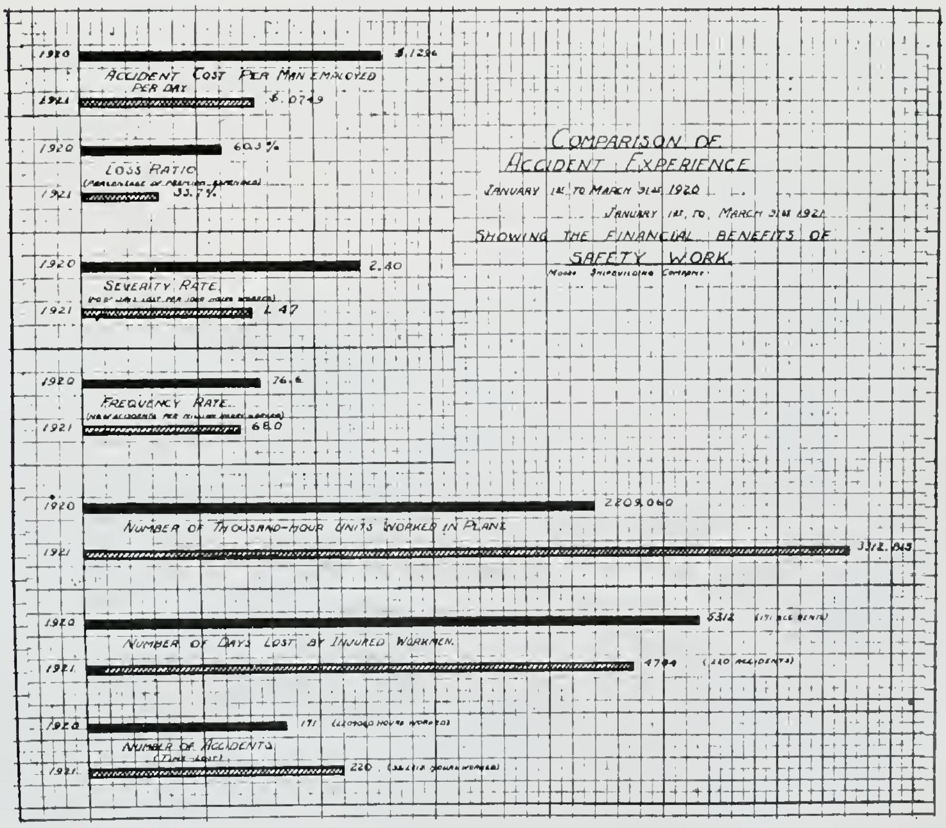
Hospital and Medical

5. One medical director.
6. One resident surgeon (day).
7. One resident surgeon (night).
8. Two registered nurses.
9. One eye specialist (part time).
10. Consulting specialists.

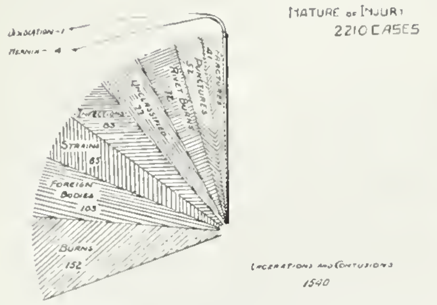
The company maintains a plant hospital where first aid is administered and where ambulatory cases are treated. This treatment includes redressing service and physio-therapy for cases where loss of function is involved. Bed cases are cared for at a local hospital where the company maintains a six-bed ward. The headquarters of the safety and insurance department are in the plant hospital. This affords a direct contact between the accident occurrence and the accident prevention work of the safety department, and the compensation features that interest the insurance department.

Safety Department

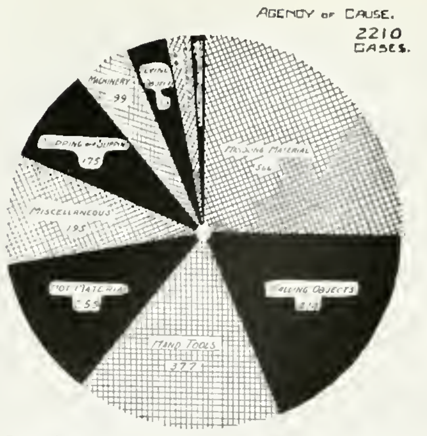
The safety department operates through close inspection of workmen, work places and practices, and is designed to co-operate with and supplement the work of departmental foremen, quartermen and leadingmen. There is a certain amount of educational work carried on by means of committees consisting of men elected by the employes, from their ranks, as workers' representatives. Thus each craft in the yard, by virtue of popular election, has one representative in whom is vested a considerable moral authority by his fellow craftsmen. To this is added a definite responsibility regarding safe practices. Accident records are carefully kept, causes of accidents definitely established,



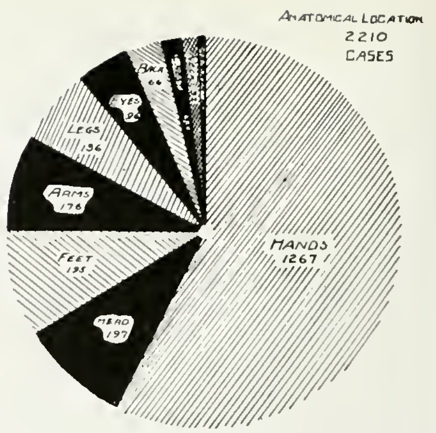
A comparison chart showing the financial benefits of safety work



Graphical analysis of 2210 cases showing the nature of injuries. It will be noted that lacerations and contusions constitute nearly 70 per cent.



Graphical analysis of 2210 cases, showing the agency of cause for accidents. Very noteworthy is the startling fact that machinery is responsible for only 4.5 per cent.



Graphical analysis showing anatomical location of injury. It will be noted that 57.5 per cent of all cases are hand injuries.

and work planning and methods changed if necessary to eliminate the causes. Plant rules are formulated and rigidly enforced, discipline for violation, when apprehended, consisting of layoffs or discharges. The importance of this feature of the work, that of placing the responsibility for accidents, is recognized from the management down. Each accident, whether it causes or might have caused serious injuries, is reported immediately to the general superintendent, who takes such action as the facts warrant.

The engineering revision conducted by the safety department, aside from construction of safeguards, maintenance of standards of ladders, runways, staging, tackle, etc., consists principally of such changes in construction methods as are indicated by analyses. These analyses compare accidents by their causes and severity with the progress of construction. In this manner it is possible to anticipate to 'some extent the class and severity of accidents which usually occur during certain periods of ship construction. This knowledge makes possible definite prevention measures which effectively reduce the anticipated accidents.

A comparison between the first quarters of 1921 and 1920 show the result of the safety department's activities:

	Worked Hours	No. Accidents	Days Lost	Severity Rate	Frequency Rate
January 1 to March 31, 1920	2,208,060	171	5312	2.40	76.6
January 1 to March 31, 1921	3,212,813	220	4744	1.47	68.

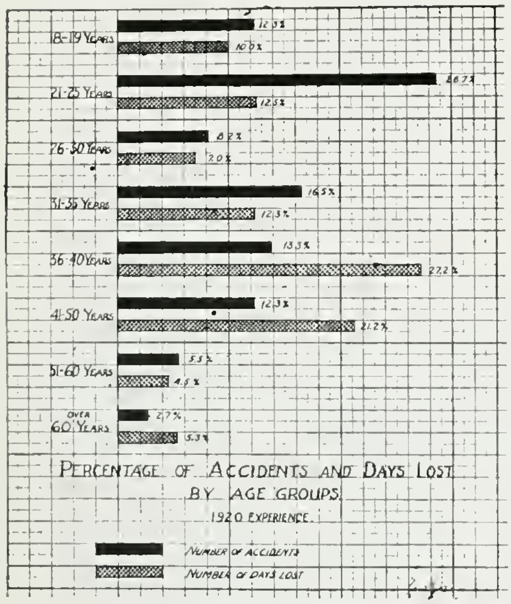
It will be seen that in one year the accident severity rate has been reduced 38.7 per cent, and the frequency rate reduced 16 per cent, in spite of the fact that the exposure had increased 45.5 per cent.

The value of the safety department's work during the past year is demonstrated by the following figures:

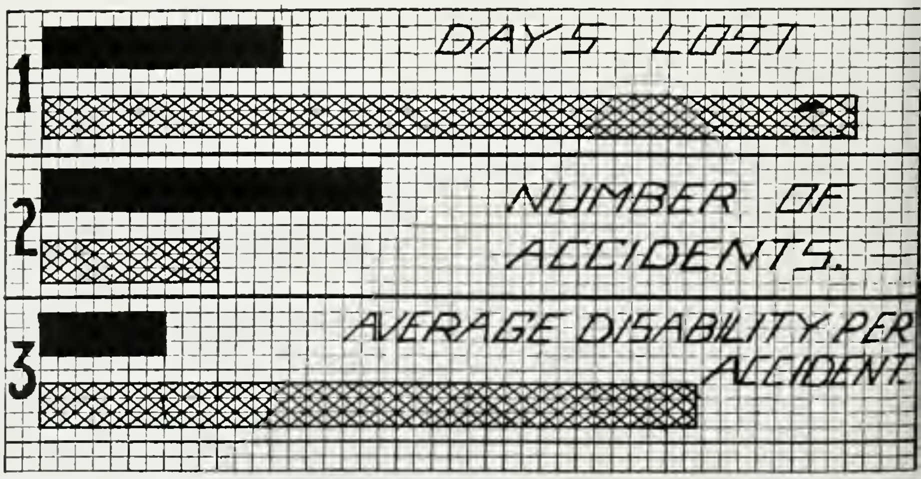
If the 1920 loss ratio, representing safety conditions a year ago, were applied against the 1921 earned premium, which reflects the exposure this year, a figure is obtained which would be the expense of 1921, under the 1920 safety conditions. The difference between this figure and the actual expense for 1921 is $23,732.91. Therefore it is reasonable to assume that organized safety work should be credited with a value of $23,732.91 for the first three months of 1921.

Insurance Department

That the aim of the Moore Shipbuilding Company to conduct its compensation policy fully in accord with the spirit of the Workmen's Compensation, Insurance and Safety Act is being successfully accomplished, is proven by the fact that



A graphical analysis by age groups



Three comparisons showing the experience of groups of men under 35 years of age (in black) and over 35 years of age (shaded) out of 970 compensation cases but 39 have gone to the commission for hearing and adjudication. Among these 39 were 3 in which the only question was the establishment of dependency in the case of fatalities. This means that over 96 per cent of the employes who were injured were satisfied that they had received a square deal.

The insurance department takes a complete record of every case reporting to the plant hospital, whether or not the employe leaves work as a result of the injury. A record is also kept of every redressing and physiotherapy treatment. When a case becomes compensable, a file is started and the history of the case, including all hospital records, X-ray diagnosis, and medical opinions, is placed therein. These files are so kept that the entire cost and progress of any case is instantly discernible.

The financial condition of the insurance department (including all safety and medical costs as well as compensation) is shown in the monthly report to the management. This report lists all expenses in the current month, segregating them into their main cost elements, and further segregating them into charges against current month's accidents and previous month's accidents. The itemized cost to date is shown, compared with the cost to the same date of the previous year. The cost of each accident in compensation and medical expense is estimated to the complete recovery of the patient. The total of these estimated costs, together with current expenses of the department, is compared with the earned premium for the month, based upon minimum insurance rates.

Crediting the insurance department with a premium based upon the minimum insurance rates and charging all expenses for administration, compensation, medical and safety work, the insurance department for the first quarter of 1921 has operated upon a loss ratio of 33.7 per cent, the loss ratio for March, the last month of the quarter, being only 29.1 per cent, which indicates improved safety conditions.

McKenzie reconstruction apparatus for arm, wrist, hand and finger movements at the emergency hospital Moore Shipbuilding Company

Medical Department

The medical department believes that complete restoration of injured workmen is the most economical solution of industrial accident expense. In order to effect complete restoration, the most modern medical practice is observed, as is shown by the fact that in one case, a Colles fracture of the wrist suffered by a man twenty-three years of age, was reduced and the man returned to work in twenty-five days with complete restoration of function. Another case, a man fifty-four years of age, victim of Colles fracture of both wrists, returned to work in sixty-four days with a similar result. In a foot case, showing a line of fracture through the left os calcis (heel bone) the employe was returned to his work as a ship carpenter in seven weeks.

Dressing room emergency hospital Moore Shipbuilding Company

In 1919, with about 10,000 injuries which received first aid treatment, there were 312 cases of infection. Of these 312 cases, only 34 developed where the injury was reported immediately upon its occurrence. The rest had become infected before the injury was reported.

For the treatment of injuries involving loss of function, a physiotherapy department has been equipped with a set of McKenzie functional apparatus, and a complete outfit of heat and electrical appliances. Massage under heat, baking, light baths, violet ray, and electrical treatment are given by a specially trained physiotherapist who devotes her entire time to this work. Men left with loss of movements of the ankles, knees, wrists, elbows and fingers are given restorative exercises with the McKenzie apparatus, which was developed by army surgeons during the war. This physiotherapy is part of the usual treatment of the majority of cases and is prophylactic as well as curative.

The main feature of this company's method is that from the moment an employe is injured he is under the direct treatment of the company's surgeons, and all the features of his case receive prompt personal attention. All of this tends toward the maintenance of a spirit of friendly co-operation between the employes and the employer.

STABILIZING THE SHIPBUILDING INDUSTRY

Some Notes on Efficiency in Pacific Coast Shipyards

II.

By LETSON BALLIET, M. E.

In last month's installment of this very timely article on the stabilizing of the shipbuilding industry Mr. Balliet pointed out the tremendous preventable waste through inefficient or useless mechanical motions. In the present installment he shows the equally, if not more, tremendous waste through inefficient or useless chemical motion, and makes some very excellent suggestions for minimizing or eliminating this leak in shipyard operation.

EVERY fire is performing a chemical action. The oxygen of the air is combining with the fuel. The combustion of fuel oil, coke, coal, wood, gas or gasoline is a chemical action. In the making of acetylene, or separating hydrogen and oxygen in water, case-hardened fires, foundry furnaces, brazing, burning steel, electric welding, gas welding, and even in heating rivets, we have chemical action. If the chemical motion is too much or too little it runs rapidly into the expense account. If the chemical action is not the correct action, **it costs money**, and **big money at that.**

The chemical motions that are lost and that cause losses are so many and so varied that they could not be enumerated within the covers of this magazine, yet they are obscured because the motion is not visible, and little attention is paid to them, except to kick at the cost accountant and operating engineers for the size of the bill. It is a case of "cut and try" to get better results, and let it go at that.

As an illustration of losses, we have all seen a blacksmith cut off the end of a piece of steel because it was "burned," which nets a loss of a pound or two of steel that has been improperly oxidized, due to error in regulating the combustible mixtures of the fire for chemical efficiency. Besides the steel loss, there is the fuel loss, the air loss, the time loss, and the overhead.

In some of the shipyards there was a loss of two or three tons of burnt rivets a day, worth 7 cents a pound, or $560 a day loss when the burnt rivets reached three tons, simply because the chemistry of combustible mixtures was not understood by the engineering staff. It is easier to "pass the buck" and lay the blame upon the rivet heaters or heater boys than to correct the chemistry of the combustible mixture. Of course the manager and the cost accountant cannot discover the chemical inefficiency and the waste is buried in "overhead expense," while the lost time of transportation, heating and hauling off is buried in the "labor" account.

Combustible Mixtures

A fuel is any element or substance that will combine with oxygen and give off heat by the combination. Every element has a definite amount of oxygen that it requires for complete combustion. That amount of oxygen, and no other amount, makes the chemical change of complete combustion.

If too much oxygen is supplied, the excess oxygen is wasted or combines with something else, such as the material being heated, and makes the iron oxide, or scale, or burnt steel if steel is the material being heated. Or perhaps the workman in trying to adjust the fire turns on more fuel, instead of cutting down the oxygen. This is a waste of fuel.

If too little oxygen is supplied, the combustion is not complete, which results in a waste of fuel, that is not all burned.

In ordinary fires the oxygen for combustion comes from the air either in the form of compressed air, fan air, or from natural drafts. The air contains about 21 per cent of oxygen and 79 per cent nitrogen, from which figures the exact amount of air can be determined to furnish oxygen enough for complete combustion. Some heat treatments require intensified flame heat, which can be obtained by "enriched air" or air from which part of the nitrogen has been driven off, leaving the air with greater than 21 per cent of oxygen. Some special conditions even require oxygen as pure as the chemical experts can produce it, and some give the best results when nitrogen-free. But in all cases the chemistry of combustion is the combination of the oxygen with the fuel.

Each fuel, such as oil, gas, coal, wood, etc., requires a different type of combustion chamber. This is due to the variation in time required for the fuel to be converted into **combustible gas mixtures**, to the different **amount** of air (or oxygen) required to make the **combustible mixture** and the **volume** of the expanded gases of combustion, as well as to the physical character of the fuel.

Oil Waste

Fuel oil is the most abused fuel in common use. Any old kind of a box lined with brick is often installed as a "furnace" and used, but "where ignorance is bliss, 'tis folly to be wise," and complete satisfaction is obtained with flames shooting high out of the stack and out of the door, or with clouds of strangling "black smoke" filling the shop.

The fuel bill is high, and the bill is paid, because no one around the place knows better, and the waste goes on. If a workman was filling a barrel with oil, and the barrel was leaking between every stave, any manager would raise h—l, but he allows the workman to squirt the oil into a brick-lined box that is leaking at the stack and at the doors. What is the difference? Simply this, the manager knows how to stop the leak in the case of the barrel and doesn't know how to stop it in the furnace.

Whenever oil is sprayed, blown or atomized, whether by steam or air, hot or cold, the physical properties of the oil are unchanged. Although divided into the finest mist, **it is still oil.** It is not a combustible mixture. Each tiny globule of oil must float out into an atmosphere of air, and travel on and on hunting for oxygen with which to combine. The affinity of the hot oil attracts oxygen out of the air, and the globule grows smaller and smaller until it is all consumed, but the surrounding air is diluted by the products of combustion, which has thus far baffled all attempts to make the air give up all its oxygen. Thus we find that free oxygen exists in all flue gas analyses. We also find carbon monoxide (CO) showing that combustion has not been complete. The analysis that would show no CO at all would of necessity be very high in O. Therefore it is impossible, in industrial practice, to burn fuel oil without an excess of air (oxygen). If the air is supplied, as in common practice, from compressors supplying air for the operation of air tools, the compressed air costs **more**

than the fuel oil, and results in a waste of both oil and power.

Moreover, the fuel oil as now used commercially is not crude oil, but is practically a residue from crude oil, after the gasoline, distillate, kerosene, lubricants, tops, etc., have been distilled off. It is thick and viscous, requiring steaming or heating before it can be pumped and sprayed.

Since the fuel oil cannot be burned without an excess of air, the amount of excess air depends upon the efficiency of the furnace and appliances, and due allowance must be added to the following figures to cover this excess.

If all the oxygen of the air could be combined with the fuel, in complete combustion of the fuel—

One pound of carbon would require the oxygen from 11.52 pounds of air.

One pound of hydrogen would require the oxygen from 34.5 pounds of air.

One pound of sulphur would require the oxygen from 4.25 pounds of air.

Liquid Hydro-Carbon Fuels

The principal elements of fuel oil are carbon, hydrogen and a small per cent of sulphur. As air is composed of 79 per cent nitrogen and 21 per cent oxygen, it is easy to compute the volume of air required to furnish the necessary oxygen for any fuel. The nitrogen has no value, it simply expands rapidly, absorbs heat, occupies space, and does not combine with the oil.

By analysis of the fuel oil, its per cent of C, H and S per pound of oil will determine the chemical requirement of air for complete combustion.

For fuel oil analyzing 86 per cent carbon, 11 per cent hydrogen and .8 per cent sulphur, fifteen pounds of air will furnish the chemical requirements of oxygen for complete combustion of one pound of oil. This computes 186 cubic feet of air per pound of oil, assuming that all the oxygen of the air combines with the fuel.

A commonly used rule around industrial plants is stated as "one pound of air for each 1000 b. t. u. contained in the fuel." Upon this rule a fuel oil showing 18,000 b. t. u. per pound would require eighteen pounds of air or 223 cubic feet, which partially allows for the excess air required in obtaining anywhere near efficient combustion.

Completely combustible mixtures can be made only with gas fuel. However, I refer to those that can be used practically in industries. In the brevity of this article I do not wish to get into the discussion of gun powders, dynamite, T. N. T. and other high explosives, where combustion is nearly complete. I know of attempts to make "gun powder engines" and of the explosion of carbon, with liquid oxygen, but manifestly these subjects are not, in the present state of the industrial arts, pertinent to a discussion of useful chemical action in shipyard practice.

Nevertheless, it is well to state that any completely combustible mixture is explosive, and it is only of very recent date that safe appliances for handling such mixtures have been developed.

Acetylene and gasoline are two very commonly known gases that are highly explosive when mixed with air to give the proper amount of oxygen for combustion. Kerosene will also generate an explosive gas; city gas, hydrogen, carbon monoxide and most any other combination of hydrogen and carbon becomes explosive **if mixed with the right amount of air, or oxygen.**

Carburetion

The carburetor of the automobile engine does nothing but mix air with the gasoline gas, to make it combustible. The gas-mixing machines in use in industrial plants are nothing in the world but carburetors, or partial carburetors. Bunsen burners, or the "air shutter" on the kitchen range, are nothing more than partial carburetors. They simply mix air with the gas to intensify the flame to complete the combustion close to the burner, by supplying part of the air with the gas. It prevents the gas flame extending far out into the air to find the oxygen it needs for combustion. Shut the air off from the gas stove and notice how long the flame is. Open the air shutter and see how much shorter the flame is. It merely requires less air (oxygen) after it leaves the pipe or burner because part of the air has been mixed with gas before it escapes. But if you permit too much air to pass in through the shutter or air port, the stove "strikes back." In other words, you have made a completely combustible mixture inside the pipe leading to the burner and it "explodes." When you shut off a gas stove it often "strikes back" because as you turn the valve you reduce the gas flow without reducing the air and the combustible mixture inside the pipe burns when the pressure to force it out is reduced. Pressure has only one function—to make the flow of combustible gas more rapid than the rate of flame propagation, to prevent the "strike back."

If the burner becomes red hot, or above the temperature of ignition of the gases of a combustible mixture, it will strike back. That is the reason why a red hot burner or torch cannot be lighted without the strike back.

Any gaseous combustible mixture, within any container or mixing chamber, will strike back if mixing chamber becomes heated to or above the temperature of ignition. Every strike back is merely the explosion of the mixed gas. On the other hand, carbon monoxide, hydrogen or other gas can be heated inside a closed retort until the retort is white hot, without burning, exploding or changing its condition; provided there is no oxygen present. Fuel gases are absolutely harmless and none-explosive under their delivered pressures, inside of pipes, so long as they do not become mixed with air or oxygen. If the gas has to escape from the pipe to obtain its oxygen, it merely burns at the point of escape or leaking. It cannot explode in the pipe lines unless the lines are carrying combustible mixtures of gas with air.

Metallurgical Practice

In all heat treatments the action of excesses of oxygen, of the nitrogen content of the air, of the sulphur, carbon or hydrogen, upon the hot metal **must be considered** to form the proper decision as to the right fuel. The cost of the fuel, the reliability of the fuel, the cost of equipment, appliances and operation, abundant supply, ease of handling and standby expense must also be considered.

Fluctuations of pressure feeding the fuel oil or other liquid fuels, fluctuations of the air pressure, and variations in temperature of either the fuel or the air, make accurate control of fuel oil fires difficult. In fact, I know of many cases where work actually stops for several minutes many times a day, while one of the operators adjusts the oil or air valves. The loss of time costs many times what the fuel does, with an attending decrease in production.

In many cases where heating is done by combustion, the cost of preheating the fuel oil, the requirements for compressed air, the cost of operation, far exceed the costs of the more easily handled combustible gas mixtures.

Furthermore, the ability to make and handle with absolute safety the combustible gas mixtures permits the regulating of the combustion into neutral or reducing fires, thus eliminating the damaging effect of the excess oxygen always present in oil fires.

Piped Fuel

There can be no question as to the efficiency of piped fuels, in comparison to those which must be mechanically or manually handled, and gaseous fuels are more cheaply handled and capable of more delicate regulation than liquid or viscous fuels.

The choice of gas fuel is a matter of, first, the required result; second, the availability of abundant supply; and third, price or cost.

It is a common practice in many industrial plants to use acetylene, hydrogen and oxygen gases from cylinders containing the gases in a high state of compression. Except for use in remote places, inaccessible to pipe line deliveries, or where the work is very limited, this practice is expensive.

If the use of these gases is extensive, it is the highest economy for the industry to make its own gases, under competent direction, with pipe line distribution to the working places.

Acetylene generation is common. Generators of many makes are upon the market at very reasonable costs. These generators are of two types, water feed upon carbide, or carbide feed into water. The writer favors the latter method as the most economic, inasmuch as none of the carbide comes in contact with water till it is dropped into the reservoir. In case the carbide feed is stopped, generation stops. All particles of carbide dropped into water come in contact with the water, whereas by the other method the entire charge of carbide may mat itself so that a large part of the carbide in the center may not come in contact with the water, resulting in a waste. The carbide feed generators with semi-competent attendance are perhaps the safer. However, to obtain good dry acetylene gas requires expert attendance. Long distance piping is not economic. The pressure must be less than fifteen pounds, and the pipe line must be properly laid and watched. In many shipyards the portable type of generator will find economical applications, but the stationary type is advisable where the work is heavy and continuous within a few hundred feet of the generator.

Oxygen and hydrogen generation is more complicated, and more expensive installations are required. The distance from the generating plant to the work makes little difference except in the cost of piping, and opportunity for leak losses.

Where the demand for either oxygen or hydrogen exceeds a few thousand feet daily, it is advisable to consider the installation of a generating plant. With the modern safety appliances (without which insurance underwriters, the accident commission and the city electrician would not permit operation) there is no more danger than in the steam plant or air compressor equipment. Some years ago, when the production of oxygen and hydrogen was new, before the safety appliances were brought out, and when plants were operated by inexperienced operators, there were a few accidents, due entirely to ignorance.

Propagandists and skeptics still circulate stories of these early accidents, which deter many industrial plants from attaining higher efficiencies.

The skepticism calls to mind the history of illuminating gas, when it was first introduced in Manchester, England. So skeptical were the people of the new gas that they required all gas pipes to be eight inches from the walls. Today you pipe it into your kitchen, living rooms and bed rooms, and think nothing of it. The mystery is over, and we laugh at the ignorance the people displayed when the gas was new. In a few years, we will be laughing at the ignorance of today.

But the fact remains that if the business of today is to be perpetuated, and expects to compete with those more advanced in efficiencies, the piped gases must be used.

A Concrete Illustration

A striking example of the efficiency of piped gases is called to mind in the repair of an 8000-ton steel freighter which had been aground and was floated with her keel badly bent and back almost broken.

The boat was pulled up on a marine railway drydock after competitive bids had been received for her repair.

The difference between the lowest and the next higher bid was about $20,000, while the lowest bidder guaranteed to have the work done in ten days shorter time. The drydock of the lowest bidder was piped with compressed air, rivet heating mixed gas, oxygen, city gas at fifteen pounds pressure, and acetylene lines so constructed that they could be quickly connected with wharf mains.

The work to be done on a ship with a broken back requires the removal of a section of the boat amidships from bilge to bilge, removal of keel plates, and straightening of floor plates, transverses, etc.

Such a job, which included the removal of 109 shell plates, sixty feet of center keel plates, the boiler seatings, tank tops, etc., required a large amount of work in burning out rivets with the oxygen torch. Later the straightening of bent structural shapes called for much work for the flanging torches. Still later the replacement of new material called for the riveters.

Thirty minutes after the boat came to rest on the marine way, thirty-five torches were cutting out rivets. The reason was that thirty-five men picked up their hose and torch, walked aboard the boat, made their connections to the pipe line gases, and began work. There was no time lost in transportation of cylinders of oxygen, or hydrogen, or acetylene; no cranes required to swing them aboard, no rolling of cylinders around the boat, no waiting for cylinders, no time lost in adjusting regulators, nor in changing from empty to full cylinders; nor was there any labor required for removing the empty cylinders. The gas pressures were held in the pipe lines. When the burners connected their hose they were ready to go, and to keep going till they finished. The same condition permitted the flangers and the riveters to begin work and keep at work. All the rivet heater needed to start his fire was a match. He had no fires to clean, no burnt rivets, no rivets lost in the ashes, no dirt to clean from the decks or plates and delay for coke or oil to be delivered. The net result was that the ship was finished and went to sea eighteen days ahead of the guaranteed time, with its earning capacity eighteen days longer than had been expected.

A prominent official formerly with one of the big Eastern shipyards made the remark, "If that had happened in our yard, we would have been two days hauling cylinders and getting them aboard, and it would have cost us $135 a day to handle cylinders, besides the longer time it would have required." Manifestly this is true, for replacement could not even begin till the removal had been made and the structural shapes straightened.

(To be continued.)

BOOK REVIEWS

Technical Writing. By T. A. Rickard. 178 pages, 5¼ by 8 inches, bound in cloth. Price $1.50 net. John Wiley & Sons, New York.

This is a very excellent treatise on what might be termed the technical art of writing. Its application is very much broader than its own title would indicate. In the introduction and the preliminary chapters of the work the author states his purpose as being that of causing the members of the engineering profession "to sit up and take notice" and to awaken in them "an interest in the proper use of language."

The book is an outgrowth from a set of five lectures delivered before the engineering classes of the University of California. The great bulk of the material contained in the chapters on naturalness, clearness, precision, and the relative pronouns, is applicable to writing in general. The book should prove to be very valuable to engineering students and to all engineers whose professional duties include the rendering of written reports.

Financial Engineering. By O. B. Goldman. 271 pages, 6 by 9 inches, with 54 illustrations. Bound in cloth. Price $3.50 net. John Wiley & Sons, New York.

This book, written primarily for the practicing engineer, furnishes many rules by which may be determined the economic value of types and installations of machinery. A basis is given for rate-fixing units of time and power being translated into the financial units of dollars and cents. The young engineer fresh from the university usually has a very good groundwork of knowledge concerning the mechanical action and limitations of machines and the properties of materials, but is generally sadly lacking in that sort of knowledge which would enable him to translate these engineering factors into financial units.

Financial engineering is the art of producing through technical engineering the largest financial result commensurate with the service in hand. Goldman's book reduces the problems of the financial engineer to a mathematical analysis and works out many practical problems, using this mathematical analysis as a basis.

We are always glad in a book to come across a new word, and we discovered one in "Financial Engineering" which is not in any of the standard dictionaries to which we have access. The word is "vestance" and is defined by the author rather vaguely as being "the equivalent cost of a permanent service." This word is evidently a favorite of Mr. Goldman, as he uses it with great frequency and works out its value with many equations for qualified values of vestance, such as depreciation vestance, operating vestance, total vestance, etc.

Many engineers will find this book an absorbing study.

Electric Welding. By Ethan Viall. 417 pages, 6 by 9 inches. 329 illustrations and 31 tables. Price $4. The McGraw-Hill Book Company, Inc.

This book is the first thoroughly comprehensive treatment of the modern art of electric welding as it is in practical use today in the shops of America. There is a very fine introductory chapter on the history of the electric welding art, two chapters on arc welding equipment, one on the training of arc welders, one especially devoted to carbon-electrode arc welding and cutting, two on arc welding procedure, terms and symbols, and one on examples of arc welding jobs. Then follow two splendid chapters on the physical properties of arc-fused steel and the metallography of arc-fused steel, with special emphasis on microstructure and thermal analysis. The balance of the book is given over to the description of automatic arc welding machines, butt welding machines, spot welding machines, and special applications of welding, such as the welding of tubes by the electric resistance process, the welding of high speed steel in tool manufacture, and electric seam welding. The last chapter has to do with the commercial application of the art of welding and the making of proper rates for electric power supplied to the welder.

Electric welding is rapidly coming into a very prominent place in shop practice, and this book should prove very acceptable to students of the art.

Gas Torch and Thermit Welding. By Ethan Viall. 442 pages, 342 illustrations. The McGraw-Hill Book Company, Inc.

The application of the oxy-acetylene gas torch to metallic welding dates experimentally from 1901. During the twenty years since then the oxy-acetylene flame in welding and cutting has displaced many old processes and is itself used more extensively in many lines of industries than any other single process.

This book is divided into two very definite and distinct parts, the first part occupying 313 pages, being devoted exclusively to the consideration of welding and cutting by the use of the gas torch, and the second part occupying pages 317 to 425, inclusive, and devoted exclusively to welding by the thermit reactions. The treatment of both subjects is very thorough. History, appliances, application, various examples of welding work, and problems arising in their solution are treated exhaustively in both the text and the illustrations. Especially interesting are the chapters having to do with welding jigs and fixtures and welding machines.

A Handbook of Practical Shipbuilding With a Glossary of Terms. By J. D. MacBride. Second Edition, revised and enlarged. 360 pages, 204 illustrations and two folding pates. Price $3 net. D. Van Nostrand Company, New York.

"Practical Shipbuilding" deals primarily with actual shipbuilding—that is, the work on and around the shipways, and for the man working in the shipyard this little book presents a very practical, comprehensive view of hull work in its details and as incorporated in the finished ship.

In his preface to this second edition J. D. MacBride strikes a very happy note in comparing book building with shipbuilding. We will let him tell about it in his own words:

"The first edition has been thoroughly overhauled. No repairs were made, but considerable was done in the way of additional information under some of the former chapters and new material has been added to the form in Chapters XII and XV.

"Shipbuilding is an extensive industry and the more one knows of the immense amount of detail in it, the more one realizes that such is really the case. It is impossible to go into details in a volume of this size, therefore it is the endeavor of the writer to deal only with those everyday things which the men on the shipways should know.

"In building a small book of this kind it is more difficult to know what to leave out than it is to know what to put in it. It is like a 'camouflaged ship,' the viewpoint is different, according to each person who looks at it.

"It is hoped that the voyage of the Second Edition will be as successful as that of the First, which received cordial greetings in many harbors; with that in mind the anchor is weighed and 'departure' is recorded."

The Gyroscopic Compass. By T. W. Chalmers. 165 pages with numerous illustrations. Price $4 net. D. Van Nostrand Company, New York.

This book forms one of the Engineer Series published by the Van Nostrand Company.

T. W. Chalmers, B. Sc., A. M. I., Mech. E., is a member of the editorial staff of The Engineer, and his book originally appeared as a series of articles in The Engineer during January, February and March, 1920.

It analyzes in considerable detail the theory of the gyroscope and its relation to the rotation of the earth and describes the methods used by the three commercial gyroscopic compasses now in use for the dampening of the gyroscopic vibrations. The application of the gyroscope to practical navigation and the elimination of the various errors involved in its use are discussed very thoroughly, and one each of three chapters is devoted to the discussion of the Anschutz gyroscopic compass, the Sperry gyroscopic compass, and the Brown gyroscopic compass.

Notes on Marine Engineering and Naval Architecture. By Engineer Lieutenant Commander V. G. Le Mesurier, R. N. 172 pages with interpolated blank leaves. Price 7s 6d net. James Brown & Son, Glasgow.

This book forms the latest member of the "Science for Sailors" series. It is intended mainly for use at sea by the engine room force in preparing themselves to take higher grades, the object being to give the student a means of drafting his own sketches with both the textbook and the practical application on the ship at hand for his observation. For this purpose blank pages are inserted opposite the notes, and the notes are written in a very simple way, leaving room between them for additions either from the student's own experience or from other material which he may have available.

The book is divided into two parts, one devoted to marine engineering and the other to the simpler problems of naval architecture. Internal combustion engines, fuel economy, and the preservation of boilers are three chapters added to the usual material found in such books on steam engines.

This book would make a very valuable adjunct to the ordinary school courses in the subjects covered and should find a ready sale.

The Colonial Clippers. By Basil Lubbock. 440 pages, 91 illustrations reproduced from valuable and rare oil paintings, lithographs and photographs. Price 15/— net James Brown & Son, Glasgow.

This book is divided into four parts. The first part describes the great wooden clippers of the Black Ball, White Star, Eagle, and other lines, which carried the emigrants from Liverpool to Australia in the time of the Gold Rush, when all the world was taking ship to the Eldorado under the Southern Cross.

Part II deals with the wool and composite wool clipers, trading to Sydney, Melbourne, and South Australia, and also with the clipper barks in the Tasmanian trade—vessels which were contemporaries of, and which, for beauty, speed, and seaworthiness, ranked with the China tea ships in their prime.

Part III gives an account of the magnificent iron sailing ships, which, from the sixties to the end of the nineteenth century, raced out to Australian ports with passengers and general cargo and home again with wool.

Part IV takes us to the New Zealand trade, and the rivalry between the clippers of the Shaw-Savill and the New Zealand Shipping Company. A very worthy sequel to "The China Clippers" by the same author, this volume should prove a treasure trove to lovers of ships and the sea. It is "dedicated to all those who learnt the art of the sea so thoroughly and practiced it so skillfully aboard the Colonial Clippers."

EUROPEAN MARINE NOTES

Special Correspondence Pacific Marine Review

NOTHING seems to help freights in this country just now. A little recent exceptional dullness was put down to the influence of the Easter holidays, but hardly had Easter passed before we had the national coal strike. Not a ton of coal has been mined in this country since the morning of April 1 and freight markets have once more been thrown into the depths of depression. In some directions it is true these unfortunate developments have led to some inquiry for tonnage. A certain quantity of shipping has been wanted to carry American coal to ports which would otherwise have taken supplies from this country and buyers in northern Continental centers appear to have been waiting on further developments in this country before committing themselves to further extensive purchases.

American Coal in British Bottoms

The effect of the stoppage of work in the British collieries has been shown in other directions. The demand for iron ore cargoes in the United Kingdom from Spain practically ceased. Iron and steel works, faced with the possibility of lack of coal, evidently had no use for more iron ore. On the other hand, Continental works which were not in the same unfortunate position have been still wanting supplies of raw material. Consequently there has been an inquiry for vessels to load in Spanish ports for Hamburg, Rotterdam and other northern ports on the Continent. Practically the only inquiry for British steamers on time charter has been in connection with certain large coal contracts which have been secured by American firms. The new low record rate for many years of 6s (say, $1.20) a ton deadweight per month has now been established. For some weeks this year the time charter rate had been maintained at 7s a ton to which it gradually fell from 30s a ton at the beginning of last year. For all vessels except those which stand in the owners' books at a very low valuation, such a rate is considered to offer absolutely no inducement.

Theft of Goods in Transit

In previous references to the magnitude of the pilfering evil, especially in connection with goods sent by sea, attention was called to the fact that underwriters had decided to insert a clause in marine insurance policies limiting claims in respect of theft and pilferage to 75 per cent of the insured value of the goods. This arrangement has now been in force for some little time, but the amount of loss does not grow less. Another trouble was the fact that goods, after being discharged at a foreign port, were sometimes allowed to lie for months in warehouses before being examined; and, if theft was then discovered, it was difficult or impossible to prove whether the loss had occurred during the voyage or afterwards. In order to meet both these points, a further and more drastic clause has now been agreed on by Lloyds and the marine insurance companies. It provides that underwriters will only be liable for 75 per cent of the invoice value of the goods instead of 75 per cent of the insured value. This should quash any attempt to insure goods at more than their invoice value with the object of evading the clause as hitherto in use. The clause also provides that no claim for theft and pilferage will be admitted unless a survey of the goods is made within ten days after arrival at their destination. This meets the second point, and, as far as practicable, insures that the claims will be limited to loss sustained during the period of insurance, namely, the voyage. The hope is entertained that the changes will bring about a reduction in losses, which are now so great as to be a menace to trade.

More Advice to Shipbuilders

Sir Frederick N. Henderson recently spoke of the effects of the war on steamship earnings, shipbuilding and prices of new tonnage, and showed how wars always have a direct influence on trade, stimulating it for a time, with relapses of greater or less severity, according to the nature of the conflict. In the recent war, he says, the rise in wages and prices was much higher than during the Franco-Prussian war and the relapse was likely to be of much greater severity. The war, in some respects, affected the lives of the workers who stayed at home, but mainly by giving them increased prosperity, and we had yet to go through the fire of distress and suffering which was the inevitable result of any international upheaval of this character. Industrially we, as a nation, had been living at a rate we had no right to do. We had lived extravagantly on our capital as though the unprecedented prosperity would go on forever. It was just a repetition of what happened between 1870 and 1873. If we looked at the trade figures of that period we would see that the curve of prosperity when it did reach its peak dropped very suddenly. It continued to drop until about 1880, and to a point much below the normal period before the Franco-Prussian war.

"The curve of prosperity during the last six years," he continues, "has had a much higher peak. It is falling very rapidly now. It seems to me that if left to the chances of economic laws, the curve will drop relatively even faster than in the slump of 1874, and, if unchecked, will lead to terrible suffering and untold misery. It will mean passing through industrial depression worse than at any time preceding 1914 and for a longer period than the spell of years subsequent to 1873.

"The country will avoid getting into the depths of despair as during the industrial crisis of 1874 to 1880 if the lessons of that period are realized in time. The slump can be checked by employers and workmen avoiding the industrial disturbances which proved so disastrous then. In shipbuilding this is the more necessary. In those days we knew nothing of German competition, nor were we menaced from the States, Holland, Italy and Japan. Today if there are going to be industrial upheavals the recovery of our industry may be permanently and disastrously prejudiced.

"The only solution is to reduce all costs to a level which will permit orders already placed to be completed, or even to a level which will encourage shipowners, British or foreign, to place orders for more tonnage and to send their ships for repairs to British yards instead of to the Continent. Employers will need to accept a fall in profits or even an abandonment of profits as in the seventies if workmen will at the same time accept the lesson of the seventies and agree to a fall in wages rather than fight for the shadow of the better times (therefore losing even the lessened substance). Some check must be applied almost immediately to the complete depression which will otherwise swamp the country."

Old Clyde Clipper Overdue

There does not at first sight appear to be much to interest the average man in the news that the Norwegian four-masted bark Svartskog is long overdue, and that 90 guineas per cent are being paid for her reinsurance; but it so happens that she was formerly the Inverness-shire owned by Thomas Law of Glasgow. Built at Port Glasgow nearly thirty years ago, she was one of the 2000-ton "four-posters" which marked the close of the sailing ship era, and for many years ran to the colonies and South America. On one occasion she had to be abandoned by her crew in a tremendous gale off the Falkland Islands, when she appeared not to have the least chance of surviving. But she did, and it was not long before a party of islanders got their boat out to her, set what sail they could, and got her safely into Port Stanley. They then took the very wise precaution of sending for all their available relatives, so that they were ready when the crew tried to take possession of her again. The fight on deck which ensued was reminiscent of the old days of piracy, but the salvors were too strong and managed to retain possession. Later their claim was upheld by the courts.

A new factor has been introduced into the shipping services between Europe and South Africa by the inauguration of a line by the Netherlands South African Steam Navigation Company. This line was established last year primarily to cater for shipments to and from the Continent. It began its operations, as such lines not infrequently do, by quoting lower rates of freight.

In the interest of British merchants some action to meet the new competition was called for on the part of the British lines. They, therefore, agreed that if goods were carried by the Dutch line at rates below those quoted by the British companies, then in respect of similar goods shipped in the British vessels one week before or after the Dutch sailing, the British companies would charge their supporters rates for the same description of goods less by 20s per ton than the Dutch rate. It was believed that by this arrangement the position of British exporters would be adequately safeguarded. At the same time, it had the effect of limiting the losses of the British lines. There have been, and are, many more sailings by the British companies than by the Dutch company. Consequently, if all the rates of the British line were reduced to the level quoted by the Dutch line, their total losses would be far heavier.

The question of government support for the Dutch company is now before the Netherlands Parliament. A bill has been prepared providing for an annual subsidy to the company of f. 1,000,000 per annum for five years. In return for this financial support the company would undertake from the first to provide a service at intervals of about one month with vessels fitted for the carriage of a limited number of passengers, as well as cargo, and gradually to increase both the number of voyages and the accommodation for the passengers. Under the proposed agreement, the line would, within five years from the date of the first voyage, provide twenty-four sailings at intervals of about a fortnight, the service to be maintained by steamers fitted for the carriage of first-class and steerage passengers.

HINTS ON THE CARE OF AUXILIARIES

By SEA FLAME

Sea Flame, a practical chief engineer of many years sea experience, here gives some pertinent suggestions for increasing the efficiency of many of the auxiliaries, both in the engine room and on the deck of the modern steamer. These suggestions are eminently practical and simple kinks which should prove of great interest to all operating engineers.

Much of the mechanical trouble of the modern steamship is due to the improper working of auxiliaries. Of these there are many, and any irregularity in the functioning of one is a cause for disarrangement of others. For instance, a faulty working fuel oil pump will cause fires to fluctuate. This again causes change in pressures, which many times destroys, in all the several units, the "balance" so necessary to an economical operation.

The writer believes that a few hints on these matters will be well received by most marine engineers. All of them know of the troubles, but unfortunately a few seem to have the idea that it is not worth while to bother with small things. These are too often left to a watertender or oiler. And while many of these men have a fair working knowledge, there are many little kinks that can be applied to great advantage. Following are some important ones.

Duplex Pumps

If these machines do not make a full stroke they become highly inefficient. Not only by loss of steam, but a continued running with short stroke will cause uneven wear of rods, cylinders and steam valve faces. Delivery of liquid is also decreased, and altogether operation is unsatisfactory. Care should be taken to keep strokes up to full length.

Shortening of the stroke may be caused by several things. One is too hard a packing of rod glands, either steam or liquid end, or both. Slackness in link pins and connections to valve gear is a common reason. And here it is a good place to say that lack of proper lubrication of these small parts is one great cause of defects. As they never get hot, owing to slight movements, little care is given them, with the result that slackness soon develops. Another cause of "short stroking" is leaky or badly adjusted valves on the steam end. Careful attention should be given these, as the movement is in most cases slight, and minor differences will cause bad working.

Steam and liquid end pistons should also be attended to; not kept too tight or too loose. The liquid end valves should also be made to seat neatly and tightly. A very little attention to these will produce good results.

A properly adjusted pump, with all valves working as they should, can be brought to a standstill by closing down on the liquid end discharge. This closing should be done carefully, especially on heavy pressure pumps, but ordinary practice will show how it should be done. If the pump "creeps" a little with discharge valve shut, it is not of much matter, but no very great movement should be tolerated. No general directions of how the valves, etc., should be set will be given, as it is assumed that the engineer knows how to do this. Stress is laid, however, on the need of doing it. Any undue pounding in a pump should be at once fixed, as this is a presage to trouble in most cases.

Simplex Pumps

Almost identical care of simplex type pumps is advisable. With the simplex type, however, it has been found in several instances that faulty working and undue wear was caused by the steam and liquid cylinders being out of alignment owing to careless installation or changing due to strains of vessel. All simplex pumps of long stroke should have the upper or steam end free to move slightly.

Condensers

Too much attention cannot be given the condensers. The slightest leak means salt in boilers. No amount of "compound" will cure this defect. Eternal vigilance is the price of good operation. The condensate water should be tested often and, in the case of leaks, repairs made at once. The writer has made it a rule to test for salinity by the nitrate of silver process at least twice daily. Also to impress on watch engineers the need of care as to the amount of extra feed water used. Should the amount of fresh water feed lessen, it is almost sure that a leak is somewhere. Many times a leak so slight that it will not be noticed by tasting the condensate will build up feed in boilers. The ordinary old-fashioned method of testing by salinometer is not delicate enough for modern high pressures and rapid evaporations. There are several admirable methods on the market to make tests, but the electric is perhaps the most reliable, as attention is at once directed to a leak by this method.

Condensers should also be regularly looked to at the tube sheets to see that all ends are clear of particles of seaweed, etc., which will choke up proper flow of circulating water. When a ship is very light, with the condenser for the most part above the water line, the circulating pump should be kept running as the main injection is closed, so that all water spaces will be left full, thus keeping tube end packing from drying out. This can also be attended to by putting on the ballast pump after a shut down. Care in this matter will save trouble. Never allow evaporators to discharge vapor direct to condenser. This is dangerous, as salt is almost sure to go over, especially if the watch engineer does not exercise most careful attention. Work the vapor through the distiller.

Dynamos

These units must be carefully groomed if good work is to be expected. Absolute cleanliness is vitally necessary. The adjustment of brushes should be checked up regularly, especially when putting a machine into service that has been idle for a few days. It has been found that the brush holders of idle machines become disarranged more often than those in service. This is done by wipers in cleaning up. All dust around commutators should be wiped or blown off regularly. And, above all, do not paint the holders or attachments. All nuts and washers should be kept clean but not painted. The motive power of dynamos, whether turbine or reciprocating, should be carefully handled. Governor gear should be attended to. See that all links and pins are kept oiled well; that they move readily; and above all, as before written of the commutators, paint should be kept off governor gear. It is a bad practice, but one, unfortunately, often indulged in. If the metal is scraped clear of all dirt and paint, and kept well oiled, little trouble will be had with faulty regulation of speeds. It should be made a rule that when a dynamo is closed down that it be at once wiped down. Before starting up a good look over should be given it to see that all is in shape for operation.

Refrigeration Machines

No general advice as to operation is needed, as it is presumed the engineer knows the fundamental principles of the different types. However, on ammonia machines it is very desirable to attend carefully to pressures of gas. It is bad to allow these pressures to fluctuate to any great degree, unless changes are gradual. If this matter is looked after, the system kept clear of air, and all small leaks stopped, there is no difficulty in operation. Cleanliness around these machines is as vital as on other auxiliaries. Perfection and economy of operation are arrived at only by attention to details. The above advice applies to all types of these machines.

Steam Traps

These fittings are oftener steam "passers"' than steam traps. Unless the greatest care is given they will either not work at all or will permit a steady flow of steam through. Not from any mechanical defect, as all traps are for the most part well designed, and will, if rightly treated, perform satisfactorily. This trouble is usually owing to the fact that owing to small openings getting plugged with dirt, scale from pipes, etc., the "by-pass" is used for a temporary remedy, and then left that way. If attended to rightly, a steam trap is a great fuel saver. Nothing is needed to make them this way except the exercise of ordinary horse sense and some little mechanical skill.

Bilge Strainers

These should be kept clean, and periodically looked to. When wanted badly with water in the bilges rising, it is a bad time to find them choked and unworkable. One of the most common troubles with bilge suction strainers is that of a leak at the cover joint. The writer has known of an assistant engineer putting in nearly a whole watch trying to get the pumps to take, when the whole trouble was an air leak at the strainer. Holes in strainer baskets will invariably cause a fouling of pump valves, so see to it that baskets are in good order. Then, too, it pays to be careful in keeping the bilges clear of rags and dirt. Prevention of trouble is the best way to avoid it.

Water-Tight Doors

These very necessary adjuncts to the job are often left neglected. Operating gear and screws are covered with paint, and the function of the door is spoiled by reason of its being inoperative when needed. It is a good plan to open and close these doors at least once a month.

Overboard Discharges

Circulating and other pump discharges are very often left open when pumps are closed down. Time may be when it is necessary to close them, and then they are found to be set, and quick action impossible. The writer well remembers an instance where an overboard circulator discharge was so firmly set that nearly a whole day in dry dock was required to clear it. Especially do those discharges well above the water line become neglected. It is when the ship is deep that the necessity to operate them arises, and they should be at all times ready. Big expense might be saved by attention to this seemingly trifling detail. Insurance records show that at least two sinkings of vessels at wharves were caused from failure to close overboard discharge valves.

Deck Machinery

These units should be looked to when steamer is at sea. If properly cared for, the chances of delay owing to failure are reduced. A good habit is to have them well gone over as soon as possible after ship has left port. The piston rods, valve stems, throttle valve stems, etc., well doped with a heavy oil. All bearings oiled; guide bars oiled. At least once a week all deck machinery should be turned over—not by steam, but by hand. A 36-inch Stilson used on the crankshaft is a good turning instrument, although some makers provide barring holes in the crank disks. Brake and reversing gear should be operated, and all parts oiled. This job of keeping winches ready can be done in a couple of hours on the average freight steamer, and is time well spent. Winches should also be gone over after a heavy blow, where salt water has washed over them. If well oiled before the storm, they will not be injured much by the weather, especially if not long neglected. As the engineer is the one to keep these machines in order, he will find a stitch in time saves nine, on hoists as well as on clothing. Also remember that failure of the winches when cargo is being worked not only takes the time of the men doing repairs, but as a rule stops the work of a few dozen stevedores, whose pay goes on while repairs are being made. These are the things which make operation of steamers costly.

Reducing Valves

These units are often neglected to such an extent that they defeat the very object for which they were designed. Engineers are advised to familiarize themselves with the several types on the market. The principle involved in all is similar. All are good, though some are simpler and easier of adjustment than others. However, any engineer can easily grasp the "reason why" of the valve, and all that is necessary then is a fair mechanical skill to insure proper and economical operation. Of course it is to be remembered that the small "pilot" valves must be kept tight; that the piston (in those that have them) must work freely; that the springs must be properly adjusted; all ports and steam channels kept clear, and above all, that no undue strains or stresses are put on the body of the valve by reason of attached pipes being out of line. This latter is a common cause of failure. Next is dirt.

The writer once had considerable trouble with reducing valves on a 35-kilowatt turbine driven set. The steam was to be reduced from 275 pounds in line to 200 at unit. Trouble started from the first valve put on. As time was of importance, a complete new one was installed. This held up for a few minutes, and then went wrong. Stripping the valve disclosed no apparent defect, but the valve being of a well-known standard make, it was assumed that a reason for failure existed. A more careful inspection disclosed the fact that the rosin filling of the copper steam line had not been properly cleared, and small particles of this had gotten into the pilot valve steam ports, lodging where it could not be seen. When this was melted out and the pipe line thoroughly cleaned, no more trouble was had. Many times a reducing valve is condemned as "no good" when the exercise of a little patience and common sense would put it into first-class condition.

Control Valves

These are almost identical with reducing valves insofar as regards attention to details and a knowledge of the reason why. An incident proving this may be of interest. In a certain hotel in San Francisco the hydraulic elevator pumps were controlled by a valve which in turn was connected to the accumulator. If pressure in accumulator dropped, more steam would be admitted to pumps, which in turn increased pressure in accumulator. The running of elevators naturally decreased accumulator pressures. These pumps did not work right. Pressure in accumulator would vary from 50 to 70 pounds. The writer was instructed to see what the trouble was. Investigation and overhaul showed that gaskets on line from accumulator to control valve obstructed flow of water. Proper arrangement of these, with a slight overhauling, made the valves work so delicately that a movement of any of the five elevators would immediately be followed by an increased speed of pumps, and the variation of pressures did not exceed one pound, resulting in greater economy as well as better working. While elevators are not generally in use on steamers, the application of detail to a control valve is equally necessary, especially where fuel oil, feed water supply, sanitary water, etc., is controlled by such a valve.

Forced Lubrication of Small Engines

In these units again the lack of attention to minor details is a fruitful source of trouble and expense. A standard electric generator set has a small pressure gauge on the front. Probably not one-half of these gauges show the pressure on the system. As long as the machines run nobody seems to care whether the pressure is shown or not. Result is that many times the machines are seriously injured and much repair expense entailed which could have been avoided if proper attention had been given to the working of the gauge, with assurance that the lubricating oil was flowing. The system of forcing the oil to the bearings, etc., varies in different machines. Some pump the oil to a reservoir, from whence it flows by gravity to points needed. Others again pump the lubrication oil direct. In either case it is imperative to be sure the oil gets there. This can only be done by having all parts perfectly clean; pumps working properly, with gauge glasses or pressure gauges in order, and with sufficient clean oil in base. One important unit should never be overlooked, and that is the relief valve on pumping system. Any imperfection in this will upset all.

Turbine Lubrication

This is a matter requiring most careful attention. If properly arranged it is of the utmost simplicity and little or no trouble. Left to go out of order, any one of the several units is liable to produce failure with resulting tremendous expense. If alarm signals are put into the oil lines they should be tested regularly, so that positive assurance of their action when needed can be had. If left to themselves for any length of time they will stick and fail to give an alarm. The sight flow is, in the writer's opinion, perhaps the best. If it is of proper design and placed where it can readily be seen, the watch engineer will accustom himself to observe it subconsciously, as he will a boiler water glass, or a pressure gauge. However, both sight and aural signals are advisable, as a failure of lubrication for only a few seconds means disaster to high-speed bearings and gears.

Again, cleanliness is of the first importance. Builders for the most part fail to realize this, and have been prone to take chances. Some of them have objected to a more thorough cleaning of lubrication systems on the grounds of a lack of time. Others relegate this work to a gang of men who do not have the slightest idea of the importance of the work. Let it be understood at once that the lubricating oil system should be cleaned mechanically, mentally and morally, and then cleaned all over again. This may sound foolish, but those engineers who have operated turbine installations for any length of time will endorse the idea.

The writer has also found that it is of advantage to entirely renew the lubricating oil after a first run of, say, ten to twenty days. While it may appear to have been cleaned by the purifiers, there seems to be something in it that destroys its best lubricating qualities. Experience has shown that a few hundred dollars in lubricating oil is cheaper than a few thousands in repair bills. The oil need not be wasted, either, for it can be used around deck winches, auxiliaries, pillar blocks, etc., to good advantage.

Once the lubricating system is thoroughly cleaned it requires slight attention other than to see that no water gets into it while operating, and that special care is taken when bearing caps or other openings are off that no dirt enters. The water can easily be kept out by the purifiers. If no solid dirt can get in the system will work well. The wear on journals and teeth of gears will be practically nothing if this most important matter is attended to.

The temperatures of the oil must not be kept too low, either. Experience shows that around 100 degrees Fahrenheit is fine for an average for oil flowing to bearings. This does not injure its qualities, and insures a rapid flow. However, this matter is best settled by the engineer himself. Without any intricate measuring instruments he can easily find out how the oil is working, by dipping the finger into it and "stretching" it between the finger and thumb. If the oil drop elongates slightly it is all right and will give no trouble. If it flattens like water, get busy on it. Either it is too hot, has water in an excess quantity, or the oil is not suited for the work. This "thumb and finger" test is one of the quickest and most reliable when properly carried out. Experience will soon show how it is done.

Another thing to be attended to in turbine installations is the regular turning of the gears, etc., when laid up. While being hand turned the lubricating oil should be freely washed through bearings by a pump, either steam or hand operated. This should be done at least once every week. If vessel is laid up for any considerable time the old oil should be entirely drained from the system and new clean oil put in. This will in a marked way reduce the danger of "pitting" so often noticed on gears and bearings. It is presumed by the writer that there is some trace of acid in the system held by the old oil. This acid may be from the "pickling" of castings of pumps, etc. It may be from working of copper pipes. It may be something that comes from age of oil, but that it does pit is undisputed, and that pitting is arrested by absolutely clean and new oil is also known to be a fact. But it **must** be pure and all **old** oil taken away.

In operation of lubricating coolers it is also very advisable to be sure that the water pressure is lower than the oil pressure. When this is so any leak in cooler will allow oil to go away with the salt water, but will not permit the salt water to get into the oil system. The loss of the oil is something easily replaced, but salt water in the oil means indefinite trouble and difficulty. Of two evils choose the least.

Steering Gear

The good working of these units is often a matter of luck—especially so when they are situated aft, away from the engine room. In many vessels the oiling is left to the deck department. Glands are let leak; valves pass steam, and a great waste results that could with slight attention be avoided. The steering engine is a very vital auxiliary. It should be kept in the best of order. In the very nature of things it is subjected to most severe treatment, as the average deck officer has no conception whatever of mechanical needs. Helms are put "hard over" at the utmost speed, even when it is not necessary, and the ease of operation of steam steering gear in many cases is a cause for carelessness in the amount of helm given. This keeps the steering engine on the jump. And the construction of steam gear precludes any attempt at steam saving by expansion in cylinders.

The writer effected a great saving in one vessel by increasing the lap of the control valve to about one-sixteenth at each end. It was amusing to see the way the helmsman would turn his wheel in the pilot house back and forth with every little swing of the ship. The steering gear, however, did not move at all owing to the slight lap mentioned. The course of the vessel was kept better, and a most noticeable saving in fuel oil resulted.

At its best, steering gear at a considerable distance from the boilers is a very wasteful machine. If owners were to understand this better, it is believed orders would be issued to use greater care in its handling. However, a careful engineer, by looking after small leaks, can help considerably. The several "telemotors" in use need no special explanation, as the builders describe them well. But it is to be always remembered that tightness of valves and joints is of the utmost importance in those types which are hydraulically operated, while in the electrically operated types contact points and connections must be kept clean and tight. Voltage variations to any marked degree will put an electric telemotor out of order quicker than anything else, excepting perhaps flooding with water or careless shorting of a circuit. Still, with patience and a good understanding of the working of these mechanisms, results will come. One thing is obvious, the care and management of these machines should only be entrusted to a man skilled and knowing the "reason why." This is vital if proper operation is to be expected.

An Engineer's Sixth Sense

Sometimes a disarrangement of some auxiliary, or a "hot pin," disrupts the smooth working of the watch in the engine room. When this happens the watch engineer should never forget the other units. The faculty of thinking several things at once is one well to be cultivated. Train the mind so that it will subconsciously know what is going on around you Long practice has so developed that faculty that many engine-room men can tell water level in a gauge glass without apparently looking at it. They do look at it, and they see it, but subconsciously, and any marked difference in working level is at once noted. The same faculties will, if properly enlarged, give one the ability to feel when anything out of the ordinary happens. Should there be a breakdown on the bilge pumping system, with water gaining too fast for comfort, do not fail to keep an eye on the rest of the machines. A glance is sufficient to note operation. Instruct the oiler and water tender to exercise this same trait and thus real engineers will be developed. For all arguments about technical knowledge and mathematical training to the contrary, it is the one who exercises his sixth sense, that of instinctively knowing things, that makes the best man to have the care of moving masses of machinery.

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME
JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON
E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.
FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

MARINE INSURANCE

By CHARLES F. HOWELL Eastern Contributing Editor

Johnson & Higgins

It has been recently announced that, effective January 1, 1921, Messrs. E. A. Hassan, Alexander Field and John A. Bishop were admitted into the partnership of Johnson & Higgins. This advancement comes through long and faithful service with the firm.

Mr. Hassan formerly was associated with the International Mercantile Marine Company in New York, with whom he had considerable experience in marine insurance matters. In May, 1904, he joined Johnson & Higgins in San Francisco and shortly thereafter became manager of the marine brokerage department, which position he has held since.

Mr. Field, prior to joining Johnson & Higgins, was manager of the Los Angeles office of the Board of Fire Underwriters of the Pacific, resigning in the year 1907 to accept the position of manager of the fire department of Johnson & Higgins. He is conceded to be an authority on fire insurance forms, as well as ratings on the Pacific Coast.

Mr. Bishop joined the staff as an average adjuster in 1907 and shortly thereafter became manager of the department. Previous to joining Johnson & Higgins he was engaged in the practice of average adjusting in San Francisco for his own account, and his ability as an average adjuster is recognized throughout the shipping world.

The firm of Johnson & Higgins is the oldest establishment engaged in average adjusting and the insurance brokerage business in the United States, having been founded in New York in the year 1845. It now has offices in all the principal seaports in the United States, as well as many interior points. As broker the firm handles all lines of insurance, with the exception of life.

Prominent Boards Merge

As the result of frequent conferences by committees representing the National Board of Marine Underwriters and the Board of Underwriters of New York, it has been unanimously decided by those organizations to consolidate in the interest of economy and the saving of a duplication of effort. They did very much the same kind of work in the field of losses. The latter organization is a hundred years old, the former less than half that; but the National Board was much the larger of the two. A petition to the Supreme Court for an order accomplishing the consolidation has been drafted and sent in. The new body is to be known as the Board of Underwriters of New York, and its headquarters will be at 44 Beaver Street, the new Kerr Building. The merger will be effective early in June. The first president will probably be Cornelius Eldert, who is president of the Atlantic Mutual Insurance Company; and the first vice president, Harry Bird, of Talbot, Bird & Company, as they were the last presidents of the New York Board and the National Board, respectively. The first directorate is composed of leading underwriters, as follows: Cornelius Eldert, Harry Bird, William H. McGee, Clayton Platt, Hendon Chubb, William R. Hedge, Walter Despard, S. D. McComb, Louis F. Burke, Frank H. Cauty, and Douglas F. Cox.

Syndicate Annual Meeting

Satisfactory progress in all departments was shown by the reports submitted at the recent annual meeting of the American marine insurance syndicates. During the five months' period in which Syndicate A had been functioning, its surveyors made 884 damage surveys, of which 120 were on privately owned vessels. Of the 425 surveys made at New York, no less than 345 were on collision damages in New York harbor. Manager C. R. Page announced that there are 2249 condition surveys on file. For the eight months upon which Syndicates B and C reported, net premiums have been as follows: To B, $749,648.41; to C, $3,580,396.90. There had been 101 losses, distributed as follows: To B, $151,000; to C, $802,945. One of the most interesting announcements of the meeting was that the proposed loss department has been organized, and that Douglas C. Anderson has been placed in charge of it. Mr. Anderson has both experience and ability. He was brought on from California, where he had been connected with Willcox, Peck & Hughes for the past two years. He was born at Plainfield, New Jersey, May 11, 1887; served with the Atlantic Mutual Insurance Company from 1903 to 1919; and has made a fine reputation as a loss expert.

Salvage Association O. K.'ed

The Shipping Board has signed the supplementary agreement with Syndicate A, of the American marine insurance syndicates, and has thus granted the necessary permission to go ahead with the organization of the United States Salvage Association, which is destined to take the place of Syndicate A. An election of officers will be effected soon. The directorate is as follows: To serve until the first annual meeting: Louis F. Burke, William R. Hedge, Douglas F. Cox, and Charles R. Page. To serve until the second annual meeting: Walter Wood Parsons, Edwin C. Jameson, Samuel Bird, Jr., Lawrence J. Brengle. To serve until the third annual meeting: Benjamin Rush, Gomer H. Rees, Hendon Chubb, and William H. McGee. Under the very broad powers allowed the association, it will han-

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING

F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

dle wrecked and damaged shipping property in all parts of the world.

A Great Loss Man Dies

One of the most eminent of American marine loss experts has been removed by the recent death of Bradford Darrach, assistant to the president of the Atlantic Mutual Insurance Company. He stood in the very first ranks of surveyors and appraisers of damaged goods, and his dependable advice will be greatly missed in the councils of men of his profession. Mr. Darrach had been connected with the Atlantic Mutual fifty-five years. He was in his seventy-third year, a native of New York State, and prominent in the club and church life of the city of Elizabeth, New Jersey, where he had long made his home. His character was beyond reproach, and his remarkable devotion to business has set a high mark for the emulation of younger men. No journey was too long nor too unexpected to prevent his promptly taking it, nor was any problem in his line too difficult to prevent his solving it. They are telling of one occasion when he reached home on Christmas morning after several weeks' work in upper New England, and left within an hour or two in response to a telegram urgently requiring his presence in a distant state in the South, where his duties detained him four months. Eastern marine loss men will not soon forget the wise words and splendid example of Bradford Darrach.

Insurance Loss Coverage

A decided novelty in the way of complete coverage has recently been adopted by several leading New York banks, the object being to secure protection against losses on insurance account arising from incomplete coverage in their foreign departments. Shipments to South America and to Europe were especially thus secured against carelessness in effecting adequate insurance protection. As no such policies have ever been written on this side, the insurance had to be effected in London. The amount of the policy in each case was based upon the total volume of acceptances outstanding at the time the policy was written; and the rate was 1½ per cent of the liability. The language of one of these novel contracts was as follows, as respects the scope of the coverage: "Against loss by destruction or damage to goods which is not otherwise recoverable owing to error or omission or lapse of other insurance; any merchandise in which assured might be interested by purchase, discount or acceptance of drafts, or under drafts held pending collection, merchandise underlying loans, merchandise underlying drafts under letters of credit, merchandise consigned to assured or any of its branches or to any representative."

Dividing Theft Responsibility

Action of the first importance has been inaugurated by the American Institute of Marine Underwriters looking to the effecting of a curb upon the wholesale losses from theft, pilferage and short deliveries through the device of placing the liability for such losses upon the shoulders of shippers and shipowners. The proposal of this character that recently originated with English underwriters, and which the London Institute recommended to American underwriters for their co-operation in generally securing, has been modified to meet conditions on this side and unanimously adopted by our institute and passed along to the individual companies for their acceptance or rejection. These clauses are now in the hands of the companies, and it is hoped and believed that they will be generally approved. It is now up to the merchants to improve their methods of packing and shipping; to patronize those steamship lines that are most careful in supervising shipments; and to give adequate and prompt notice of loss. The language of these important clauses is as follows:

Theft and Pilferage

(Open Policy Form)—in consideration of additiona' rates which have been or shall hereafter be agreed upon, it is hereby agreed that this insurance covers the risk of loss by theft and/or pilferage, irrespective of percentage, but subject to the following conditions:

1. Underwriters shall only pay 75 per cent of the shipping value (as hereinafter defined) of any goods lost by the risks above mentioned;

2. The shipping value of the goods, for the purposes of this insurance, is defined as follows:

The prime cost of the goods to the assured by whom or on whose behalf the insurance is effected, including expenses of and incidental to shipment of the goods; prepaid freight, if any, and charges for insurance.

When any element of the shipping value is expressed in a foreign currency it shall, for this purpose, be converted into dollars at the sight rate of exchange current at the time and place of settlement by underwriters.

3. No liability for loss to attach hereunder unless notice of survey has been given to underwriters' agent within ten (10) days of the expiry of risk under the policy; nor unless claim is promptly reported to these assurers at the office or agency where the loss is payable.

4. No loss shall constitute a claim hereunder unless the 75 per cent thereof which would be due from underwriters shall amount to $25 or over.

5. Underwriters shall be entitled to 75 per cent of any amount recovered from carriers

or others in respect of losses covered by this insurance, after deducting expenses of recovery, if any; the amount payable to underwriters not to exceed the amount paid by them in respect of the loss.

6. Notwithstanding that losses are settled on the shipping value, as above defined, the rate of premium agreed upon shall be payable upon the sum insured against marine perils, whether this be more or less than the shipping value.

Theft, Pilferage, Short Delivery and (or) Non-Delivery

(Open Policy Form)—In consideration of additional rates which have been or shall hereafter be agreed upon it is hereby agreed that this insurance covers the risk of loss by theft and (or) pilferage, or by short delivery and (or) non-delivery (as hereinafter defined), irrespective of percentage, but subject to the following conditions:

1. Underwriters shall only pay 75 per cent of the shipping value (as hereinafter defined) of any goods lost by the risks above mentioned.

2. The shipping value of the goods, for the purpose of this insurance, is defined as follows:

The prime cost of the goods to the assured by whom or on whose behalf the insurance is effected, including expenses of and incidental to shipment of the goods; prepaid freight, if any, and charges for insurance.

When any element of the shipping value is expressed in a foreign currency it shall, for this purpose, be converted into dollars at the sight rate of exchange current at time and place of settlement by underwriters.

3. "Short delivery" and "non-delivery," as used herein, shall cover only the unexplained disappearance of goods, and shall not include more delay nor destruction of the goods by causes which would not be covered under other provisions of the policy. Furthermore, short delivery and non-delivery shall only be covered if the liability of the carrier is limited by stipulation in the bill of lading to an amount less than the shipping value of the goods or negatived by statute solely because of the valuable character of the goods.

4. No liability for loss to attach hereunder unless notice of survey has been given to underwriters' agent within ten days of the expiry of risk under the policy, nor unless claim is promptly reported to these assurers at the office or agency where the loss is payable.

5. No loss shall constitute a claim hereunder unless the 75 per cent thereof which would be due from underwriters shall amount to $25 or over.

6. Underwriters shall be entitled to 75 per cent of any amount recovered from carriers or others in respect of losses covered by this insurance after deducting expenses of recovery, if any, the amount payable to underwriters not to exceed the amount paid by them in respect of the loss.

7. Notwithstanding that losses are settled on the shipping value, as above defined, the rate of premium agreed upon shall be payable upon the sum insured against marine perils, whether this be more or less than the shipping value.

The clauses are not obligatory as to specie, bullion, precious stones, securities, evidence of debt, personal effects, pictures, works of art, copper, metals and raw silk. The exclusion of raw silk to be confined to raw silk shipped from the Orient.

New Propeller Rules

The American Bureau of Shipping has formulated new rules for the construction of propellers for vessels in salt-water service that are built to class with that society. When satisfactory compliance has been made with these regulations a notation will be made in the record indicating the type of propeller and the material of which it is made. The material of the propeller blades is to be tested and inspected by a surveyor of the bureau; one set of the prescribed tests shall be made for each blade of built-up propellers and for each of two opposite blades of solid propellers. The material of the studs securing detachable blades to the hub should be of Grade 1 steel or of equally satisfactory material. The use of bronze for all propeller blades is strongly recommended when service conditions do not require other material. The thickness of the blades is prescribed, and this may not be reduced in order to provide clearance for nuts. Detachable blades are to be recessed into the propeller hub; the side clearance should be as small as possible and should be filled with a protective mixture to prevent corrosion and galvanic action. Studs should be fitted tightly into the hub and a shoulder on the same under the flange is recommended. The nuts should have a tight-fitting thread and be secured by stop-screws. The feather should extend nearly the full length of the taper and bear on the propeller hub for its entire length. The exposed steel of the shaft is to be protected from the action of the water by filling all spaces between cap, hub and shaft with tallow or other protective material. Vessels of unlimited class are to carry at least one spare blade for each built-up propeller. All solid propellers and blades of built-up propellers are to be swung clear of the ground, be hammered all over and inspected for surface defects. The finished and assembled propeller is to be inspected by the surveyor. Upon request the surveyors shall witness and certify as to the balancing and pitch of the propeller.

Discontinue Direct Writing

Further signs of the times are emphasized in the retirement from the field of direct marine writing in this country by such strong companies as the Second Russian and the Rossia. They are among those fire companies that were attracted into making this experiment by the immense war insurance profits, but they have recently been finding these new departments more expensive than profitable. Hereafter they will confine themselves to marine reinsurance, so far as that branch of the business is concerned.

Shipowners' Liability

It would seem to be impossible for steamship companies to evade liability for losses due to pilferage by the device of stamping bills of lading "not responsible for loss by pilferage." By the Harter Act water carriers are forbidden to attempt to relieve themselves in their bills of lading from losses occasioned by a failure to properly care for the goods entrusted to them; and theft and pilferage losses arise from lack of just such care.

Marine Insurance Addresses

That marine insurance is a subject of interest to "big business" is a matter of course; but it has been in the spotlight more than usual of late. At the ninth annual meeting of the Chamber of Commerce of the United States, held at Atlantic City, N. J., during the closing days of April, its needs and importance were ably presented by Insurance Commissioner Burton Mansfield of Connecticut, and by S. S. Huebner, insurance expert to the United States Shipping Board. At the Foreign Trade Convention, held at Cleveland during the first week of May, Third Vice-President William D. Winter of the Atlantic Mutual Insurance Company rehearsed some of the problems of the business that stand in need of a fuller solution. By the time these accomplished speakers had finished, it must have been evident to their imposing audiences that marine insurance is a rapidly growing safeguard of our national material good, and that the provincialism of much of the present state legislation ought to be relegated to the Middle Ages and the shackles struck off this vital agent for the extension and protection of our proposed world-wide trade.

Tank Gases Dangerous

Considerable interest is being manifested in a campaign to secure municipal ordinances of sufficient stringency adequately to protect the lives of marine workmen and to insure safety from fire to the invaluable property that surrounds our city waterfronts, the "proximate cause" of such menace being the slip-shod methods now employed for the detection of the presence of poisonous and inflammable gases in recently emptied fuel-tanks of oil-burning vessels. As all marine men know, such gases are very apt to be present in dangerous quantities at such times; and if a workman were to inhale them it would cost him his life; or if he were to strike a spark or drop a heated bit of metal the resultant explosion would imperil adjacent property whose value might easily run into the millions. There is nothing chimerical about this; several such explosions are already a matter of recent history. Repair yards under prudent management employ qualified chemists to make tests after tanks have been emptied to ascertain the presence or absence of such noxious and perilous gases, but streaks of economy are developing and the chemists' salaries are beginning to be looked upon as items that might be reduced by recourse to some cheaper though less effective device, such as the lowering of mice, birds, etc., into the tanks. Should this tendency become general there is no legal refuge for those whose lives or property are endangered. The compensation laws appear to afford no relief to the workmen. It is a matter that is beginning to attract the serious attention of fire underwriters. Such conditions prevail in many of our leading ports, and the need for adequate protection through stringent municipal ordinances is urgent.

The Edmonds Bill

The Edmonds bill to regulate marine insurance in the District of Columbia would widen the field materially, and by serving as a model bill will, it is hoped, cause the different states to enact identical or similar legislation. Under the Edmonds bill insurance written by marine and similar companies (marine, fire-marine and fire insurance companies) would be divided into the following groups: (1) marine insurance, which would cover risks of the following classes: loss or damage to vessels, aircraft, automobiles, cars and other vehicles, wherever situated, and whether complete, in process of or awaiting construction, goods, freight cargoes, merchandise, effects, disbursements, profits, monies, securities, choses in action, evidences of debt including money loaned on bottomry and respondentia bonds, valuable papers, liabilities and liens of every description, (2) risks on property, rents, use and occupancy of property, loss or damage by fire, lightning, tempest, hail, etc.; breakage or leakage of fire prevention apparatus and liability of insured for loss or damage through such cause, on automobiles against loss or damage due to (a) collision, (b) theft, (c) injury to persons or property, (3) against accident, injury or disability resulting from sickness, (4) against the death or disability of another, (5) against property loss from causes other than fire, marine and inland navigation hazards, and against liability of insured for such loss or damage, against personal injury or death from boiler explosions and against losses due to burglary, theft and forgery, (6) against loss through bad debts, (7) against defects in titles (8) against theft, injury, sickness, or death of livestock, and (9) against all other hazards not forbidden by public policy other than (a) life insurance, and (b) fidelity and surety bonding.

Seamen's Compensation

Representative Ogden Mills of New York and Senator Johnson of California have introduced seamen's compensation bills in their houses of Congress, the Mills bill having been introduced April 27. Hearings will begin before the committee on the merchant marine and fisheries June third.

Mr. Mills' bill provides for compensation in a comprehensive manner. Article I is given over to definitions. Compensation proper is taken up in Article II, which provides a fixed scale for specified minor injuries and 66⅔ per cent of the weekly earnings of the seaman for total disability. For death payments are to be made as follows: to the widow, 35 per cent of the weekly earnings of the husband, plus 15 per cent for each child, the total not to exceed 66⅔ per cent; to children alone, 25 per cent for one and 15 per cent for each additional child, the whole not to exceed 66⅔ per cent; to parents, 25 to 40 per cent conditioned upon dependency; to brothers, sisters, grandparents and grandchildren, wholly dependent, 25 to 40 per cent.

For total disability compensation shall not be more than $25 nor less than $10, unless weekly earnings are less than $15, except that the compensation shall be the full amount of earnings. In case of death weekly earnings shall be considered to have been not more than $37.50 nor less than $15, except that the compensation paid shall not exceed actual earnings.

"Seaman" is defined as "any person employed to serve on board a vessel," stevedores and repairmen excluded; and "vessel" is defined as "every vessel or structure capable of navigating and owned in the United States," men-of-war excluded.

The compensation fund, to be administered by a Federal commission, would be raised as follows:

"Every employer subject to this act shall pay . . . the premium determined and fixed by the commission for the seamen employed by him. . . . The commission shall classify seamen with respect to the degree of hazard in their employment . . . and shall fix the rates of premiums . . . sufficiently high to provide for the payment of compensation . . . and for the maintenance of adequate reserves and surplus. . ." The minimum surplus is fixed at $50,000, but the commission may increase it.

Failure of an employer to comply with the act may result in the imposition of severe penalties, such as the refusal of clearance. Seamen are specifically enjoined from paying the premiums and employers are forbidden to deduct them from wages.

No provision whatever is made for transfer of liability, so that compensation insurance as a means of protection against claims is impossible. The employer must pay the premiums, but Section 204 provides that ". . . the rights and remedies herein granted for injury shall exclude all other rights and remedies . . . against his employer or his vessel on account of such injury." The seaman or his representative may elect to sue any person, etc., other than his employer, however.

Drydock Insurance

An interesting question concerning insurance of a dry dock arose in the trial of the cases of Frank McWilliams, Inc., against Aetna Insurance Company and other companies, which were tried in the Supreme Court of Richmond county, New York, April 13.

The insurance companies issued their policies covering the plaintiff's dry dock No. 3. The policies were of a printed form, commonly used for insurance of vessels engaged in navigating inland waters, but riders were attached to them stating that where the word "vessel" occurred in the policies "drydock" was to be substituted.

The policies contained the following provision among others:

> "And it is understood that no loss is to be paid arising from any negligence in not keeping vessel well pumped out, excepting in case of accident."

The pumps of the pontoon were operated by electric power supplied by the Richmond Light Company. On May 1, 1920, the dock was being lowered to receive a vessel and when it had reached the proper depth, the pumps were put in operation, but in a very short time, through some accident at the power house of the electric light company, the current was put off and in consequence the dry dock sank.

It was held that the sinking of the vessel was due to an "accident," under the provision of the policy referred to, and that the plaintiff was entitled to recover from the insurance company the amount of damage sustained by the sinking of the dry dock.

West Hartland Repairs

The money loss resulting from the collision of the Admiral steamship Governor and the Shipping Board freighter West Hartland, operated by the Admiral Line, in Puget Sound April 1, now exceeds $1,300,000. The Governor insurance, as previously stated, was about $1,250,000. Repairs to the West Hartland will cost $63,250, a contract having been let to the Todd Drydocks, Seattle. The successful bidder was pushed closely by the Albina Engine Works, which bid $65,300. The Heffernan Engine Works bid $76,000, and the Bremerton Navy Yard submitted an estimate of $67,000.

Bremerton had been quite anxious to obtain the work in order to tide itself over the present lean period, but two private companies were considerably below the navy yard.

Work began April 30 and will be completed, under the contract, by June 18, or within fifty days.

Tokio to Increase Capital

Advices from Tokyo state that the Tokio Marine & Fire Insurance Company, the largest of Japan, has decided to increase its capital from yen 15,000,000 to yen 30,000,000. The 300,000 shares of capital stock, par value yen 50 each, will be doubled in number. The dividend for the last business term will be 50 per cent, it is reported, as compared with 40 per cent for the preceding period, net profits being yen 9,116,110, as against yen 8,032,736. The dividend to be paid will aggregate yen 7,500,000; yen 40,000 will go into the depreciation fund of the Tokyo Kaijo building, owned by the company; and the remainder, yen 1,576,110, will be carried forward.

Japanese companies have consented to an extension of the Kamchatkan season, heretofore June 1 to September 1, and will insure vessels from May 15 at the regular rates and from May 1 to May 15 at an increase of 50 sen.

Bills of Lading and Insurance Claims

By Charles H. Williamson,
Manager, Frank B. Hall & Co., Inc.

The old theory that corporations are "soulless creatures" is one that is easily disproved if people who deal with them would take more pains to see that they get in touch with the men who handle the question involved and present their case clearly.

Take the case of claims filed against corporations selling transportation for goods; the average shipper or consignee does not take the trouble to review the bill of lading conditions, which is the contract between him and the carrier, and in many cases does not even know what such conditions mean. "Oh, well, try it on," is the usual attitude, and a claim not only is presented but the documents necessary to prove the loss are missing and the claim agent of the carrier, who is human like the rest of us and who, in most cases, is willing to pay just claims, is placed in a position where he cannot decide on the merits of the claim and a lengthy correspondence results, which ends in the consignee finding out that either the claim is not valid or that, if he had had his papers in order to begin with, his claim could have been paid promptly.

It is perfectly true that the construction of a bill of lading is not an easy matter, particularly in view of recent decisions and acts of Congress; and some steamship lines include limitations in their bills of lading that are of little value as a protection against the cargo claims presented, but certainly shippers or consignees should confer with someone qualified to advise them before presenting their claims.

Most cargo moving by water is protected by marine insurance, which injects another element in the event of loss or damage, as to whether the claim is a "ship's claim" or an insurance claim, or as sometimes happens, is both; that is, the insurance company paying the claim and taking subrogation against the vessel. Here again, the shipper or consignee so often does not know what papers he must have to prove his claim, and the insurance company is blamed for a delay that is due to the ignorance of the shipper or consignee himself.

The proverb "a little knowledge is a dangerous thing" truly applies to the above matters, and considering how easy it is for shippers and consignees to obtain the advice they need, it is all the more surprising that they do not make the effort to do so. There is one clause generally in bills of lading with which consignees and shippers should be familiar and that is the clause specifying the time within which claim or notice of claim should be filed with the carrier—or they will wake up some fine day sadder and wiser men.

PACIFIC MACHINERY

THE NEW STRUCTURAL SHOP AT MARE ISLAND

A RECENT visit to Mare Island by a representative of Pacific Marine Review developed some very interesting facts concerning the new structural shop at that Navy Yard.

This shop is said to be the largest structure of its kind in the United States and is setting a standard for shops for this purpose in all of the large navy yards. It combines under one roof a forge shop, plate shop, and shape shop. It is 700 feet long and 300 feet wide, being divided into three 100-foot bays. It is of steel girder and reinforced concrete construction with the walls so arranged as to give the maximum lighting. In fact, the general appearance of the shop would indicate that fully 90 per cent of the entire wall surface, exclusive of large door openings, is in clear glass.

Each of the three bays is devoted to one particular line of work and is complete in itself for that line.

Shape Shop

The shape shop occupies the 100-foot bay on the east side and is served by one 15-ton overhead electric crane running the entire length of the bay and by four 5-ton and two 3-ton electric wall cranes. This shape shop bay has fitted on its south end a very large area of bending slabs, which are served by two oil angle furnaces, one 40 feet in length and one 80 feet in length, these furnaces being erected outside the building with their ends projecting through the wall and opening onto the bending slabs. In front of the furnaces are two large angle beveling machines, and arranged in order up the length of the bay are a 350-ton hydraulic press, a hydraulic frame bender, and four 75-ton hydraulic presses, together with gate shears, radial drills, and a number of light punches. Then comes the anglesmiths' department with a number of forges, hammers and presses, a number of welding tables and punches, angle shears, drill presses, and straight and joggling rolls.

Plate Shop

In the plate shop bay there are two 15-ton overhead electric traveling cranes running the entire length of the bay, six 5-ton and four 3-ton electric wall cranes. Fitted on the south end of this bay is a 32-foot oil plate furnace and a similar furnace of smaller dimensions opening onto a plate bending slab with a bending machine, and both inside and outside of this shop at the south end is a large space properly arranged for laying off work.

Directly opposite the south entrance, which in all three bays is served by a standard gauge railroad track, there will be erected a steel overhead structure carrying a trolley track at each side, and underneath this structure will be arranged the double end punch and shear machines.

The Mare Island Navy Yard experience has been very much in favor of the handling of plates at shears and punches by overhead trolleys so that the plate is floated, as it were, to the machine, and it is the intention with this overhead structure to work a large number of ball-bearing trolley hoists capable of taking care of all plates that are put through the shop.

On the west side of this bay there are three large single punches and gang drills and plate planers and a large space arranged for the countersinking of the plates on the floor of the shop.

At the north end are situated two large plate rolls. One, in process of installation at the present time by the Southwark-Harris Foundry Company of Philadelphia, is said to be the largest plate bending roll of its kind in the United States, being able to take between the standards a 36-foot plate and have a capacity for plates up to 1½-inch thickness.

In the westerly bay the forge shop is served by one 15-ton and one 80-ton overhead electric traveling crane running the entire length of the bay and by one 5-ton and two 3-ton electric wall cranes. This bay is divided into two sections so that the 15- and 80-ton cranes serving the larger section have a span of 66 feet and the smaller section on the westerly side of the shop, which is served by a 5-ton overhead electric traveling crane, has a width of 34 feet. The larger section takes care of the heavy work and the smaller section the lighter work. The large section houses a United Engineering 2000-ton steam hydraulic forging press served by three furnaces, an 800-ton steam hydraulic forging press served by two furnaces, and it is proposed to install later a 1000-ton steam hydraulic forging press between these two with four additional furnaces.

At the north end there are two annealing furnaces of the car type, one with a chamber 7 feet 3 inches wide, 6 feet high, and 60 feet long, and there is also to be installed a chain testing machine with a capacity of 300,000 pounds. A number of large air hammers are to be installed, ranging in capacity from 3300 to 8000 pounds, and this bay also will have at the south end a large drop forging department, while in the smaller section at the west side there will be twelve steam hammers ranging in capacity from 600 to 2500 pounds, a tool dressing department, and a department fitted with a number of bolt and rivet machines.

The roof is of the box girder type with a large proportion of the side space of the girder indent in glass.

Mold Loft

Above the shape shop is the mold loft, which is the best arranged space for this kind of work that we have ever seen. Here there is an absolutely uninterrupted finished floor 100 feet wide and 700 feet long—not a column or projection of any kind on the entire surface—so that the draftsman or loftsman may here lay out full size, absolutely complete lines for a 700-foot ship. There is to be an office in the center of this floor, but it will be suspended from the roof girders in such a way that the lines on the floor will not be interrupted in any manner.

The ground floor of the entire shop is laid in creosoted wooden blocks on a reinforced concrete foundation. Power for all electrically driven tools and for the electric cranes is carried into the building underground through large concrete conduits in lead sheathed cables with suitably arranged manholes for inspection and repair. The two large overhead cranes in the forge shop are arranged with wall pulpit control so that an operator at the control station has a good, uninterrupted view of the entire shop and can manage every movement of his crane to suit the conditions on the floor.

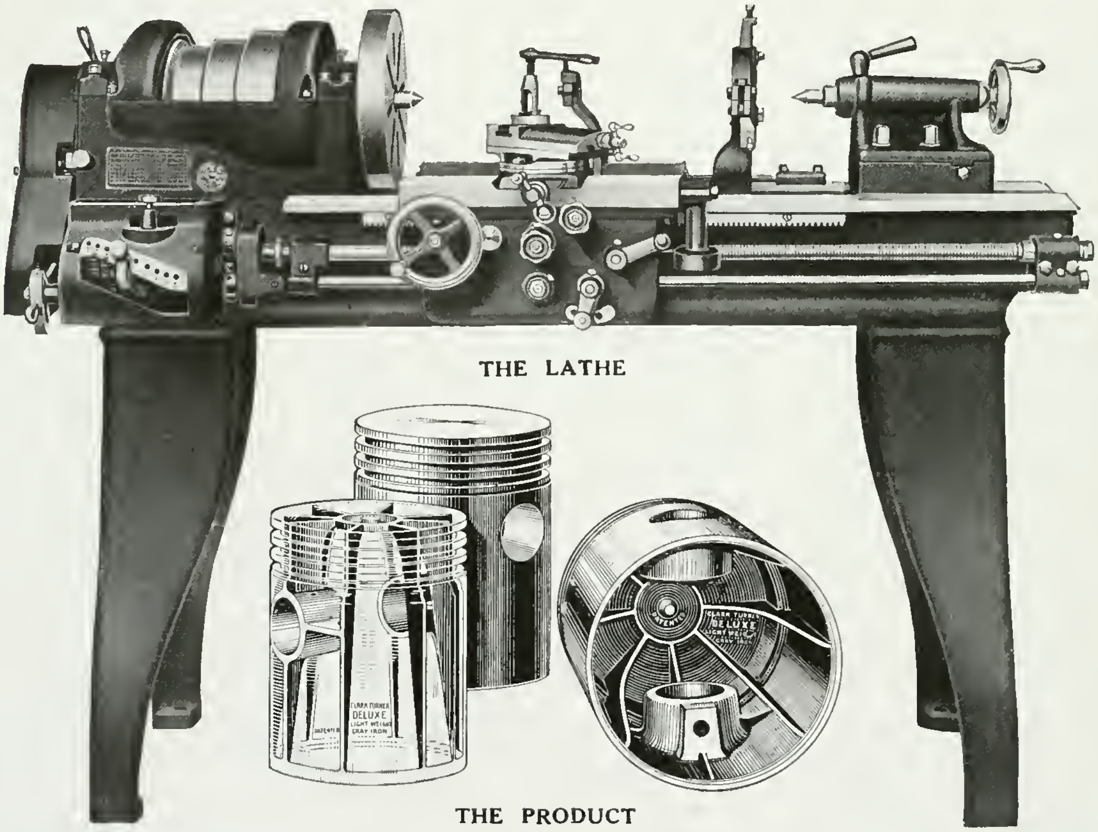
Hydraulic and pneumatic pressure mains are carried along the walls with convenient laterals. Acetylene gas, oxygen and hydrogen are piped to all locations where needed. Industrial trackage is carried through the shop in all three bays, connecting directly to standard gauge railroad from the outside.

A suitable space has been laid off on the south of the shop for angle plate and ingot storage, these spaces being independently served by overhead gantry cranes.

The machines to be used in this shop are to come from three sources: first, the equipment now in use in the old forge shops, plate shops, and shape shops at Mare Island; second, the machinery that has been used at the Risdon plant, which during the war was operated by the Bethlehem Shipbuilding Corporation for the United States Navy; and, third, new machines bought on the market. About 50 per cent of the equipment will be new. The building and the equipment will cost when finished in the neighborhood of $3,000,000 and will be the last word in structural shop design and construction.

THE DE LUXE PISTON

Great Demand for Los Angeles Product Leads to Record Machine Tool Order



THE LATHE

THE PRODUCT

Monarch Lathe installed recently by the Clark-Turner Piston Company

IT should be of vital interest to the metal and manufacturing trades of the Pacific Coast to become acquainted with the phenomenal growth of the Clark-Turner Piston Company of Los Angeles. These people started in business in a very small way three or four years ago with one or two lathes in their shop.

The De Luxe piston, manufactured by this firm, is now being shipped throughout the entire world; agents are established through the United States and foreign countries. The principal feature of this piston is the combination of strength, durability and light weight.

Enormous orders for these pistons have made necessary a great expansion of plant and very recently the Clark-Turner Piston Company purchased from the Herberts Machinery & Supply Company sixty-eight Monarch lathes, size 16 inches by 6 feet bed, quick change, three-step cone, double back geared machines. Each of these tools is equipped with air chucks and special tooling equipment for the purpose of turning out De Luxe pistons accurately and in great quantities. A single order of this character running into six figures certainly contains great encouragement for the machine tool trade and shows that business is not altogether dead.

Taking into consideration the placing of this enormous order of lathes, Mr. C. A. Herberts, president of the Herberts Machinery & Supply Company, was interviewed by our representative when he was in San Francisco on May 11, and made the following statement:

"The Clark-Turner Piston Company were very careful to select a lathe best adapted for their requirements and one that would stand up under high pressure production and continuous operation, as this firm is at the present time running three shifts; in other words, their equipment never stops and they must have tools which will stay on the job and produce the goods.

"This concern now has in operation various makes of engine lathes, some of which have been in their shop for a period of a year or more. Each one of these lathes has been under severe test, as far as accuracy, workmanship, material and durability are concerned, and although the Monarch lathe is a medium-priced tool they have found it to stand the strain to better advantage than any other lathe which they have used, as they themselves wanted to be thoroughly convinced in placing an order of this size, that they are securing the best possible production lathe for the money. The price was a secondary consideration.

"The Monarch Machine Tool Company guarantee each of their lathes to be accurate within one-thousandth of an inch in each eighteen inches of bed. They have an enormous plant engaged in the manufacture of lathes exclusively. Some of the principal features of these lathes are: large phosphorus bronze bearings in the headstock; wide cones; double plate apron with a central oiling system; and steel gears used throughout the entire construction in the apron as well as in the quick-change gear box. Furthermore, the length of the carriage on the V's and the great width of the bridge of same give accurate control of cutting edge. These lathes are fitted with a separate feed rod for feed and do not use a spline lead screw for this work."

Mr. Herberts also stated that during the past year the Herberts Machinery & Supply Company sold in the state of California alone 228 Monarch lathes, which we believe is a record for any make of machine on the market today. The principal reason for this is that the lathes have given the best of satisfaction to the trade, and after a customer installs the first Monarch it is the easiest thing in the world to sell him the second, especially taking the quality and price into consideration.

The up-to-date manufacturing methods used and the great quantities in which Monarch build their lathes enables them to keep their overhead down and produce a real machine tool at a moderate price.

We are showing above a cut of the Monarch lathe as installed by the Clark-Turner Piston Company; also a few illustrations of the pistons which they manufacture.

Mr. Herberts has just returned from an extensive Eastern trip and when questioned about same stated that conditions there were almost unbelievable. A great many of the largest plants and manufacturers were closed down entirely, but fortunately things have opened up considerably during the last two or three weeks. Orders back East are starting to come in, workmen are being reinstated, individuals are more optimistic than they were, and business in general is picking up.

He further states that we here in California have no occasion to talk hard luck and hard times; that we are today and have for the last six months been many hundreds per cent better off than the East is at present and that if some of us would quit talking hard times and put a little more energy into the improvement of our own business we would find further betterment of conditions in our own state.

New Westinghouse Plants

K. E. Van Kuran, district manager of the Westinghouse Electric & Manufacturing Company, has announced that the company is preparing to place a series of plants on the Pacific Coast in order to avoid high freight rates on manufactured products from the East and to take advantage of the rapid industrial growth and foreign trade in the Pacific. The development includes a $1,000,000 plant already announced for Los Angeles, two similar plants, one in the San Francisco Bay district and one on Puget Sound; one central Pacific Coast factory; and two specialty manufacturing plants. The locations of the last three units have not yet been chosen. In addition, a series of distributing agencies will be set up in principal Western centers.

In making this announcement, Mr. Van Kuran said: "Not all of this material to be manufactured in our plants will be used on this coast. In 1914 the United States exported less than $20,000,000 worth of electrical appliances. Today America exports almost this amount of electrical appliances each month, the exports totaling more than half a million dollars today. There is a great future for continued development of Pacific trade through concentration of industries here. In 1919 America shipped more than 1,600.000 metal filament electric lamps to Mexico; more than 1,100,000 to Australia and New Zealand; more than 250,000 to the Dutch East Indies; 231,000 to India; 31,000 to the Straits Settlements; 55,000 to Hongkong; 6000 to Siam; and 8000 to French Oceania. We are shipping almost three times as much electrical machinery abroad as Great Britain, and we must keep that trade for America and the Pacific trade must be concentrated in Pacific states.

"Nor is this all. The export of electrical machinery to the Orient means that the Oriental countries will soon be using this machinery to manufacture goods in competition with ourselves, and, in the interest of American industry and American labor, we must build every form of labor-saving and producing device possible at the cheapest cost, to take care of our own manufacturers. Oil prices have tripled since 1914, and if we are to maintain our present industrial position, hydro-electric power in the Pacific states must be rushed to development without any hesitation whatsoever.

"It is only through cheap power that we can expect to offset the cheap labor of the Orient. and our oil must be turned over to the operation of the ships that carry our products abroad."

GLASGOW SOLVES THE PROBLEM OF PERPETUAL MOTION

FOLKS who believe hustle and bustle in everyday life is a characteristic confined strictly to the Western Hemisphere would do well to visit Glasgow, according to J. H. Bell, a Western Electric engineer, who has just returned from a tour of investigation of the utilities of Europe. "In all the time I was in the busy Scotch metropolis," he states, "I never saw a street car stop at any but few stipulated stations. At all other places, the motorman merely reduces the speed of his vehicle when he is hailed by a prospective fare and the latter makes his ascent to the platform on the fly.

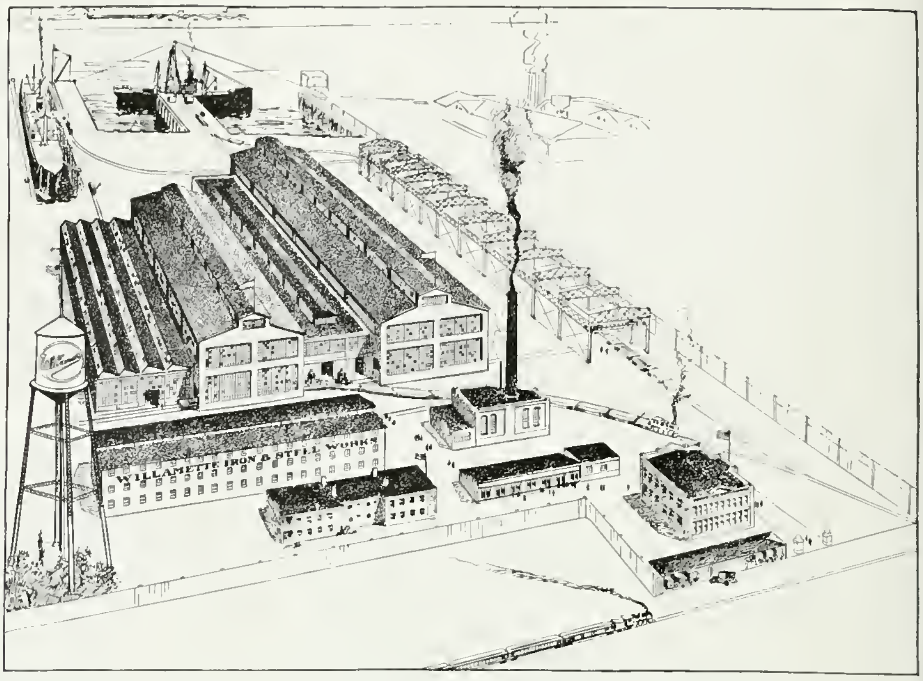
NEW SHOP AT PORTLAND

Willamette Iron and Steel Works Building on a New Site

WITH the idea of providing larger space for the work entailed by the great expansion of their output, the Willamette Iron & Steel Works of Portland recently acquired a twelve-acre tract on the waterfront at the foot of North Front and Nicolai Streets. This tract has an approximate depth of 1000 feet and a harbor line frontage of 600 feet. The entire area is being filled up to grade, with the exception of a slip 350 feet wide and 100 feet deep along the water line where the outfitting docks will be established. In this filling arrangements are being made for the foundations of shops and office buildings.

Plans for the new plant contemplate a two-story office building 67 feet by 100 feet, a two-story employes' welfare building 50 feet by 100 feet, and a three-story warehouse 70 feet by 270 feet. The boiler shop and machine shop will be practically under one roof. The present plans call for four 50-foot bays, two to each shop, the boiler shop bays being 500 feet long and the machine shop bays 250 feet long. A wing between the machine shops and boiler shops will house the blacksmith shop, carpenter shop, pipe shop, and tool rooms. On the north end of the wide building housing the machine shop will be a shop for light tools principally devoted to saw-tooth manufacture and arranged in 20-foot bays. This shop will be 120 feet wide and 200 feet long The buildings are all planned so that they can be extended by the addition of similar units as conditions require. The illustration accompanying this article shows very clearly the arrangements of the buildings on the plot.

In planning this plant great stress has been laid upon the easy handling of materials. The three-story warehouse will have a 30-foot crane bay extending its entire length. On the south side of the property is located the material yard, which is spanned by an overhead bridge structure carrying a 15-ton traveling crane. This crane will have a 60-foot span and a run of approximately 1000 feet and extends out to the waterfront so that this storage area will be served by standard gauge railroad trackage connecting with transcontinental systems and also by marine service connecting directly with deep water.



View of the plant to be built by the Willamette Iron & Steel Works, Portland

The outfitting dock will be equipped with all the modern appliances for expediting marine repair work and for the rapid discharge of materials. There will be several derricks, large shear legs, ample industrial and standard gauge trackage.

The comfort of employes has been well looked after, their building being fitted with a very fine assembly hall, an adequate lunch room, a properly equipped emergency hospital, and an excellent arrangement of locker and wash rooms.

The business of the Willamette Iron & Steel Works has had a remarkable expansion since their removal to their present location in 1905, and this second move is now made necessary in order to economically take care of the great rush of orders in all of their lines of work.

A Just Decision

THE following order appeared in the last issue of the Panama Canal Record: Quite recently the governor has had a request from an employe for permission to libel a vessel which caught fire while lying at a pier in the harbor of Balboa. This employe was on duty at the time he proceeded to the assistance of the vessel, although not on duty with reference to that vessel.

It is the belief of the governor that all employes of the Panama Canal should be considered available for such emergency work as is involved in rendering assistance to a vessel on fire within the confines of the port of Balboa without laying the vessel liable to libel for salvage. The governor considers that all shipping within the Canal prism, or, to be exact, within the limits marked by the sea buoys at Balboa and the breakwater at Cristobal, have a right to expect any assistance from the equipment and personnel of the Panama Canal which is necessary for their proper care, preservation and handling in Canal Zone waters.

He believes that the equipment of the Canal Zone is maintained for the above purpose; and that the reputation of the Canal for fair dealing requires that the above viewpoint be insisted upon and maintained. In view of the above, the governor will not approve in future any proposal to libel vessels for assistance in emergencies within the Canal waters; and if any such libel is placed by a Canal employe it will be considered that such employe has taken action which is inimical to the best interests of the Canal, even though such action technically be within the law.

By order of the acting governor.

C. A. McIlvaine, Executive Secretary.

A NEW CRANE GEAR

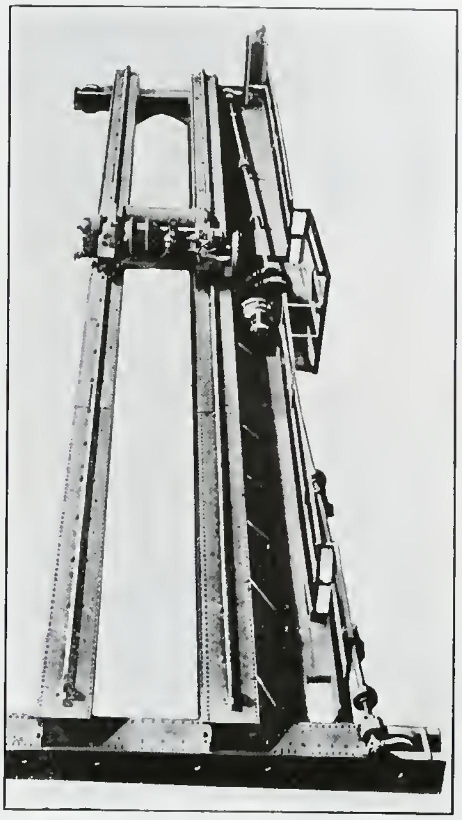
Application of Differential Gear Simplifies Circular Track Crane

THERE are probably more difficult engineering problems met in the design and building of electrically driven cranes than in any other standard line of machinery. Not only are the cranes used for radically different kinds of work, but the dimensions, the speeds and numerous other factors are constantly being altered.

Among some of the more peculiar demands are those for cranes to travel around curves, others to run on a straight track part of the time and the remainder on a curved track, and for others to travel in complete circles.

A patent was recently secured on a method of driving a crane on a circular track by R. W. Valls, vice-president and general manager of the Champion Engineering Company, Kenton, Ohio, builders of Champion cranes. This is said to be quite an improvement on former devices, and the illustration shows quite clearly how the object is accomplished.

On cranes of this kind it has been customary to make the track wheels for the outer radius considerably larger than those for the inner track and to use different sizes in gears and pinions. This meant complication in design, having various sizes of gears and pinions, and keeping many more "spares" on hand, the parts not being interchangeable.


Differential Gear for Champion Circular Crane

With the construction shown, all track wheels, gears and pinions are of a size, excepting one gear and pinion at the center of bridge. This allows the use of one size gear case. It simplifies the construction greatly, reduces upkeep cost and the repair time.

A new crane was built for the roundhouse of the Pennsylvania Lines, Columbus, Ohio, and notwithstanding the span is 75 feet it is said the loss in traveling the complete circuit is but one-eighth inch. It has been the cause of many most favorable comments.

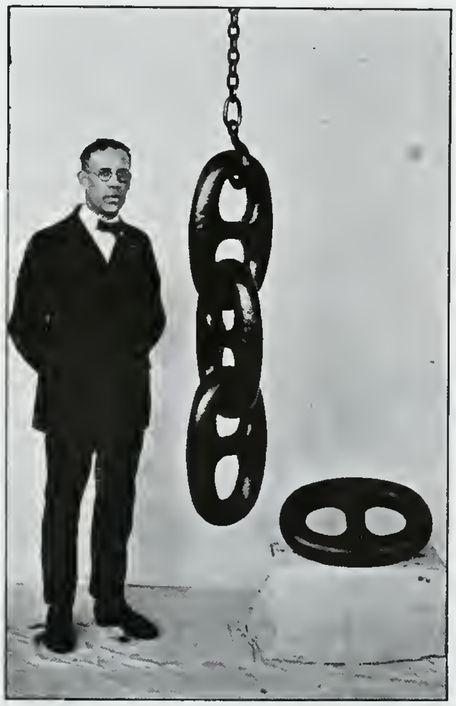
All cranes have a tendency to get out of square on the runways, this being emphasized on cranes on curved tracks. By a very simple device, covered by the same patent, the crane may be squared up again in a few moments. This squaring up device is applicable as well to cranes operating on straight tracks as the differential gear provided forms the correcting means for accomplishing that purpose.

LARGEST CAST STEEL CHAIN

WE illustrate herewith four links of 3½-inch "Naco" cast steel anchor chain cable. These are representative links of the chain cable being manufactured by the National Malleable Castings Company for the United States Navy for use on two of the new first-class battleships.

It will be seen in the cut that these four links joined together are equal in height to a fair-sized man. The actual dimensions of each link are: length 21 inches, width 12⅝ inches, circular section of cast steel 3½ inches diameter. The average weight of a link is in the neighborhood of 130 pounds. This is one of the largest chains ever built in this country. Several years ago the Charleston Navy Yard built some 4⅛-inch wrought iron chain for the Leviathan. With that exception, the present chain is said to be the record for size.

An interesting feature in connection with this large cast steel anchor chain cable is its great strength in comparison with wrought iron chain as manufactured by the old process. The proof load for 3½-inch wrought iron chain cable is between 390,000 and 400,000 pounds. The proof load for "Naco" cast steel cable is 555,000 pounds. In other words, the 3½-inch cast steel chain has strength equal to a 3½-inch wrought iron chain plus at least a 1¾-inch iron chain, the proof load for the latter being 125,000 pounds. This extra proof load is put on cast steel chain because the use of cast steel for this purpose is a departure from ordinary practice.


Four links of "Naco" Cast Steel Anchor Chain

The testing of cast steel chain to these higher proof loads provides a great margin of safety for users of cast steel chain, and the fact that it is being used by the United States Navy for two of its latest battleships is further proof that careful marine navigating officers are beginning to recognize the superior merits of this material for such purposes. The United States Navy has always been exceedingly careful with regard to its anchor chain specifications.

SOME GAS COMPARISONS

An Interesting Experiment in Metal Cutting

VERY recently the Pacific Gas & Electric Company at their industrial laboratories at San Francisco have carried out, in conjunction with the experiments of the Victor Oxy-Acetylene Equipment Company, an interesting series of tests to determine the relative economy of various gases in the cutting of metals.

These tests were all made with a new torch which had been especially designed for cutting with city gas. In this torch the gases are mixed at the tip, which is so arranged that a spiral motion is imparted to the gases as they leave the tip, somewhat in the same manner as the rifles in a gun bore act on a bullet. It is claimed that this spiral motion lessens the waste of oxygen so that for a given length of cut less gases are required.

As arranged, these tests were all arranged on the basis of a continuous fifteen-minute cut without stop. Two sizes of Victor torch tips were used, No. 1 and No. 3. The material being cut was steel of various thicknesses. With the No. 1 torch material ⅜ inch to ⅞ inch thickness was used; with the No. 3 torch material 1¼ inch to 2 inch thickness was used. The average cutting speed with all the gases was 100 feet per hour with the lighter sections and 60 feet per hour with the heavier.

Based on a cost of $.00085 per foot for city gas, $0.009 for hydrogen, $0.0275 for acetylene, and $0.014 for oxygen, the costs for the various gases worked out according to the following table:

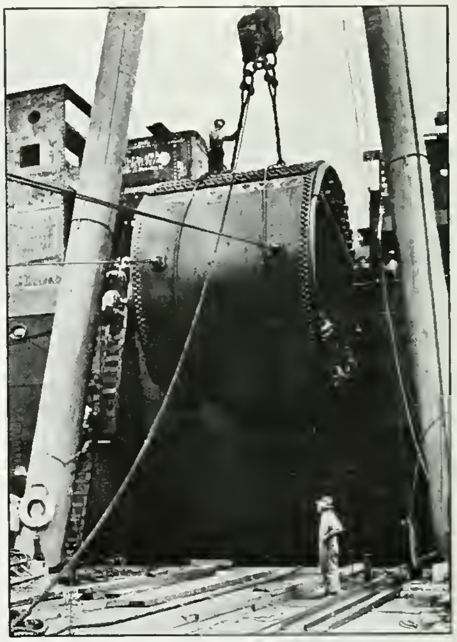
As far as the results of this particular experiment are concerned, they indicate a decided comparative economy in favor of the use of city gas, and undoubtedly wherever city gas is available, piped to the spot under suitable pressure and in suitable quantities, this condition would hold good to a greater or less degree governed by the conditions in each individual industrial case. The various factors for any industrial plant would have to be carefully worked out by the efficiency engineer before deciding the practicability of the installations necessary for the use of any one of these gases, but this experiment is certainly interesting from a laboratory standpoint in showing the possible economies to be effected by the use of city gas where available.

City Gas

Victor Torch No. Tip	Thickness Material	Pressure		Consumption		Average Consumption		Average Cost		Total Average Cost
		Ox.	Gas	Ox.	Gas	Ox.	Gas	Ox.	Gas	
1	⅜ - ⅞	40	25	30	8	31	8⅛	.434	.0069	.4409
1	⅜ -	40	25	32	8¼					
3	1¼ - 2″	40	25	44	14	46	13¾	.644	.0107	.6457
3	1¼ -	40	25	48	13½					
Hydrogen										
1	⅜ - ⅞	40	10	29	12	30½	14	·427	.126	.553
1	⅜ -	40	10	32	16					
3	1¼ - 2″	40	12	45	17	46½	19½	.651	.175	.826
3	1¼ -	40	12	48	22					
Acetylene										
1	⅜ - ⅞	40	9	32	5½	30½	5¼	.427	.144	.571
1	⅜ -	40	9	29	5					
3	1¼ - 2″	40	9	48	7	45	6½	.63	.178	.808
3	1¼ -	40	9	42	6					

A Rigging Record

IN these days of keen competition when shipyard jobs go to the plants with the most efficient force that can show the lowest production costs, every detail in work or equipment looms large on the estimator's sheet. A particularly progressive spirit apparently pervades all departments in the plant of the Los Angeles Shipbuilding & Drydock Company, where each foreman and leading man seems anxious to break past records made by himself or his predecessors. The day following the launching of the West Faralon, an 11,500-ton freighter for the United States Shipping Board, last month, she was towed around to one of the fitting-out wharves of the plant under its 100-ton shear legs, where her three 75-ton boilers were awaiting. In a shade under four and one-half hours, the yard ship-rigging gang, led by Peter Phorson, raised these three boilers, lowered them into the hull and placed them in position in the boiler room, breaking by considerable margin previous records for such work.



Rigging Gang of Los Angeles Shipbuilding & Drydock Company placing boilers in the steamship West Lewark.

FULL SPEED AHEAD

Steamship Operations

Out of Their Own Mouths

At the meeting of Admiral W. S. Benson, chairman of the Shipping Board, with steamship owners and representatives of the marine unions in Washington April 29, the admiral, with his wonted vigor and bluntness, laid down the law as to overtime. "Overtime has been greatly abused and we all know that it has," said the admiral. "It is bound to be as as long as it is carried on at all, but we must have within reason a certain amount of it. Work piled up at sea to induce overtime is theft. There is no other name for it." What the admiral said would be endorsed without hesitation by practically every shipowner and operator who has had any experience whatever with the overtime system, but even this unanimity doubtless is unsatisfactory to many disinterested persons, "because," as they might retort, "we have heard only one side, that of the employers. What have the men to say?"

In view of this probable attitude, shipping men and the public at large should welcome the naive admission of Andrew Furuseth, made at the hearing immediately preceding Admiral Benson's statement.

Mr. Furuseth said that a reduction of 15 per cent of the wages stipulated in the articles would mean in some instances 40 and 50 and 60 per cent reduction in total earnings because of the elimination of overtime. Mr. Furuseth is candor itself; for the good of his men in pleading their cause before the public, he has been too candid; he has said more in those few words, and said it with better effect, than anything that has come from the owners. A wee bit of algebra discloses that Mr. Furuseth has made the following admissions:

A man whose total earnings are cut 40 per cent by a 15 per cent reduction in wages and elimination of overtime has been piling up overtime to the extent of 41-2/3 per cent of his stipulated wages.

A man whose earnings are cut 50 per cent has been piling up overtime to the extent of 70 per cent of his stipulated wages.

A man whose earnings are cut 60 per cent has been piling up overtime to the extent of 112½ per cent of his stipulated wages.

In short, an able seaman whose stipulated pay is $85 a month has been making in wages and overtime $120.36, $144.50, or $180.62, as his earnings have been reduced 40, 50 or 60 per cent.

Now any man who earns in overtime 41-2/3 or 70 or 112½ per cent of his wages, and who continues to do this for any considerable period of time, is accomplishing it by one of two means: He is working at a killing pace or he is robbing his employer.

As to which has been done aboard American vessels "the man on the street" is competent to judge for himself.

Luckenbach to Gulf

The Luckenbach Steamship Company has announced the opening of a new service between Mobile and New Orleans and Los Angeles, San Francisco and Oakland. The first sailing will be that of the steamship Pleiades, which will depart from Gulf ports about the middle of June, to be followed about a month later by the Hattie Luckenbach. The first eastbound sailing will be by the Pleiades from California ports the middle of July, and after her will be the Hattie Luckenbach the middle of August. A statement of the company says:

"The above service is in addition to our regular service between North Atlantic ports and Pacific Coast ports, and the steamers named will be employed exclusively in the service between the Gulf and the Pacific Coast. As business warrants, more frequent sailings will be announced. Time in transit from New Orleans to San Francisco, twenty-one days."

Would Amend Seamen's Act

A bill introduced in the House of Representatives by Mr. Edmonds and referred to the committee on the merchant marine and fisheries May 13 would amend the Seamen's Act to provide that firemen, oilers and watertenders should be divided, as are the sailors, into two watches instead of three, except on coal-burning vessels, on which three watches should obtain for the engine-room crew. The bill would prohibit a demand for pay more than once in the same harbor on the same entry and also would limit the amount to one-half of what he had "to his credit" instead of half of what he had "earned." A complaint of unseaworthiness of a vessel would have to be signed by at least two of the officers as well as a majority of the crew, although the first and second officers alone, as heretofore, could register a protest. No payment of wages would need to be made to any seaman pending hearing of a properly-made charge against him, provided that the hearing be held at the first port of entry at which a competent representative of the United States was stationed.

Mutual Indemnity

A statement issued by Johnson & Higgins, managers of the American Steamship Owners' Mutual Protection & Indemnity Association, says:

"The present period of dullness in shipping gives an opportunity to owners and operators to make their organizations more thoroughly efficient. The association is particularly interested in helping its members to reduce the cost of operation by preventing the occurrence of claims. We have increased our staff of surveyors and are now prepared to examine steamers in the ports of New York and San Francisco, and adjacent ports, with a view to their general fitness for their trade, or for the carriage of any particular kind of cargo. At the same time, we continue to inspect the stowage of steamers at those ports upon request. Members and operators should avail themselves fully of this service, for which no charge is made. During the past year there has been improvement in the personnel of the merchant marine, both afloat and ashore; but much remains to be done, and there is no better time than the present for fresh efforts."

Fuel Oil Consumption

During 1920 the deliveries of fuel oil for ships' bunkers on the Atlantic Coast surpassed those on the Pacific, the relative standings of 1919 being reversed, according to a report of the American Petroleum Institute. The report, which will be of great interest to steamship operators and fuel oil and coal companies, follows in part:

Practically complete returns to the American Petroleum Institute from companies engaged in the marine fuel oil business and from the United States Navy show that in 1920 a total of 44,487,319 barrels of fuel oil were delivered for ships' bunkers, as compared with 27,102,616 barrels in 1919, an increase of 64.1 per cent. The figures compare as follows:

Deliveries of Fuel Oil

	Barrels 1920	Barrels 1919	Per Cent Inc. or Dec.
To merchant Vessels	38,436,300	18,188,974	Inc. 111.3
To U. S. Navy	6,051,019	8,913,642	Dec. 32.1
	44,487,319	27,102,616	Inc. 64.1

For vessels engaged in coastwise and foreign trade, including those of the United States Shipping Board, 21,990,612 barrels of Mexican fuel oil and 16,445,688 barrels of domestic fuel oil, a total of 38,436,300 barrels, were delivered in 1920 at ports of the United States and insular possessions. This compares with 8,590,406 barrels of Mexican oil and 9,598,568 barrels of domestic oil, a total of 18,188,974 barrels, in 1919. The oil used by the Navy is a blend of domestic and Mexican oils and the statistics as to the relative quantities are not available. The Navy figures are stated separately above.

The bulk of the fuel oil delivered to merchant vessels in 1920 was handled at Atlantic Coast ports, the total being 19,326,410 barrels; all except 208,976 barrels of this was Mexican oil. In 1919 the total was 7,240,358 barrels. The largest deliveries of domestic oil were made at Pacific Coast ports. The total for 1920 was 12,264,245 barrels as against 7,856,717 barrels in 1919.

The following table gives a classification by coastal districts of fuel oil deliveries made for ships' bunkers in 1920 and 1919 by companies reporting to the American Petroleum Institute:

Fuel Oil Delivered for Ships' Bunkers, 1920 and 1919

	Domestic Oil Barrels	Mexican Oil Barrels	Total Barrels
At Atlantic Coast Ports			
1920	208,976	19,117,434	19,326,410
1919	328,128	6,914,230	7,240,358
At Pacific Coast Ports			
1920	*12,264,245		12,264,245
1919	7,856,717		7,856,717
At Gulf Coast Ports			
1920	2,164,539	1,922,981	4,087,520
1919	759,089	1,347,373	2,106,462
At Insular Possessions			
1920	1,807,928	950,197	2,758.125
1919	656,634	328,803	985,437
Total			
1920	16,445,688	21,990,612	38,436,300
1919	9,598,568	8,590,406	18,188,974

---

*Includes small quantity of Mexican oil blended with domestic.

Garibaldi Co-operative Report

The following statement concerning the Co-operative Navigation Company of Genoa has been received from Rome:

Some American and English papers published some weeks ago that the Co-operative Navigation Company Garibaldi of Genoa, had been declared in failure, or similar; but really, and fortunately, there is no ground for such rumors.

At the annual ordinary general meeting of the shareholders, which took place in Genoa on March 21 last, the directors and the auditors presented the balance sheet for the business closed on December 31, 1920, from which the position of the company appears clearly excellent and on a sound basis. The accounts were unanimously approved as presented.

During 1920 the total income for freights, interests and other receipts was lire 18,609,369.05; while the total of the expenses of navigation, management and others was 17,396,577.37; and thus the net profit amounted to 1,213,791.68. This sum was distributed as follows: lire 121,379.17=to the reserve fund, 10 per cent; 546,206.26=to the amortisation of shares, 45 per cent; 242,758.33=to pension fund, 20 per cent; 303,447.92=to the fund for the development of the society, 25 per cent.

The assets of the cooperative totalled lire 35,631,492.36, and the fleet was valued at 17,069,548.79; the bank balances in Italy were 10,501,408.18; capital paid up on December 31, 1920, was lire 27,063,768.94.

The Garibaldi began to operate in the most critical moments for shipping, say the directors in their yearly report; but all the employes and mariners of the company, who are also the shareholders, have succeeded in surpassing the difficulties, and yet adversity eggs them on to fresh endeavor for the mutual welfare. The shareholders of the Garibaldi are about 28,000, and the monthly increasing of the capital has been about lire 1,500,000. The fleet of the Cooperative is today composed of nine vessels, six owned and three chartered.

Notes from the East

At the time these notes are being written the one dominating item of interest to shipping circles along the Atlantic Seaboard is the pending settlement of the wage controversy between the seamen and their employers. It seems odd that the labor leaders were unwilling to accept the 15 per cent reduction laid down by Admiral Benson, because these terms were considerably more favorable to the working men than the terms originally proposed by the ship-owners and operators. The universal opinion outside of the labor ranks is that the laboring men are cutting their own throats when they insist on a strike, because at this particular time there are over 600 ships tied up in the various American ports and not any too much freight being offered to those ships which are still in operation. It logically follows that unless there should be a tremendous and unbelievable boom in shipping the ship-operators can well afford to tie up the rest of their boats, and in the not far distant future, when the funds of the seamen would have been depleted, the ship operators would then be in a position to dictate whatever they deemed just. This might be considerably lower than the 15 per cent reduction urged by Admiral Benson. Surely there are enough serious-thinking men in the ranks of the seamen to insist that some settlement be made.

Baltimore Up and Doing

Within recent weeks the writer has had occasion to visit most of the prominent industrial centers along the Atlantic seaboard from Boston to Baltimore. Of all the places visited, Baltimore seems to be the most optimistic so far as shipping is concerned, though the people of that city are willing to concede that at present they are suffering a slump in common with the general trend of business through the country. Baltimore, however, is wise enough to think in terms of the future instead of wasting energy and ambition on "self-pity."

Under the auspices of the Export and Import Board of Trade of Baltimore there will be a marine show in June. It is not likely that this show will measure up to the big one held in New York, but Mr. Brittain, who is managing this affair, is such a live wire that we are safe in predicting that this show will not be a fizzle.

Early in May the Cunard Company moved to its new quarters in the recently constructed Cunard Building at 25 Broadway. The new general office is beautiful and impressive and certainly the Cunard Company did not stint itself to make this the most beautiful of its kind in this country. The only criticism the writer could possibly make would pertain to the inscription in Latin on a bronze tablet embedded in the floor directly beneath the dome. There was a time when it might have been possible for me to translate this, but frankly I have become rusty on my Latin and I am prompted to wonder just how many others who see that inscription will be able to tell their neighbor what it means. Our English cousins will probably think that this is one more proof that Americans are more interested in acquiring dollars than knowledge of the classics.

German Peace Will Help

Business in the East is expected to improve materially as soon as terms are definitely reached regarding the final arrangements to be made with Germany, and from present indications it would seem that this question will be settled before June 1. Most Eastern manufacturers and shippers are now beginning to see daylight, and signs of improvement, based on their hopes that these peace terms will soon be settled. The repair yards are eagerly looking forward to a resumption in shipping, for it is only a question of time until all these boats which have been tied up must be reconditioned and when that hour arrives our friends in the repair business are destined to enjoy more business than they have for many months past. It is surprising how many of the manufacturers who sell to the marine trade have missed the point with reference to the post-war volume of business. Granting that half of our total tonnage is at present tied up, there is still about four times as much tonnage in activity than we had before 1914. History records that immediately after the Civil War, Franco-Prussian War, Boer War and Spanish-American War, there was a corresponding period of inactivity in shipping circles and it was only reasonable to suppose that we were to undergo this serious period of readjustment sooner or later after the finish of this World War. The old rule of the survival of the fittest still applies and ten, twenty and fifty years from now we will probably be able to look back and say to ourselves that conditions in 1921 were not as bad as the people thought when they were at their daily grind then.

Intercoastal Changes

The United American Lines announces that after May 1 its sailings in the coast-to-coast service will be maintained on a ten-day schedule instead of a fortnightly schedule. The first steamer to sail under this new arrangement is the Iowan. Beginning with the Floridian, which cleared Boston May 18, and New York May 21, alternate sailings will accept cargo direct for the Hawaiian Islands.

H. E. Stocker, assistant general freight agent of the Pacific Mail, New York, announced that arrangements had been effected with the Halschaw Steamship Lines and the Old Dominion Steamship Company for offering through bills of lading on shipments from New York to Central America, Los Angeles and San Francisco via Pacific Mail steamers.

Shipping Briefs

New high records for net tonnage of traffic through the Panama Canal during a calendar month, and for tolls earned, were established by the traffic in March. In number of ships and cargo carried, however, the movement was less than in previous months.

The aggregate Panama net tonnage of merchant vessels was 1,112,818, as compared with 1,094,323 in January, the month of high record previous to March.

The tolls earned in March amounted to $1,105,529.05, as compared with $1,095,857.46 in January. March was the fourth month in which the tolls were in excess of $1,000,000, and the first in which they exceeded $1,100,000.

The number of commercial ships in March was 255. The cargo carried in the commercial ships aggregated 1,086,463 tons, which had been exceeded in only one previous month (January, 1921), when the cargo amounted to 1,177,053 tons.

Reports are current on the Pacific that the Coast Guard cutters Haida and Tampa, now being built by the Union Construction Company, would be sent to the North Pacific.

W. L. Comyn announced in May that the Commonwealth of Australia had sold its claim for $1,625,000 against the Pacific Motorship Company, $125,000 being paid by the Ocean Motorship Company, a new corporation formed by men affiliated with Mr. Comyn. The cost of the eight wooden motorships sold by the commonwealth to Pacific Motorship accordingly has been reduced by $1,500,000, or from $2,400,000 to $900,000.

Vessels operated by the United States Transport Company in the intercoastal trade were seized by the Shipping Board upon their arrival at Pacific Coast ports in May. The reason was delinquency in payments. The board and the company have been at outs for several weeks, principally because of the use of the vessels in the intercoastal trade against the wishes of the board and the other being the refusal of the line to join the conferences.

Following the action of Seattle May 8 in doing away with wharf charges, the Canadian Pacific at Vancouver eliminated overland export and import charges. Other docks are expected to do likewise.

Reciprocal laydays were written into the standard Shipping Board charter form for the Pacific Coast as the result of a conference in Portland. The effect is that a vessel saving time in loading is credited with the saving before demurrage begins at discharging.

A tour of Eastern Asia will be made by members of the San Francisco Chamber of Commerce. They will depart September 3 on one of the Shipping Board 535's, operated by the Pacific Mail, for a ninety-day voyage to Honolulu, Yokohama, Kobe, Shanghai, Manila, Soerabaya, Singapore, Saigon, Haiphong and Hongkong.

Frank K. Hitching of San Francisco announces that he has been appointed Pacific Coast general agent of the Yamashita Kisen Kaisha, which proposes to open a service between Pacific Coast ports and Australia, the return voyage to the Pacific being via Oriental ports. The company was listed on April 5 as owning 47,935 gross tons of shipping.

American Shipbuilding

The American Bureau of Shipping reports 290 steel vessels of 1,123,176 gross tons under construction in the United States May 1; of these vessels, 254 of 820,388 tons were for private owners and 36 of 302,788 for the Shipping Board. Private owners had 75 tankers, 4 of which were barges, and 46 freighters under way; the Shipping Board had 13 freighters, 8 tankers and 15 combinations. No passenger vessel was building for a private owner.

The geographical table shows that the Atlantic had under construction 723,900 gross tons; the Pacific 283,615; the Gulf 83,584; the Lakes 12,877, and the interior 19,200. Of the vessels, 88 were less than 500 gross; 57 were between 501 and 1000; and 48 were between 5001 and 7000. Eight were between 13,001 and 14,000.

An interesting table of the report is that showing vessels classed by means of propulsion. Reciprocating engines were to be installed in 121 vessels; turbines in 21; Diesels in 9, and 124 were to be without power.

New York Shipbuilding Corporation led all yards with 17 vessels of 155,800 gross tons, and Sparrows Point, Bethlehem, was second with 11 of 115,190. Union of Bethlehem led the Pacific Coast with 9 vessels of 78,424 tons gross.

The tables are quite complete and they certainly meet a need that has existed for a long time, inasmuch as accurate and up-to-date statistics of American shipbuilding have been exceedingly difficult to get.

At the current rate of construction the output of American shipyards for the current fiscal year will be about 2,250,000 gross tons, compared with 3,735,000 for the previous fiscal year, says the bureau of navigation.

On May 1 there were 35 steel merchant vessels of an aggregate deadweight tonnage of 389,870 under construction in shipyards of the Pacific Coast of the United States. These totals are a decline of 5 vessels of 59,800 tons from those of April 1, no new contracts having been executed to offset deliveries of that tonnage during April. Returns compiled by Pacific Marine Review show that April deliveries were classed as follows: freighter for private account, 1 of 14,000 tons; tankers for private account, 4 of 45,800 tons. No deliveries were made during the month to the Shipping Board; and the status of tankers for foreign private account also remained unchanged on May 1.

The following table is of building May 1:

American Yards	No. Vessels	Agg'te D. W.
Freighters U.S.S.B.	7	73,200
Tankers U.S.S.B.	6	60,300
Tankers private	10	119,690
Freighters private	3	54,000
Tankers foreign	9	82,680
Totals	35	389,870

In Canadian yards one delivery was made in April, that of an 8390-ton freighter for the Canadian government merchant marine. The work as of May 1 in Canadian Pacific Coast yards was:

Canadian Yards	No. Vessels	Agg'te D. W.
Freighters gov't	5	41,880
Freighters private	1	600
Totals	6	42,480

Vessels now under construction for the Navy Department include 11 battleships, 6 battle-cruisers, 10 scout cruisers, 21 destroyers and 37 submarines. Of these 14 are building in the navy yards and the remaining 71 are under construction in private shipyards, as follows: New York Shipbuilding Corporation, 7; William Cramp & Sons Ship & Engine Building Company, 6; Newport News Shipbuilding & Drydock Company, 5; Bethlehem Shipbuilding Corporation, 17; Todd Drydock & Shipbuilding Corporation, 3; Electric Boat Company, 29; Lake Torpedo Boat Company, 4.

The naval appropriation bill, reported April 22 by the House appropriations committee, carried $90,000,000 for continuing work on the capital ships authorized in 1916.

World Building

Lloyd's Register reports that 7,086,766 tons of new merchantmen was under construction in the world April 1. This is an apparent decline of less than 100,000 tons from the total of January 1; nevertheless, suspensions and postponements in British yards alone aggregate 847,000 tons, so that the actual volume of going work is considerably smaller. British yards generally are turning out work more rapidly than they are receiving new contracts. The total on hand in British yards April 1 was 3,798,593 tons, as compared with 1,102,000 in American yards; the British made a gain of 89,000 from January 1 and the Americans lost 200,000.

France has displaced Holland as the third builder of the world, having 427,000 tons building April 1, when Holland had 417,000, Italy 351,000, Japan 294,000, and British dominions 180,000.

The world total of tanker tonnage was 1,320,193, as compared with 1,169,000 January 1. The United States lost 5000 tons, whereas Britain gained 135,000 and other countries 22,000. Nevertheless, the United States led on April 1 with 632,016 tons against Britain's 557,027.

New Work Offers

Prospects for new construction improve. The Red D Line of New York is planning to build two new passenger steamers, designed by Theodore E. Ferris. They will be 375 feet long and will be driven by geared turbines at a speed of 14 knots. Two ferries for the Fort Lee, New Jersey, run are being considered by the Commerce Commission of New Jersey. Reports are current that the Eagle Oil & Transport Company will build four more tankers, each of about 11,000 deadweight tons.

An official of the Union Oil Company of California states that there is no truth in the persistent rumor that four new tankers would be built.

Japanese Contract Placed

The first naval contract placed in many years by the Japanese government with an American shipyard was signed May 17 in the offices of the New York Shipbuilding Corporation, according to an announcement made by Captain M. Yokura, I. J. N., chairman of the imperial Japanese naval commission visiting the United States, on behalf of Captain K. Goto, chief of the imperial Japanese naval inspectors' office.

The contract was signed by Captain Yokura and Captain Goto, representing the Japanese navy, and was accepted by Marvin A. Neeland, president of the New York Shipbuilding Corporation. It calls for the construction of a unique type of vessel, a combination coal and oil supply ship of 20,000 tons for fueling the various units of the Japanese navy.

The design of the vessel, which has been worked out by the New York Shipbuilding Corporation in accordance with the outlined requirements laid down by the Japanese commission, calls for a length on the water-line of 496 feet, with a beam of 67 feet. The vessel will be electrically driven, the equipment being of the newest design furnished by the General Electric Company, and will have twin screws with a total of 7500 shaft horsepower, which will give the ship loaded a speed of fifteen knots an hour. The vessel will be constructed with both oil and coal bunkers, while a feature of the new craft will be the installation of an anti-torpedo boat battery.

Owners Study Structural Standards

An important movement toward more comprehensive handling by American shipowners of problems relating to structural standards for American ships, especially with reference to bulkheads as well as to load-line regulations, general design and engining, has been instituted by the American Steamship Owners' Association, 11 Broadway, New York.

Feeling that the shipowners should have the best technical representation in national and international conferences dealing with these problems, and deliberations of every character relating to legislation and the adoption of official regulations intended to improve American merchant ships, the owners' association has appointed a special technical committee to represent it in such matters.

Hitherto these problems have been handled chiefly at conferences between the Navy Department's architects and representatives of the shipbuilders, at which the shipowners were represented by shipping company officials whose experience was not necessarily technical. These conferences have dealt with such highly technical subjects as subdivision of hull, and load-line, with the most vitally interested party, the owner, unrepresented in the deliberations by a technical representative.

In naming its technical committee the American Steamship Owners' Association has chosen men trained to deal with these intricate subjects as experts, but who at the same time are in close touch with the executive problems of the shipping business. The members of the committee are as follows: William Francis Gibbs, chief of construction, International Mercantile Marine Company (chairman); Captain O. W. Koester, vice-president in charge of construction, United States Mail Steamship Company; John H. Telford, superintending engineer, Munson Steamship Line; C. A. Ward, Jr., naval architect, Merchant Shipbuilding Corporation (Chester, Pennsylvania); A. S. Hebble, superintending engineer, Southern Pacific Company; James Donald, president, States Marine & Commercial Company, Inc.; Warren T. Berry, superintendent marine construction, New England Steamship Company.

This committee already has begun its labors by picking up the loose ends of plans for greater structural safety of American ships that had begun to take shape when the war began, but which led nowhere because of the great upset in business caused by the war. These plans were brought to a head in the International Convention of 1914 on Safety at Sea, which worked out regulations for the subdivision of ships by bulkheads, and establishment of load-line rules. Great Britain adopted the suggested rules, but this country did not. In the last Congress a load-line bill was introduced and appeared to make some progress but it died with the session.

It is the aim of the technical committee of the American Steamship Owners' Association to take up the subject with vigor. As a first step, Mr. Gibbs, its chairman, when recently in Great Britain, held conferences with representatives of the British Board of Trade, the Chamber of Shipping, which corresponds to the owners' association here, and of Lloyd's, learning their methods of handling the problems, regulations now in force, and proposed developments pertaining to load-line and bulkhead regulations. As a result of these conferences Mr. Gibbs, who returned home a few days ago, gathered much important material for the use of his committee, which will have early consideration in shaping plans to be followed on this side of the Atlantic.

"We have no uniform rule of bulkheads, and we have no load-line rules," said Mr. Gibbs on his return. "We propose to get both. We also hope to co-operate with the classification societies and with the Department of Commerce in working out better methods on many points in the steamship inspection regulations, some of which are onerous and inadequate. What we want is safer ships and simpler and more effective regulations for maintaining their standard of construction and equipment. It is a big job, but with the steamship owners behind it we feel confident that it can be accomplished without undue loss of time."

Association Branches Out

At the annual meeting of the Atlantic Coast Shipbuilders' Association, held in Philadelphia May 9, the association decided to extend its field to embrace the entire shipbuilding industry, repair plants included, and to endeavor to enroll every building yard and drydock and repair plant on the Atlantic and Gulf. Heretofore membership has been confined to builders of steel vessels.

Pacific Building

Bethlehem

The Union Works of Bethlehem launched the 10,100-ton tanker Hammac for the Shipping Board in May and expected to launch the sister Hamer and deliver the sister Hambro late in the month. These are the last Shipping Board vessels building at the yard. The three tankers for the Standard Oil of California, Hillman, Storey and Rheem, are scheduled to be launched in July. Immediately after the ways become available the keels of the two 20,000-ton ore and oil carriers for the Ore Steamship Company will be laid, and they probably will be launched in October or November, with deliveries in January and February. Four destroyers, Preston, Lamson, Hull and Macdonough, were delivered in April.

Harbor Marine

The Harbor Marine Company, Victoria, delivered the 8390-ton freighter Canadian Traveller to the Canadian Government Merchant Marine April 9.

Kiangnan

The 10,000-ton Shipping Board freighter Celestial, the second of four building at the Kiangnan yard, Shanghai, is expected to arrive at a port of the Pacific Coast for delivery about the end of June. The third, the Oriental, will not be ready until late autumn, and the fourth, the Cathay, not until next year. She probably will be the last of all vessels delivered to the board.

Los Angeles

The last 8800-tonner under construction by the Los Angeles Shipbuilding & Dry Dock Company for the Shipping Board, the West O'Rowa, was delivered May 7. Delivery of the 11,000-tonner West Lewark is estimated for June 15, and of the West Faralon for August 21, the other three to follow at intervals of a month.

A contract has been placed with the Los Angeles yard for repairs to the Edward Luckenbach, which will cost approximately $60,000. Work will cover bottom repairs due to grounding; renewing one boiler head, four furnaces and one main boiler; installing locomotive superheaters in three main boilers; installing entire new gravity lubricating system for main turbine reduction gears; removing old and installing new reduction gears and pinions and making miscellaneous repairs to shaft, bearings, etc.

Moore

Moore launched the 10,000-ton tanker Bohemian Club for the Shipping Board May 14 and expects to make delivery in June. The two sisters, Tustem and Lubrico, are scheduled for launching June 25 and for delivery about a month later. These vessels are the last government work at the Moore yard. The 14,000-ton freighter Manukai, the second of two sisters for Matson, was delivered in late May. The Standard Oil motorship H. T. Harper will be launched about June 15 and delivered about July 15; the 16,340-ton tanker Tamihua for the Southern Pacific Atlantic Line will be launched about July 2 and delivered a month later; and the last vessel building, the S. S. Birkenhead for Vacuum Oil, the name of which was recently assigned, will be launched about July 12 and delivered in late August.

The Manulani, the first of the two sisters delivered, arrived at Honolulu May 8, six days and 13½ hours from San Francisco, having made the voyage at an average speed of 13.3 knots an hour.

Northwest Bridge

The tanker Swifteagle was delivered by Northwest Bridge & Iron to Swiftsure Oil in April and the Swiftlight was launched and delivered in May. One vessel, the Swiftking, remains on the ways.

Prince Rupert

The Wallace Shipbuilding & Drydock Company, which is completing two Canadian Government Merchant Marine vessels at the Prince Rupert yard, launched the first of them, the Canadian Scottish, May 17.

Robertson

The James Robertson Shipyard, Alameda, launched and delivered a sidewheel ferry steamer to the Richmond-San Rafael Ferry Company in May.

Southwestern

The Southwestern Shipbuilding Company schedules launching of the three Dutch tankers, Scopas, Silvanus and Semiramis in May, June and July and deliveries in June, July and August.

Standifer

Standifer delivered the 11,940-ton tanker Calgarolite to Imperial Oil May 10 and launched the Albertolite, the last vessel under construction, April 29 and delivered her in May.

Todd

The Todd yard, Tacoma, launched the third scout cruiser, the Cincinnati, May 23, one year and eight days after keel-laying. Two years and eight days intervened between keel-laying and launching of the first vessel, and two years, three months and eleven days between keel and launching of the second. No vessels remain on the ways.

Union Construction

Union Construction delivered the tanker Acardo, the first of four for Anglo-Saxon Petroleum, in May, and launched the sister ship Achatina May 21.

Reports of the Yards

B. C. MARINE ENGINEERS & SHIPBUILDERS, LTD., VANCOUVER

Lady Kindersley, aux. schr. Hudson Bay Co; 3-masted, 200 LOA; 36 beam; 15 deep; 12 loaded draft; 700 DWT; oil engs 360 BHP built by William Beardmore & Co; speed 7½ knots.

Two 35-foot schrs. Hudson Bay Co.

Two 43-foot schrs; same.

Deliver all vessels May20/21, est.

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Purchasing Agent: O. W. Street

Hammac, hull 5274, tanker USSB; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT: rec engs 2600 IHP; 3 Scotch marine boilers 15x 11-9; **launch May/21**; deliver July30/21 est.

Alameda Works

Hambro, hull 5272, tanker USSB; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec engs 2700 IHP; 3 Scotch marine boilers 15x 11-9; keel Sept8/20; launch Apr15/21 deliver May31/21 est.

Hamer, hull 5273, tanker USSB; sister to Hambro; keel Nov1/20; launch May 28/21 est; deliver July30/21 est.

Chilore, hull 5309, combination ore and coal carrier Ore Steamship Company; 571-6 LOA; 550-1 LBP; 72 molded beam; 44 molded depth; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; Curtis turbines with Falk reduction gears; 5000 SHP; 3 Scotch SE boilers 17-6x12, each 4287 square feet; oil-burners; keel July/21 est; launch Oct/21 est; deliver Jan/22 est.

Lebore, hull 5310, combination ore and coal carrier Ore Steamship Company; sister to above; keel July/21 est; launch Nov/21 est; deliver Feb/22 est.

F. H. Hillman, hull 5311, tanker Standard Oil Co of California; 500 LBP; 68 beam; 25-11 loaded draft; 11 loaded speed; 15,000 DWT; rec engs 4000 IHP; 3 Scotch marine boilers 16-x12-9; keel Jan10/21; launch July5/21 est; deliver Aug15/21 est.

H. M. Storey, hull 5312, tanker Standard Oil Co of California; sister to F. H. Hillman; keel Jan19/21; launch July 15/21 est; deliver Sept1/21 est.

W. S. Rheem, hull 5313, tanker Standard Oil Co of California; sister to F. H. Hillman; keel Mar1/21; launch July 31/21 est; deliver Sept 15/21 est.

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Naval Work

Destroyers USN; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1308 tons; turbine engs 27,000 IHP; 4 Yarrows boilers as follows: **Preston, deliver Apr13/21; Lamson, Apr 19; Hull, Apr26; Macdonough, Apr30;** Farenholt, hull 332, launch Mar9/21; Sumner, hull 333, keel Aug 27/19, launch Nov24/20; Corry, hull 334, launch Mar28/21; Melvin, hull 335, launch Apr11/21.

Submarines USN: S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145, launch Jan5/21; S-41, hull 146.

CHOLBERG SHIPYARD, VANCOUVER, B. C.

Purchasing Agent: W. Meed.

Sir Henry Drayton, hull 5, 4-masted barkentine Victoria Shipowners, Ltd; 250 LOA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel; shaft logs fitted for auxiliary but no machinery installed; keel May 15/20; launch Aug1/21 est.

No name, hull 6, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel June4/20; launch Oct1/21 est.

No name, hull 7, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel Feb/21.

J. COUGHLAN & SONS, LTD., VANCOUVER, B. C.

Purchasing Agent: J. Joseph.

Canadian Transporter, hull 20, steel freighter Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE eng 3000 IHP; 3 Scotch boilers 15-6x11-6; keel Jan6/21.

Canadian Freighter, hull 21, steel freighter Canadian government; sister to above; keel Jan6/21.

HANLON DRYDOCK & SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: R. Barker.

Dan F. Hanlon, hull 89, steam schr. D. J. Hanlon; 2500 DWT; 1400 IHP engines; 2 B&W boilers.

HARBOR MARINE COMPANY, VICTORIA, B. C.

Purchasing Agent: B. L. Robertson.

Canadian Traveller, steel freighter Canadian government merchant marine; 400 LBP; 52 beam; 25-2 loaded draft; 11½ loaded speed; 8390 DWT; TE eng; 3 Scotch boilers 15-6x11-6; 2 deck; keel Aug9/19; launch Sept29/20; **deliver Apr9/21.**

Car ferry Canadian Pacific; 270 LOA; 42 beam; 12 molded depth; single-deck; three tracks, capacity 18 cars; launch Jan25/21.

LOS ANGELES SHIPBUILDING AND DRYDOCK CO., SAN PEDRO

West O'Rowa, hull 30, steel cargo USSB; 410 LBP; 54 beam, 24-2 loaded draft; 10½ loaded speed; 8800 DWT; TE eng 3500 IHP; 3 WT boilers; keel June14/20; launch Dec30/20; **deliver May7/21.**

West Lewark, hull 31, steel cargo USSB; 430 LBP; 54 beam; 28-2 loaded draft; 10½ loaded speed; 11,000 DWT; TE engs 3500 IHP; 3 Scotch single end 15-9; keel July30/20; launch Feb24/21; deliver June15/21 est.

West Faralon, hull 32, steel cargo USSB; sister to above; keel Sept27/20; launch Apr19/21; deliver Aug/21 est.

West Greylock, hull 33, steel cargo USSB; sister to above; keel Nov10/20; launch June15/21 est; deliver Sept/21 est.

West Prospect, hull 34, steel cargo USSB; sister to above; keel Dec31/20; launch July15/21 est; deliver Oct/21 est.

West Chopaka, hull 35, steel cargo USSB; sister to above; keel Feb24/21; launch Sept6/21 est; deliver Nov25/21 estimated.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: W. E. Hostetter.

Bohemian Club, hull 2862, tanker USSB; 425 LBP; 57 beam; 26 loaded draft; 10,000 DWT; rec eng; 3 Scotch boilers 15-2x11; keel Oct23/20; **launch May14/21**; deliver Jun15/21 est.

Tustem, hull 2863, tanker USSB; sister to above; keel Nov24/20; launch June25/21 est; deliver July20/21 est.

Lubrico, hull 2864, tanker USSB; sister to above; keel Jan/21; launch June 25/21 est; deliver July20/21 est.

Manukai, hull 159, freighter Matson Nav Co; 480 LBP; 62 beam; 30 loaded drat; 14,000 DWT; Parson engs; 5 Scotch marine boilers 15-6x12-3½; keel Aug 17/20; launch Feb 20/21; **deliver May/21.**

H. T. Harper, hull 163, tanker Standard Oil Co of California; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engs; keel Oct/20; launch June15/21 est; deliver July15/21 est.

Tamihua, hull 165, tanker S. P.-Atlantic S S Co; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; rec engs; 3 Scotch boilers 15-9x12; keel Feb28/21; launch July2/21 est; deliver Aug6/21 est.

S. S. Birkenhead, hull 166, tanker Vacuum Oil Co; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec engs; 3 Scotch marine boilers 15-2x12; keel Dec9/20; launch July12/21 est; deliver Aug20/21 est.

NAVY YARD, PUGET SOUND

Medusa, repair ship for government; 460. LBP; 70 beam; about 19 loaded draft; 17-5 loaded speed; turbine eng 7000 IHP; 2 WT express type boilers; 10,000 tons disp; keel Jan2/20; date of launching not set.

Holland, submarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K. loaded speed; turbine eng 7000 IHP; two WT express type boilers; 10,000 tons disp; keel Apr11/21.

NAVY YARD, MARE ISLAND

California, battleship USN; 600 LBP; 97-3½ beam; 30-3 loaded draft; 21 loaded speed; 32,300 disp; turbo-electric engs 26,800 SHP; 8 Bu's express boilers 50,984 sq ft; keel Oct25/16; launching Nov20/19.

Montana, battleship USN; 660 LBP; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 disp; turbo-electric engs 60,000 SHP; 12 Bu's express boilers 74,040 sq ft; keel Sept1/20.

Wasmuth, destroyer USN; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 disp; geared turbine eng 26,000 SHP; 4 Normand boilers 27,000 sq ft; keel Aug12/19; launch Sept15/20.

Trever, destroyer USN; sister to above; keel Aug12/19; launch Sept15/20.

Perry, destroyer USN; sister to above; keel Sept15/20.

Decatur, destroyer USN; sister to above; keel Sept15/20.

NORTHWEST BRIDGE & IRON COMPANY, PORTLAND

Purchasing Agent: W. C. Smith.

Swifteagle, tanker Swiftsure Oil Trans Co (France & Canada S S Co); 12,000 DWT; shelter-deck; Isherwood system; 465-7 LBP; 60 beam; 26-3 loaded draft; 10½ loaded speed; TE eng 3150 IHP; 3 Scotch boilers 15-5½x 11-9; launch Apr9/21; deliver Apr/21.

Swiftking, tanker Swiftsure Oil Trans Co; sister to above.

Swiftlight, tanker Swiftsure Oil Trans Co;sister to above; **launch May4/21; deliver May/21.**

PACIFIC COAST SHIPBUILDING CO., BAY POINT

Purchasing Agent: J. A. Smiley.

Nashaba, hull 950, steel cargo USSB; 402-6 LBP; 53 beam; 26-6 loaded draft; 9400 DWT turb eng 2800 IHP; 3 Scotch boilers 11x15-6; keel Aug25/19; launch Mar24/21; deliver June10/21 est.

PRINCE RUPERT DRYDOCK & ENGINEERING COMPANY, PRINCE RUPERT

Canadian Scottish, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Sept27/19; **launch May17/21.**

Canadian Thrasher, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Oct20/19.

These vessels will be completed by the Wallace Shipbuilding & Drydock Co, North Vancouver. The terms are time and material plus 8 per cent.

JAMES ROBERTSON SHIPYARD, ALAMEDA

Purchasing Agent: James Robertson.

City of Richmond, side-wheel ferryboat Richmond-San Rafael Ferry Co; 190 LBP; 34 beam; 17 loaded draft; 10 loaded speed; diagonal cross comp eng 500 IHP; 2 marine dry back boilers 9x 17; keel Nov15/20;**launch and deliver May/21.**

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

La Purisima, hull 23, Isherwood tanker Union Oil Co; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engs 2800 IHP; 3 Scotch boilers 14x12; keel Dec22/20; launch July/21 est; deliver Aug/21 est.

Scopas, hull 24, Isherwood tanker Nederlandsch - Indische Tankstoomboot Maatschappij; 412 LBP; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engs 2800 IHP; 3 Scotch boilers 15-6x11-7; keel Oct20/20; launch May/21 est; deliver June/21 est.

Silvanus, hull 25, Isherwood tanker Nederlandsch - Indische Tankstoomboot Maatschappij; same as above; keel Oct 20/20; launch June/21 est; deliver July /21 est.

Semiramis, hull 26, Isherwood tanker Nederlandsch - Indische Tankstoomboot Maatschappij; same as above; keel Nov 5/20; launch July/21 est; deliver Aug /21 est.

G. M. STANDIFER CONSTRUCTION CORP., VANCOUVER, WASH.

Calgarolite, hull 19, shelter-deck tanker Imperial Oil; 463 LBP; 60 beam; 26 loaded draft; 10½ loaded speed; 11,940 DWT; rec eng 3000 IHP; 3 Scotch boilers 14-9; keel Dec10/20; launch Apr 16/21; **deliver May10/21.**

Albertolite, hull 20, shelter-deck tanker Imperial Oil; sister to above; keel Dec21/20; **launch Apr29/21; deliver May/21.**

TODD DRYDOCK & CONSTRUCTION CORPORATION, TACOMA

Purchasing Agent: C. L. Bankson.

Omaha, hull 100, scout cruiser USN, 555-6 LOA; 550 LBP; extreme beam 55-4; molded beam 54-9; depth molded 26; mean loaded draft 13-6; disp 7100 tons; Westinghouse Parsons turbines and reduction gear, 105,000 IHP; designated speed 34; 12 Yarrows WT boilers; keel Dec6/18; launch Dec14/20.

Milwaukee, hull 106, scout cruiser USN; sister to above; keel Dec13/18; launch Mar24/21.

Cincinnati, hull 107, scout cruiser USN; sister to above; keel May15/20; **launch May23/21.**

UNION CONSTRUCTION COMPANY, OAKLAND

Acardo, hull 15, oil-tanker Anglo-Saxon Petroleum Corp, Ltd; 412 LBP; 53-5 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec engs 2600 IHP; 3 Scotch marine boilers 15-6x11-7; keel Aug7/20; launch March12/21; **deliver May/21.**

Tampa, hull 16, cutter USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engines 2600 IHP; 2 WT boilers; keel Sept27/20; launch April16/21.

Haida, hull 17, cutter for USCG; same as above; keel Sept27/20; launch Apr19/21.

Mojave, hull 18, cutter USCG; same as above; keel Apr16/21; launch Sept 10/21 est.

Modoc, hull 19, cutter USCG; same as above; **keel Apr19/21**; launch Sept 10/21 est.

Shawnee, hull 20, cutter USCG; 150 LOA; 30 beam; 13-6 loaded draft; 12½ loaded speed; 1000 DWT; rec engs 1000 IHP; 2 WT boilers; keel June1/21 est.

Achatina, hull 21, oil-tanker Anglo-Saxon Pet Corp, Ltd; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec engs 2600 IHP; 3 Scotch marine boilers 15-6x11-7; keel Dec15/20; **launch May21/21.**

Ampullaria, hull 22, oil-tanker Anglo-Saxon Pet Corp, Ltd; sister to Achatina; keel Feb5/21; launch June20/21.

Amalthus, hull 23, oil-tanker Anglo-Saxon Pet Corp, Ltd; sister to Achatina; keel Mar12/21; launch July15/21 estimated.

All cutters on transverse system; others on Isherwood system.

WALLACE SHIPBUILDING & DRYDOCK CO., VANCOUVER, B. C.

Canadian Skirmisher, cargo Canadian government; 8400 DWT; 413 long; 52 beam; 31 deep; 11½ loaded speed; keel Oct/20; launch Mar17/21.

Coastwise steamship Canadian Pacific; 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel Oct/20; launch May/21 est; deliver Aug or Sept/21 est.

This company also will complete the Canadian government steamships Canadian Reaper and Canadian Thrasher, each of about 8400 tons deadweight, work on which was suspended when the Prince Rupert Drydock & Engineering Company went into the hands of a receiver.

On the East Coast

Baltimore

The Tulsagas, a tanker built for the Shipping Board by the Baltimore Drydocks & Shipbuilding Company, was launched April 30.

Bethlehem

Sparrows Point, Bethlehem, has delivered the 10,100-ton tanker Alladin to the Standard Transportation Company and has launched the combination Pine Tree State for the Shipping Board and the 8400-ton tanker Emil Deutsch de la Meurthe for the Lux Navigation Company. The sister Henry Deutsch de la Meurthe was delivered in April, as were the 12,600-ton tanker Agwipond to the Atlantic, Gulf & West Indies and the combination Buckeye State to the Shipping Board.

Harlan has delivered the 6900-ton tanker E. R. Kemp to the Sinclair Navigation Company. A sister, E. E. Sinclair, was launched in March and delivered April 27.

Fore River has delivered the 12,600-ton tanker India Arrow to the Standard Transportation Company. The sister Java Arrow was launched April 30.

California Brick

The Moffitt, a 7500-ton concrete tanker, was delivered in April by the California Brick Company, Jacksonville, Florida. The hull of this vessel was constructed by A. C. Bentley & Sons Company, Jacksonville, Florida, which previously built the hull of the Dinsmore, a tanker of similar design. The two vessels were outfitted by the California Brick Company. The Moffitt is the last vessel of the concrete program.

Canadian Vickers

Canadian Vickers, Montreal, delivered the 8400-ton Canadian Commander to the Canadian government merchant marine April 29 and followed with the sister Canadian Leader in May. The Topdalsfjord, a 6400-ton tanker for the Norwegian America Line, was launched May 5.

Daniels

Oscar Daniels Company, Tampa, delivered the 9500-tonner City of Brunswick to the Shipping Board early in May. She was the last of ten vessels built for the board. The Standard Oil tanker T. J. Williams was launched May 3.

Doullut & Williams

Doullut & Williams, New Orleans, delivered the 9600-ton steamship Jeff Davis to the Shipping Board April 22 and the sister ship Galveston April 6. Keels of the two 1000-barrel steel barges were laid in late April, launching and delivery to be in May; and four other barges will follow. The Shipping Board freighter Ward, the seventh of the series, was scheduled to be completed in May.

Federal

Federal, Kearny, New Jersey, delivered the 15,000-ton tanker Vancolite to the Standard Oil of New Jersey April 15. She was the second of five sisters. The seventh pontoon of the new Federal drydock was launched April 16.

Great Lakes

Great Lakes Engineering Works, River Rouge, Michigan, delivered the yacht Delphine to the estate of Horace E. Dodge May 15.

Jahncke

The Jahncke Dry Dock & Ship Repair Company, New Orleans, is about to spend $2,000,000 in new equipment and extensions to its plant in New Orleans and in addition will build a new 600-foot steel wharf below the present yard, which will give much needed additional steamer repair berths. The Dock Board of New Orleans recently granted the Jahncke Company the right to use the additional 600 feet on the waterfront, says the bulletin of the Atlantic Coast Shipbuilders' Association.

Lake

Lake Torpedo Boat Company, Bridgeport, has launched two submarines for the United States Navy, the second, the S-49, having gone down the ways on April 23.

Merchant

Merchant, Chester, Pennsylvania, launched the 10,000-ton tanker Puente for the Union Oil Company April 28. The company stated that of 24,000 rivets driven in the afterpeak tank, only three were ordered replaced after inspection, which is believed to constitute a world's record for efficient work.

The combination steamship Mount Clinton, built by Merchant for the Shawmut Steamship Company, was delivered in April. The Mount Carroll, a sister, was delivered in March. They will be used between New York and Hamburg.

A statement signed by J. L. Ackerson, second vice-president of the yard, reads in part as follows: "Despite the adverse business conditions existing in shipping and shipbuilding throughout the world, the Merchant Shipbuilding Corporation has decided to branch out into steel construction in general, manufacturing and power plant equipment, machinery and machine work, special railroad equipment and material, plate shop work, ship conversion and repair work.

"The new departure into the general engineering and construction field means that the corporation has seized the dormant period in shipbuilding to extend its industrial activities and utilize its most modern shipbuilding and engineering equipment in a wider range of its industrial uses which will permanently benefit the Chester yard and the city in which it is located.

"The extension into these new fields will in no way affect the shipbuilding activities, but will rather be supplemental to the main purposes of the yard, which will go forward just as soon as shipping and shipbuilding revive.

"Our intention is two-fold in this expansion project: first, to hold together our excellent shipbuilding organization; and secondly, while doing so seek other fields of endeavor which will hold this organization together until such times as it can go ahead under normal shipbuilding conditions."

Morse

A new world's record in drydocking ships was established in April, when the steamship America was lifted on the 30,000-ton floating drydock of the Morse Dry Dock & Repair Company, Brooklyn, in twenty-eight minutes and seven seconds after she was centered over the keel blocks. The America, a vessel of 22,622 tons gross and 687 feet long, covered practically the entire length of the dock, 700 feet. The last three feet of the vessel to come out of the water was raised in four minutes and thirty seconds, the speed having gradually increased as the dock relieved itself of the weight of the water. The America is the largest vessel ever raised on a floating drydock in this or any other country, and the time in which the vessel was lifted has never been equaled, says a statement of the Morse company. She is being reconditioned by Morse for the trans-Atlantic service of the United States Mail Line.

Navy Yard, Boston

Boston Navy Yard launched the fuel ship Pecos for the Navy April 23 and immediately laid the keel of the destroyer-tender Whitney, construction of which will require about a year. The Whitney will be named for the late William C. Whitney, former secretary of the navy.

Navy Yard, Philadelphia

The Philadelphia Navy Yard launched the destroyer Dobbin May 5. She is the third vessel of her class to leave the ways at the yard, but is the first that embodies the lessons of torpedo-defense learned during the war.

Newburgh

Newburgh launched the combination vessel Comayagua for the Cuaymol Fruit Company April 21. She is the third of three sisters, all designed for the transportation of 50,000 bunches of bananas and twenty-four passengers between Puerto Cortez and New Orleans. The vessels are shelter-deck, 301 feet long by 42 beam by 24 feet molded depth, with a deadweight of 2100 tons on a mean draft of 16 feet 6 inches.

Newport News

Naval engineers who witnessed the first dock trials of the superdreadnought Maryland at the Newport News Shipbuilding & Drydock Company in May, said that the demonstration was one of the best ever made by a capital ship. The Maryland is expected to go to sea late in June for the builders' sea trials and will be ready for acceptance by the navy early in July. She will be the third electrically propelled battleship in the United States Navy. In making the dock trials, the ship was secured to the dock by heavy cables and then the complete propelling machinery was set in operation. The trials lasted sixteen hours, with eight hours' test on each of the turbine-generator sets. The motors were operated separately and paired in various combinations, being subjected to strain equivalent to 21.5 knots at sea.

The trial trip of the Silver State, being built at the Newport News Shipbuilding & Drydock Company's yard, was held May 5. The Silver State will take the place of the Keystone State on the schedule of the Admiral Line. During the trials the vessel easily maintained a speed of 18½ knots. The Admiral Line will sail the Silver State from New York on June 4, with passengers and cargo to Seattle, via Havana, Panama Canal, Los Angeles and San Francisco. The vessel was the last built by Newport News for the Shipping Board.

New York

New York Shipbuilding Corporation delivered the combination Centennial State to the Shipping Board April 23. The name of the Sea Girt, a 535 combination, has been changed to Southern Cross. The sister Keystone State was scheduled for delivery in May. The name Dixie Arrow has been assigned to hull 266, a 12,550-ton tanker, for Standard Transportation.

Pensacola

The Pensacola Shipbuilding Company has contracted to build for the Alexandria Coaling Company of New Orleans two 600-ton coal barges 135 feet in length and 30 feet in beam. Four smaller steel oil barges will be built for a Tampico oil company.

Port Arthur

The 3000-ton Lake freighter Glenafton was delivered by the Port Arthur Shipbuilding Company to the Glen Transportation Company April 30.

Saginaw

The Saginaw Shipbuilding Company delivered the 4200-ton steamship Lake Miraflores to the Shipping Board April 21. She was the last vessel building for the board in the Lakes district, although at the last of April vessels building on the Atlantic, Gulf and Pacific numbered 44 of 452,500 deadweight tons.

Staten Island

Staten Island delivered the barge Socony 107 to Standard Oil of New York in April. Five others remain under construction. The last large vessel, the American Sugar Refining Company's Dixiano, will be delivered about June 1. The keels of a tugboat and a fireboat were to be laid in May.

Submarine Boat

Submarine Boat, Port Newark, has completed and delivered twelve steel barges for the Submarine Boat's Transmarine Line. The 5350-tonner Sucubaco for the Submarine Boat was delivered May 4 and the Supheneo, which will be a motorship instead of a steamship, was launched April 12. She is the last vessel under construction.

Sun

The Sun yard, Chester, launched the 12,800-ton tanker J. N. Pew for the Sun Oil Company April 23. She was named for the father of J. N. Pew, Jr., chairman of the Sun Shipbuilding board, and of J. Howard Pew, president of Sun Oil. A pontoon, the tenth of a series under construction, was launched the same day. The tanker Cerro Azul, delivered to Pan-American Petroleum recently, attained a sea speed of 12¾ knots on a full loaded draft of 27 feet, a performance that ranks her as one of the highest-speed tankers ever built in America. The keels of two tankers for the Sun Oil Company, hulls 46 and 47, were laid in April.

Todd

The Shipping Board has awarded a contract to the Robins Dry Dock & Repair Company (Todd Shipyards Corporation) for the installation of steerage accommodations in the new 522-foot combination freight and passenger liner Centennial State. The Robins plant for $128,000 agreed to put in quarters for 650 passengers on the new liner. She will be delivered early in June and will make her maiden voyage for London under the house flag of the United States Mail Steamship Company during that month. The Centennial State was built by the Camden yard of the New York Shipbuilding Corporation, and has just been delivered. The Blue Hen State, the last of seven 522-foot liners, will be completed soon and will be converted in a similar fashion.

Shipbuilding Returns

Atlantic and Gulf

AMERICAN BRIDGE COMPANY, PITTSBURGH, PENN.

Purchasing Agent: W. G. A. Millar.

Twenty-five coal barges Carnegie Steel Co; 175 LBP; 26 beam; 8 loaded draft; 4 launch Mar/21; 5 launch Apr/21.

Six coal barges US War Dept; 145 LBP; 24 beam; 9 loaded draft; keel Mar/21; launch May/21 est; deliver May/21 est.

Three car floats undisclosed interests; 285 LBP; 38 beam; 8 loaded draft; keel June/21 est; launch Aug/21 est; deliver Sept/21 est.

Two coal barges W. G. Coyle & Co, New Orleans; 175x26x8 loaded draft; launch and deliver July/21.

Two tow boat-hulls Carnegie Steel Co; 149-2x34 4-5 loaded draft; launch and deliver Aug/21.

BATH IRON WORKS BATH, MAINE

Purchasing Agent: John L. P. Burke.

Thomas P. Beal, hull 86, freighter

The 23,000-ton steamship America on the Morse floating drydock, Brooklyn
Photographic department, Morse Dry Dock & Repair Company

Crowell & Thurlow; 395-6 LBP; 55 beam; 27-1 loaded draft; 10 loaded speed; 9600 DWT; Parsons geared turb 2100 SHP; 3 Scotch boilers 15-6x11-6; keel Nov/20; launch June/21 est; deliver Aug/21 est.

BETHLEHEM SHIPBUILDING CORP., FORE RIVER PLANT, QUINCY, MASSACHUSETTS

Lexington, hull 1300, battle-cruiser USN.

Raleigh, hull 1382, scout cruiser USN.

Detroit, hull 1383, scout cruiser USN.

Massachusetts, hull 1400, battleship USN.

And the following nineteen submarines USN: AA-2, hull 1270; hulls 1309 to 1320 inc., submarines S-18 to S-29 inc; hulls 1389 to 1394 inc, submarines S-42 to S-47 inc.

Java Arrow, hull 1388, tanker Standard Trans Co; 468-6 LBP; 62-6 beam; 27 loaded draft; 11 loaded speed; 12,620 DWT; rec eng 3200 IHP; 3 Scotch boilers 15-3 x 11-6; keel May17/20; **launch Apr30/21.**

Agwibay, hull 1395, tanker At Gulf & W I SS Co; sister to above; keel Aug27/20.

J. Fletcher Farrell, hull 1496, tanker Sinclair Nav Co; 430 LBP; 59 beam; 25-5 loaded draft; 11 loaded speed; 10,600 DWT; rec eng 3200 IHP; 3 Scotch boilers 15x11-9.

William Boyce Thompson, tanker Sinclair Nav Co; sister to above; keel Nov11/20.

BETHLEHEM SHIPBUILDING CORP., SPARROWS POINT PLANT, SPARROWS POINT, MARYLAND

Pine Tree State, hull 4195, combination USSB; 518 LBP; 72 beam, 30-7 loaded draft; 17½ loaded speed; 11,700 DWT; turb eng 12,000 SHP; 8 Yarrows boilers; keel Feb 15/19; launch Mar19/21.

Palmetto State, hull 4196; combination USSB; sister to above, keel Feb 19/19.

Nutmeg State, hull 4197, combination USSB; sister to above; keel July 29/20.

Emil Deutsch de la Meurthe, hull 4209, tanker Lux Nav Co; 412 LBP; 53-1 beam; 24-5 loaded draft; 11 loaded speed; 8400 DWT; rec eng 2850 IHP; 3 Scotch boilers; keel Dec14/20; launch Apr16/21.

G. Harrison Smith, hull 4210, ore and oil International Pet Co; 550 LBP; 72 beam; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; rec eng 4600 IHP; 3 Scotch boilers 17-6x12; keel July22/20.

Bethore, hull 4211, ore and oil Ore SS Co; sister to above; keel Feb24/21.

Marore, hull 4212, ore and oil Ore SS Co; sister to above except turb eng; keel not laid.

Steelore, hull 4213, ore and oil Ore SS Co; sister to above, keel not laid.

CONSOLIDATED SHIPBUILDING CORPORATION, MORRIS HEIGHTS, N. Y.

Purchasing Agent: William Rayner.

Oak, hull 251, US lighthouse tender; 160 LOA; 30 beam; 9-6 loaded draft; 875 DWT; TE eng 700 IHP; 1 Scotch boiler 14 diam; keel Nov22/20; launch May/21 est; deliver July/21 est.

Hawthorn, hull 252, US lighthouse tender; sister to above; keel Nov22/20; launch May/21 est; deliver July/21 est.

No name, hull 246, US lightship; 146-3 LOA; 30 beam; 12-7 loaded draft; 825 DWT; comp eng 400 IHP; 2 Scotch boilers 10-6 diam; keel Mar4/21; launch May/21 est; deliver Aug/21 est.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING COMPANY, PHILADELPHIA

Purchasing Agent: Ed. C. Geehr.

Hull 448, scout cruiser USN; keel Feb16/20.

Hull 449, scout cruiser USN; keel Mar29/20.

Hull 501, scout cruiser USN; keel Aug18/20.

Hull 502, scout cruiser USN; keel Aug4/20.

Hull 503, scout cruiser USN; keel Oct14/20.

Cuba, hull 505, passenger P&OSS Co; 325 LBP; 47 beam; 16 loaded draft; 16 loaded speed; 1100 DWT; 2-cyl TE eng 1800 IHP each; 4 SE Scotch boilers 12 x14-6; keel May3/20; launch Dec11/20; deliver Apr15/21 est.

OSCAR DANIELS COMPANY, TAMPA, FLORIDA

Brunswick, hull 10, Isherwood cargo USSB; 416 LBP; 54 beam; 26-11 loaded draft; 11 loaded speed; 9600 DWT; TE eng 2800 IHP; 3 WT boilers; keel Oct 27 / 19; launch Feb17/21; **deliver May/21.**

B. D. Benson, hull 11, Isherwood tanker Standard Oil; 466 LBP; 60 beam; 26-7 loaded draft; 10½ loaded speed; 11,900 DWT; QE eng 2800 IHP; 3 Scotch boilers 15x11-6; keel June29/20; launch Apr15/21; deliver June15/21 estimated.

T. J. Williams, hull 12, Isherwood tanker Standard Oil; sister to above; keel Aug11/20; **launch May3/21;** deliver Aug15/21 est.

DOULLUT & WILLIAMS SHIPBUILDING CO., NEW ORLEANS

Purchasing Agent: B. A. Solomon.

Jeff Davis, hull 1911, Isherwood SS for USSB; 395-6 LBP; 55 beam; 27 loaded draft; 11 loaded speed; 9600 DWT; turbine eng 2800 IHP; 3 WT boilers 9150 sq ft; keel Jan26/20: launch Oct30/20; **deliver Apr22/21.**

Galveston, hull 1912, sister to above; keel Feb20/20; launch Dec18/20; **deliver Apr6/21.**

Ward, hull 1913, sister to above; keel Mar25/20; launch Jan22/21; delivery May15/21 est.

Oldham, hull 1914, sister to above; keel Apr17/20; launch Mar19/21; deliver May/21 est.

FEDERAL SHIPBUILDINB COMPANY KEARNY, N. J.

Purchasing Agent: J. L. Hastings.

Vancolite, hull 46, tanker Standard Oil of NJ; 500 LBP; 68 beam; 27-6 loaded draft; 11 loaded speed; 15,000 DWT; rec engs 3500 IHP; 3 Scotch boilers; keel May5/20; launch Mar24/21; **deliver Apr15/21.**

E. T. Bedford, hull 48, tanker Standard Oil of NJ; sister to above; keel July 25/20; **launch May17/21.**

Victolite, hull 49, tanker Standard Oil of NJ; sister to above; keel July22/20; launch June/21 est.

J. A. Moffett, Jr., tanker Standard Oil of NJ; sister to above; keel July23/20; launch June/21 est.

Steel Seafarer, hull 43, freighter US Steel Products Co; 425 LBP; 56 beam: 25-10 loaded draft; 12 loaded speed; 9400 DWT; turb engs 3100 IHP; 3 Scotch boilers; keel June/21 est.

Steel Pathfinder, hull 44, freighter US Steel Products Co; sister to above; keel June/21 est.

Steel Pioneer, hull 45, freighter US Steel Products Co; sister to above; keel June/21 est.

GLOBE SHIPBUILDING & DRYDOCK COMPANY OF MARYLAND, BALTIMORE

Purchasing Agent: H. B. McCauley.

San Leopoldo, hull 101, oil-carrier Eagle Oil Transport Co; 401 LBP; 54 beam; 25-1 loaded draft; 10½ loaded speed; 8600 DWT; TE engs 2800 IHP; 3 Scotch boilers 15-3x11-6; keel Sept/20; launch May 15/21 est; deliver June 30/21 est.

San Leonardo, hull 102, oil-carrier Eagle Oil Transport Co; sister to above; keel Sept/20; launch May30/21 est; deliver July15/21 est.

GROTON IRON WORKS, GROTON, CONN.

Purchasing Agent: J. S. MacDougall.

No name, hull 13, ferry boat City of Boston, 174 LOA; 57 beam over guards; 900 gross; 2 vert comp eng 750 IHP each; 2 Scotch boilers 11x11; keel Nov/20; deliver May15/21 est.

Hull 14, submarine structure Western Elec Co; 130 overall; 12 beam; 15 deep; **deliver May/21.**

LAKE TORPEDO BOAT COMPANY, BRIDGEPORT, CONN.

Purchasing Agent: H. C. Stevens.

S-48, hull 48, submarine USN.

S-49, hull 49, submarine USN.

S-50, hull 50, submarine USN.

S-51, hull 51, submarine USN.

MERCHANT SHIPBUILDING CORP., CHESTER, PENN.

Purchasing Agent: G. Coit.

Mount Clinton, hull 380, combination Shawmut SS Co; 440 LBP; 57 beam; 28-8¾ loaded draft; 13 loaded speed; geared turb engs 4200 IHP; 4 Scotch boilers 15-10x12-1; keel May 27/20; launch Feb8/21; **deliver Apr/21.**

Puente, hull 381, tanker Union Oil Co; 424 LBP; 58 beam; 25-5 loaded draft; 10½ loaded speed; 10,000 DWT; TE engs; 3 Scotch boilers 15-3x11-7; keel July3/20; **launch Apr28/21;** deliver June/21 est.

Playa, hull 382, tanker Union Oil Co; sister to above; keel July22/20; launch May/21 est; deliver June/21 est.

Robert E. Hopkins, hull 383, tanker Tidewater Oil Co; sister to above; keel Aug30/20; launch May/21 est; deliver July/21 est.

Samuel Q. Brown, hull 384, tanker Tidewater Oil Co; sister to above; keel Oct1/20; launch May/21 est; deliver July/21 est.

No name, hull 385, freighter American-Hawaiian SS Co; 445 LBP; 59-8 beam; 28-6 loaded draft; 11½ speed; 11,000 DWT; 2 6-cyl, 4-cycle Diesel engs, 4500 metric; 1 vertical donkey 400 sq ft HS; keel Feb5/21; launch June/21 est.

No name, hull 386, freighter American-Hawaiian SS Co; sister to above; keel Feb10/21; launch July/21 est.

NAVY YARD, BOSTON

Pecos, fuel ship No. 18, USN; 455 LBP; 56-2 beam; 26-8 loaded draft; 14 loaded speed; 14,800 disp; rec eng 5200 IHP; 4 Ward WT boilers; keel June2/20; **launch Apr23/21;** deliver Oct/21 estimated.

Whitney, destroyer tender No. 4 US N; 460 LBP; 60-11 beam; 21 loaded draft; 16 loaded speed; 10,600 disp; geared Parsons turbs 7000 IHP; 2 WT exp small tube boilers; **keel Apr23/21**; launch Apr/22 est; deliver Oct/22 est.

NAVY YARD, PHILADELPHIA

Dobbin, hull 7, destroyer tender USN; 460 LBP; 60-10 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp; Parsons geared turb single screw engs 7000 SHP; 2 WT boilers; keel Dec23/19; **launch May5/21**; deliver date not determined.

Constitution, hull 8, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive 180,000 SHP; 16 WT boilers; keel Sept25/20; launch and deliver dates not determined.

United States, hull 9, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive 180,000 SHP; 16 WT boilers; keel Sept25/20; launch and deliver dates not determined.

NEW YORK SHIPBUILDING CORP., CAMDEN, N. J.

Purchasing Agent: L. G. Buckwalter.

Southern Cross, hull 241, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs 12,000 SHP; 8 WT boilers; keel Aug/18; launch July20/19; deliver fall/21 est.

American Legion, hull 242, combination USSB; sister to above; keel Jan 21/19; launch Oct11/21; deliver summer/21.

Centennial State, 249, combination USSB; 520-8 LBP; 62 beam; 32-3 loaded draft; 14 loaded speed; 13,050 DWT; 4 cyl. TE engs 7000 SHP; 6 SE Scotch boilers 13-3x11-6; keel Oct/19; launch Nov/20; **deliver Apr23/21.**

Blue Hen State, hull 250, combination USSB; sister to above; keel Mar4/20; launch Feb23/21; deliver summer/21 est.

Bay State, hull 251, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs 12,000 SHP; 8 WT boilers; keel Oct15/19; launch July17/20; deliver winter/21 est.

Peninsula State, hull 252, combination USSB; sister to above; keel July 20/20; launch Apr/21 est; deliver spring/22 est.

Keystone State, hull 253, combination USSB; sister to above; keel May13/19; launch May15/20; deliver May/21 est.

Empire State, hull 254, combination USSB; sister to above; keel May13/19; launch Aug4/20; deliver summer/21 est.

Lone Star State, hull, 255, combination USSB; sister to above; keel May 13/19; launch Oct23/20; deliver summer/21 est.

Hoosier State, hull 256, combination USSB; sister to above; keel May20/19; launch Oct23/20; deliver fall/21 est.

Yankee Arrow, hull 260, bulk oil Standard Trans Co, NY; 468 LBP; 62-6 beam; 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs 3200 SHP; 3 SE Scotch boilers 15-2x 11-6; keel Aug17/20; launch Apr10/21; deliver summer/21 est.

Empire Arrow, hull 261, bulk oil Standard Trans Co, NY; sister to above; keel Sept14/20; launch summer/21; deliver summer/21.

Levant Arrow, hull 262, bulk oil Standard Trans Co, NY; sister to above; keel Nov4/20; launch fall/21 est; delivery winter/21 est.

No name, hull 263, combination Munson SS Co; 414 LBP; 57-6 beam; 23 loaded draft; 15½ loaded speed; 4950 DWT; geared turbs 5800 SHP; 5 SE Scotch boilers 16-4x12-3; keel Sept30/20; launch summer/21 est; deliver winter/21 est.

No name, hull 264, bulk oil stock; 419-3 LBP; 56-3 beam; 25-9¼ loaded draft; 10¾ loaded speed; 9870 DWT; 3 cyl TE engs 3000 SHP; 3 SE Scotch boilers 15-10x11-4; keel Jan17/21; launch fall/21 est; deliver winter/21

No name, hull 265, bulk oil, stock; sister to above; keel spring/21 est; launch fall/21 est; deliver winter/21 est.

Dixie Arrow, hull 266, bulk oil Stand Trans Co, NY; 468 LBP; 62-6 beam; 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs 3200 SHP; 3 SE Scotch boilers 15-3x11-6; keel Aug11/20; launch fall/21 est; deliver winter/21 est.

Saratoga, hull 199, battle cruiser USN; 874 LOA; 850 LBP; 105-5¼ extreme beam; 31 mean draft; 43,500 normal disp; 33¼ loaded speed; GE turbo-electric drive; 180,000 SHP; 16 WT boilers 198,000 sq ft, plus 18,000 superheat; keel Sept25/20.

Colorado, hull 200, battleship USN; 624 LOA; 600 LBP; 97-3½ beam waterline; 30-6 mean draft; 32,600 normal disp; 21 loaded speed; Westinghouse turbo-electric drive, 28,900 SHP; 8 B&W WT boilers 41,678 sq ft, plus 4169 superheat; keel Mar29/19; launch Mar22/21.

Washington, hull 201, battleship US N; sister to above; keel June30/19.

STANDARD SHIPBUILDING CORP., SHOOTERS ISLAND, MARINERS HARBOR, NEW YORK

Purchasing Agent: Jamie Cortada.

San Ugon, hull 31, Isherwood tanker Eagle Oil Transport Company, London; 412 LBP; 53-1 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; TE engs 2850 IHP; 3 Scotch boilers 15-6x 11-7; keel May26/20; launch Apr16/21; **deliver May17/21.**

Hull 32, fireboat City of New York; 121 LBP; 27 beam; 14-9 deep; 12 loaded speed; comp eng 900 IHP; 2 B&W WT boilers, oil-burning; keel Mar31/21; deliver Sept1/21 est.

STATEN ISLAND SHIPBUILDING COMPANY, STATEN ISLAND, NEW YORK

Purchasing Agent: R. C. Miller.

Dixiano, hull 726, sugar ship Am. Sug. Re. Co; 360 LBP; 50 beam; 23 loaded draft; 10 loaded speed; 6300 DWT; TE eng 2000 IHP; 2 Scotch boilers 15x11; keel Sept9/20; launch May21/21 est; deliver June1/21 est.

Hell Gate, hull 728, dredge V. C. Browning; 140 LBP; 48 beam; 15 loaded draft; keel Aug28/20; launch Feb 23/21.

Socony 107, hull 730, barge Standard Oil NY; 150 LBP; 27 beam, 11½ loaded draft; 489 DWT; keel Dec15/20; launch Mar21/21; **deliver Apr12/21.**

Socony 108, hull 731, barge Standard Oil NY; sister to above; launch and delivery dates same.

Socony 109, hull 732, barge Standard Oil NY; sister to above; keel Jan10/21; **launch and deliver May/21.**

Socony 113, hull 733, barge Standard Oil NY; 258 LBP; 40 beam; 13 loaded draft; 2200 DWT; keel Dec30/20; deliver May30/21 est.

Socony 114, hull 734, barge Standard Oil NY; sister to above; keel Jan10/21; deliver June30/21 est.

Socony 115, hull 735, barge Standard Oil NY; sister to above; keel Feb26/21; deliver July30/21 est.

Hull 736, tugboat Staples Trans Co; 136½ LBP; 27 beam; 16½ loaded draft; 10 loaded speed; 1 TE eng 700 HP; 2 Scotch boilers 16x11½; keel May 16/21 est; deliver Sept15/21 est.

Hull 737, fireboat City of New York; 247 LBP; 66 beam; 19½ loaded draft; 15 loaded speed; 1 F&A comp eng 3500 HP; 4 B&W WT boilers 13,000 sq ft; keel May23/21 est; deliver Oct17/21 estimated.

SUBMARINE BOAT CORPORATION PORT NEWARK, N. J.

Purchasing Agent: W. C. Lawrence.

Sucubaco, hull 149, ocean freight Submarine Boat Corp; 324 LBP; 46-2 beam; 23 loaded draft; 11 loaded speed; 5350 DWT; turbine engs 1860 IHP; 2 B&W boilers 2000 HP; keel May24/20; launch Feb24/21; **deliver May4 21.**

Suphenco, hull 150, motorship Submarine Boat Corpn; sister to above; keel May29/20; **launch Apr12/21**; deliver June1/21 est.

SUN SHIPBUILDING COMPANY, CHESTER, PENN.

Purchasing Agent: H. W. Scott.

J. N. Pew, hull 39, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs 4300 IHP; 3 SE Scotch boilers 15-10x11-11¼; keel Nov 5/20; **launch Apr23/21**; deliver May 15/21 est.

Agwiharve, hull 40, tanker A. G. W. I. S. Co.; 480 LBP; 65-9 beam; 26-7 loaded draft; 12 loaded speed; 12,500 DWT; single screw QE engs 4300 IHP; 4 SE Scotch boilers 15-10x11-11¼; keel Nov26/20; launch Apr2/21; deliver May 23/21 est.

Agwimex, hull 41, tanker A. G. W. I. S. Co; sister to above; keel Dec8/20; launch May21/21 est; deliver July 1/21 estimated.

Agwiscot, hull 42,tanker A. G. W. I. S. Co; sister to above; keel Dec23/20; launch July2/21 est; deliver July30/21 estimated.

Agwistates, hull 43, tanker A. G. W. I. S. Co; sister to above; keel Jan3/21; launch July16/21 est; deliver Aug15/21 est.

No name, hull 44, tanker Benham & Boyesen, Inc; 430 LBP; 59 beam; 25-7 loaded draft; 11 loaded speed; 10,600 DWT; TE engs 2600 IHP est; 3 SE Scotch boilers 15-10x11-11¼; keel Jan 12/21; launch May7/21 est; deliver June1/21 est.

No name, hull 45, tanker Tidewater Oil Co; sister to above, except loaded speed is 10½; keel Feb23/21; launch June4/21 est; deliver June30/21 est.

No name, hull 46, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs 4300 IHP ' SE Scotch boilers 15x11-11¾; keel Apr/21; launch Aug30/21 est; deliver Sept30/21 est.

No name, hull 47, tanker Sun Oil Co; sister to above; keel Apr/21; launch Sept3/21 est; deliver Oct3/21 est.

TANK SHIPBUILDING CORPORATION, NEWBURGH, N. Y.

Building non-propelled oil barges.

TERRY SHIPBUILDING CORP'N, SAVANNAH

Purchasing Agent: H. A. Bittner.

Hull 69, oil-barge builder's account;

285 LBP; 44 beam; 21 loaded draft; 3500 DWT.

Hulls 70, 71, 72; sisters to above.

TEXAS STEAMSHIP COMPANY, BATH, MAINE

Purchasing Agent: A. R. Weber.

Illinois, hull 31, tanker Texas S S Co; 415-10 LBP; 56 beam; 25-7¾ loaded draft; 11½ loaded speed; 9600 DW T; TE engs 3000 IHP; 3 Scotch boilers 15-3x11; keel Oct19/20.

No name, hull 32, tanker Texas S S Co; sister to above; keel Nov10/20.

American Lakes

ANCHOR SHIPBUILDING COMPANY, WASHBURN, WIS.

Purchasing Agent: George F. Morgan.

Double ended ferry, no name, Hudson & Athens Ferry Co; 113 LBP; 33 beam; 7 loaded draft; 8 loaded speed; Ingersoll-Rand Diesel engs 300 IHP; keel Feb/21; launch May28/21 est.

DEFOE SHIPBUILDING COMPANY, BAY CITY, MICH.

Purchasing Agent: A. D. Defoe.

Major Lester E. Moreton, hull 54, mine planter US Govt; 100 LBP; 22 beam; 11 loaded draft; 12 loaded speed; comp eng 350 IHP; LWT boiler; **delivered.**

Major Albert G. Jenkins, hull 55, mine-planter US; sister to above; delivered.

Major Wm. P. Pence, hull 56, mine-planter US; sister to above; deliver May 20/21 est.

Captain Clarence M. Condon, hull 57, mine planter US; sister to above; deliver May25/21 est.

Captain John W. McKie, hull 58, mine-planter US; sister to above; deliver May30/21 est.

GREAT LAKES ENGINEERING WKS. RIVER ROUGE, MICH.

Purchasing Agent: A. Q. Kretlow.

Delphine, hull 239, yacht Horace E. Dodge estate; 250 LBP; 35-5 beam; 14-8 loaded draft; 16 loaded speed; 4-cyl QE engs 3000 IHP; 3 WT boilers; keel June 17/20; launch Apr2/21; **deliver May15/21.**

SAGINAW SHIPBUILDING CO., SAGINAW, MICH.

Lake Miraflores, hull 147, 2-deck ocean vessel USSB; 253-6 LBP; 43-8 beam; 24-3 loaded draft; 9½ loaded speed; 4245 DWT; inv TE eng 1500 IHP; 2 Wickes WT boilers 13-2x15; launch Jan 13/21; **deliver Apr21/21.**

Canadian

CANADIAN VICKERS, LTD., MONTREAL

Purchasing Agent: H. Graham.

Canadian Commander, hull 79, single-screw steel 2-deck cargo for Canadian government merchant marine; 400 LBP; 31 loaded draft; 11 loaded speed; 8400 DWT; TE engs 3000 IHP; 3 Scotch boilers 15-6; keel June2/20; launch Oct 30/20; **deliver Apr29/21.**

Canadian Leader, hull 80, single-screw steel 2-deck cargo Canadian government merchant marine; sister to above; keel June 29/20; launch Nov27/20; **deliver May/21.**

Idefjord, hull 81, single-screw steel 2-deck cargo Norwegian America Line; 365 LBP; 49½ beam; 29 loaded draft; 11½ loaded speed; 6400 DWT; TE engs 2600 IHP; 3 Scotch boilers 14-9 with superheaters; keel May 8 / 20; launch Apr9/21; deliver May/21 est.

Topdalsfjord, hull 82, Norwegian America Line; sister to above; keel July 29/20; **launch May 5/21**; deliver June /21 est.

DAVIE SHIPBUILDING & REPAIRING CO., LTD., LAUZON LEVIS, P. Q., CANADA

Purchasing Agent: N. W. Van Wyck.

Canadian Challenger, hull 476, single-screw cargo Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE surface cond engs 3000 IHP; 3 Scotch marine boilers 15-6x11-6; keel May14/20; launch June/21 est.

PORT ARTHUR SHIPBUILDING CO., PORT ARTHUR, ONTARIO

Purchasing Agent: N. S. Thrasher, Cleveland, Ohio.

Canadian Harvester, hull 45, double-deck ocean freighter Canadian government merchant marine; 251 LBP; 43-6 beam; 22-3 loaded draft; 10 loaded speed; 3950 DWT est; 3 cyl TE 18-30-50x36 engs 1250 IHP; 2 Scotch boilers 16x10-9; keel Mar30/20; launch Nov 20/20; deliver May15/21 est.

Glenafton, hull 46, single-deck Lake freighter Glen Transportation Co; 251-11½ LBP; 42-6 beam; 16-6 loaded draft; 10 loaded speed; 3000 DWT est; 3 cyl TE 20-33-54x60 engs 1300 IHP; 2 Scotch boilers 14-6x11; keel Oct20/20; launch Mar30/21; **deliver Apr30/21.**

Miscellaneous Construction

COLUMBIA STEEL COMPANY, PITTSBURG, CALIF.

Steel castings for many steel vessels now under construction in the Pacific Coast yards, including the dreadnought Montana and sister ships 49, 50, 52; also for Coast Guard cutters under construction in the Union Const. Co. yard.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING COMPANY, PHILADELPHIA

Twelve Parsons manganese bronze propellers for scout cruisers 4, 5 and 6 building by Todd Drydock & Construction Corpn, Tacoma. Two right-hand and two left-hand propellers for each vessel. Weight of propellers 13,200 lbs. each; diameter 11-3; pitch 11-10.

ALLAN CUNNINGHAM COMPANY, SEATTLE

On order and under construction: Six steam and electric steering gears; 13 steam and electric anchor windlasses; 18 steam and electric and hydro-electric and hand capstans; 37 steam and electric winches.

DOW PUMP & DIESEL ENGINE COMPANY, ALAMEDA

H. T. Harper, motorship Standard Oil Co; one 200 IHP, two 267 IHP Diesel auxiliary electric drive engines.

JAMES C. H. FERGUSON, SALES AGENT, MONADNOCK BLDG., SAN FRANCISCO

American Engineering Co.: Two steering engines, hulls 21, 22, Southwestern; 4 steering engines, ferries Newark, Piedmont; electric capstans drydock Moore; hydraulic telemotor, hull 2077, Moore; 3 towing machines, 4 steering engines, Shipowners & Merchants' Tugboat Co.

Pneumercator Co.: 116 pneumercators USS California, Mare Island; 4 for Matson SS Manulani, Manukai, Moore; 40 for 4 Coast Guard cutters, Union Construction; 10 for West Lewark, West Faralon, West Greylock, West Prospect, West Chopaka, Los Angeles; 60 for 12 submarines USN, Bethlehem.

Rostand Mfg. Co.: air ports and lenses complete 4 Coast Guard cutters and 4 Anglo-Saxon tankers, Union Construction.

FORD & GEIRRINE, AGENTS, SAN FRANCISCO

National stockless anchors, Upson Walton Co., for hull 165 at Moore's; Dean feed pumps, Dean's Bros' Steam Pump Works, for 166 at Moore's; Reliance forced draft equipment, John Reid & Co., for hulls 165, 166 at Moore's; National stockless anchors, Upson Walton Co, hull 166, at Moore's; Dean feed pumps, Dean Bros' Steam Pump Works, hull 23, Southwestern; Willett Bruce whistle control, McNab Company, hulls 16, 17, 18, 19, Union Construction; McNab direction indicators, Mc Nab Company, hulls 16, 17, 18, 19, Union Construction; Reliance forced draft equipment, John Reid & Co, hull 23, Southwestern; Anchor chain, Lebanon Chain Co, hull 23, Southwestern; windlass, gypsy and steering gear, Hyde Windlass Co, hull 20, Union Const; Welin davits, American Balsa Co, hulls 5311-2-3, Bethlehem, hull 163, Moore; Reliance furnace fronts, John Reid & Co, hulls 2862 - 3 - 4, Moore; Willett-Bruce whistle control, McNab Co, hulls 5311-2-3, Bethlehem; McNab direction indicator, hulls 31-2-3-4-5, Los Angeles; Balsa wood for cold storage, American Balsa Co, hulls 5311-2-3, Bethlehem; Welin davits, American Balsa Co, hulls 3862-3-4 and hull 165, Moore; White fuel oil burners, Todd Dry Docks, hull 165, Moore; Mills releasing gear, hulls 24-5-6, Southwestern; Broady releasing gear, hull 165, Moore.

LIDGERWOOD MFG. CO., NEW YORK SAN FRANCISCO, LOS ANGELES

One 10x10 inch screw gear steering engine for USS Holland building at Puget Sound Navy Yard.

LLEWELLYN IRON WORKS, LOS ANGELES

Two marine engines for G. M. Standifer Const Corp, 24½ x 41½ x 72, 48-stroke, TE, 2800 IHP.

MARINE IRON WORKS, CHICAGO

Five hundred special ice machines.

SKANDIA PACIFIC OIL ENGINE COMPANY, OAKLAND

Purchasing Agent: A. Bolander.

Ten 850 BHP Werkspoor Diesel engs building for USSB; 6 cyl, 135 RPM; five delivered.

Ten 140 BHP 4-cylinder Skandia engs for self-propelling barges on Erie Canal; 8 delivered.

Fifteen 16 BHP 1-cylinder Skandia engs, auxiliaries for above; 12 delivered.

One 100 BHP 2-cylinder Skandia eng for river freighter for N. Fay & Son.

STEWARD DAVIT & EQUIPMENT CORP., NEW YORK, SAN FRANCISCO, SEATTLE

Steward davits are being installed in the following: At Union Const Co: Coast Guard cutters, hulls 16, 17, 18, 19.

For Swiftsure Oil tankers building at Northwest Bridge & Iron Co.

Drydocking and Repairs

BETHLEHEM SHIPBUILDING CORP.

Potrero Works

Renewing suction manifold for cargo pumps: Whittier. Miscellaneous repair: Argon, Cuba, S. V. Harkness, Henry S. Grove, Frank G. Drum, Brunswick, Katrina Luckenbach, City of Reno. Miscellaneous repairs, drydocking and painting: S. N. Castle, Tascalusa (also repairs to boilers), Richmond, Ventura (also draw tailshaft for inspection), La Placentia, Apus, Utique, Creole State, Coquille River. Engine, boiler, hull repairs: Waitapu, Frank H. Buck (also drydocking, painting), Waihemo, City of Para (also winch repairs, drydocking, painting). New tail shaft: Silverado (also new propeller), West Keene (also winch), D. G. Scofield. New wildcats for windlass: Washtenaw. New condenser: Coalinga.

Alameda Works

Miscellaneous repairs, painting, drydocking: McLaurin, Caspar, Hartwood, Costa Rica (also electric welding on hull), Katherine and Daisy Freeman (new propeller), F. S. Loop. New propeller: Port Angeles, Carlos. Miscellaneous repairs: Phyllis, Idaho, Davenport. Work on soot blowers as directed: Haynie.

LOS ANGELES SHIPBUILDING AND DRYDOCK CO., SAN PEDRO

Drydocking, cleaning, painting: Lyman Stewart, Vinita, Hermosa, Cabrillo. Drydocking, miscellaneous repairs: Edward Luckenbach (also hull), Carlos, Northtown, Stoddert, Reno, Kennedy, Paul Hamilton. Hull and machinery repairs: U. S. Coal Barge No. 23. Drydocking: Harvard.

MOORE SHIPBUILDING COMPANY, OAKLAND

Miscellaneous engine repairs: U. S. A. T. Sherman, Granite State, West Notus, Eastern Mariner, Santa Alicia, Bakersfield, R. J. Hanna, Steel Mariner, S. C. T. Dodd, Santa Rita. Drydocking, cleaning, painting, miscellaneous repairs: Light vessel Relief 76, Coast Guard Cutter Bear, Star of Scotland, W. P. Barge No. 1, Westport, Rufus E. Wood, George U. Hind, Chas. B. Kenney, Tug Relief, Forest Home, Ferry Yerba Buena, Philippine, Ferry Claremont, Sophie Christensen, Star of Zealand, Emily F. Whitney, Star of Iceland, Tug Christopher Columbus, Star of England, Star of Russia, Meanticut. Hull and engine repairs: U. S. Unalga, Ohioan, Tug Virgil G. Bogue. Drydocking, cleaning, painting: Saginaw, Minnie A. Caine. Hull repairs: Ferry San Francisco, Meanticut, Tug Ripley. Drydocking, miscellaneous repairs: Northland.

NAVY YARD, PUGET SOUND

Drydocking, cleaning, painting, miscellaneous repairs: Patrol Boat Helori, Destroyers Delphy, Turner, Welles, Gillis. Miscellaneous repairs and alterations: Armored Cruiser Frederick, Destroyers Aulick, Bailey, Meade, McDermut, Morris, Swasey, Thornton, Tingley, Fuel Ship Neptune, Radio repair ship Saturn, West Canon (extensive), Light vessel 67. Care and preservation: B. S. Oregon, Armored cruiser Seattle, Charlotte, Missoula, Subchaser 310. Outfitting and placing in commission: Ammunition ship Nitro. Miscellaneous repairs: Gunboat Vicksburg, Minesweeper Swallow. Miscellaneous repairs and maintenance incidental to operation as district craft: Patrol boat Eagle 57, Tugs Pawtucket, Sotoyomo, Tatnuck, Mahopac, Iroquois.

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

Renewing copper pipes: Flavel. Boiler repairs: Tug Hero. Repairs main engine: Henry S. Grove, West Camak. Engine repairs: Pride.

TODD DRY DOCKS, INC., SEATTLE

Miscellaneous repairs: SolDuc, Snohomish, Utopia, Kulshan, Tourist, Monitor. Survey: Hero, West Hartland. Cleaning, painting: Scow No. 7, G. B. Olga, Fanny Dutard, Wanona, Alice, City of Seattle and Wanderer (also change of wheels), Pico, West Notus, Tippecanoe, Catherine D, Fire boat Duwamish and Burnside (annual overhaul), Azalea, Westward Ho, Westerly. Cleaning, painting, miscellaneous repairs: St. Paul, Benjamin F. Packard, Guy C. Goss, Brookline, Jalapa. Boiler repairs: West Mahwah. Voyage repairs: Eldridge, Talthybius, Teucer, West Ivan. Repairs to feed pump: Birmingham City. General overhaul and repairs: Wenatchee. Renewal of wheel: Hopestill.

YARROWS, LIMITED, VICTORIA

Minor repairs: Wenatchee, Talaralite (also new propeller blades), Thiepval. Cleaning, painting, repairs: Princess Maquinna, Canora, Armentieres, Destroyers Patriot and Patrician (general refitting, engines overhauled). Repairs, bottom damage: St. Lawrence. General refitting and overhaul of engines: Light cruiser Aurora. Cleaning, painting: Prince Rupert (reconditioning work nearly completed).

THE WINSLOW MARINE RAILWAY & SHIPBUILDING CO., INC., SEATTLE

Drydocking, painting, miscellaneous repairs: Tug Tartar. Drydocking and repairs: Barge Coquitlam City. Drydocking and painting: SS. Fulton, Bktn. Anne Comyn, SS. Monticello, Barge Elwell, SS. Yosemite. Drydocking and miscellaneous repairs: MS. Santa Flavia. Miscellaneous repairs: Gas Boat Ocean Waves.

With the Importers and Exporters

Off Again; On Again!

Those who prefer to think in symbols may conceive of the freight conferences of today as typified by the immortal Finnegan plucking the petals of a daisy and droning "He loves me; he loves me not." Nothing less will enable the disinterested spectator to visualize the occurrences of May.

On May 5 the San Francisco committee of the Pacific Westbound Conference ceased to exist when all the Shipping Board operators, in addition to some of the Northern Board lines, withdrew following the second resignation of the Java-Pacific. This left the sole rate-making authority in San Francisco in the hands of the Shipping Board conference, which in general held to the old rates, although it shaded on two transcontinental schedules and three or more local, from which competitive lines had deviated. Inasmuch as the Northern committee held together, despite the break in San Francisco, nothing approaching a rate-war occurred.

But the Pacific Westbound Conference was left standing on one leg, and efforts were made to sew on the other. Prospects of success were good; then they were poor—very poor indeed; and again they were much better. The last week in May found this plan being worked out: All the old members of the San Francisco committee, the China Mail alone excepted, would organize a new conference to have complete control over all local rates, but to work with Seattle and New York in fixing tariffs on transcontinental goods. This plan would remove one source of trouble, the lack of harmony between Seattle and San Francisco, which may be illustrated by one incident: Seattle reduced the salmon rate from $16 to $12, San Francisco concurring. The California packers requested a reduction of the canned goods rate from $16 to $12; San Francisco, as Barkis, was willin', but Seattle refused to acquiesce, suggesting instead a $14 rate. San Francisco tried that for a month and, discovering that little business resulted, broke over the traces. Such incidents as this would be prevented by the formation of distinct conferences; and, besides, San Francisco would be enabled to work directly with the New York-Oriental conference instead of through Seattle, the old system having given birth to various tangles.

The dissolution of the San Francisco committee was sudden. A meeting had been called for May 5, at which all lines were expected to be represented; but the Java-Pacific, which by resigning in February almost forced disruption at that time, did not send a representative; on the contrary, it dispatched a letter of resignation.

North Holds Firm

Immediately upon the reading of this communication, the Shipping Board lines, the Pacific Mail, Pacific Steamship, Struthers & Dixon, withdrew for a brief conference with officials of the San Francisco offices of the board. The conference was quite brief. At its conclusion the Pacific Mail, through Daulton Mann, assistant general manager, announced its withdrawal, and he was followed by F. M. Barry, general manager of Struthers & Dixon, who spoke for the Pacific Steamship as well as for his own company. Thus suddenly the Toyo Kisen Kaisha found itself the sole member of the San Francisco committee, inasmuch as the China Mail had withdrawn some weeks before.

Contrary to expectation, the Northern lines were relatively unshaken by the dissolution of the San Francisco committee. "Contrary to expectation" perhaps is too severe, for the Seattle committee had been unmoved by the formal withdrawal of the Java-Pacific and through some of its members had been instrumental in restoring harmony; nevertheless, the Pacific Westbound Conference's troubles of 1920 largely centered in the North, where some powerful foreign lines consistently refused to become members and where other foreign lines had broken away from the fold; and the latest withdrawal of the Java-Pacific naturally might have been expected to precipitate trouble in Seattle.

Precisely the contrary effect was to be observed. The Seattle committee held firm; nor was that all: some foreign lines, which, as stated, had declined to become active members of the conference, although participating in its discussions, now manifested a desire to join and to prevent rate-cutting by requiring the posting of a bond of $2000 by each line to guarantee the upholding of conference tariffs. This was true despite the resignation of the Columbia-Pacific of Portland, submitted by telegraph the day after the San Francisco committee broke, and despite the fact that the withdrawal of the Pacific Steamship and Struthers & Dixon affected the Seattle committee no less than that of San Francisco. The single Shipping Board operator remaining in the Seattle committee was Frank Waterhouse & Company, the vice-president of which, W. D. Benson, is New York agent of the Pacific Westbound Conference.

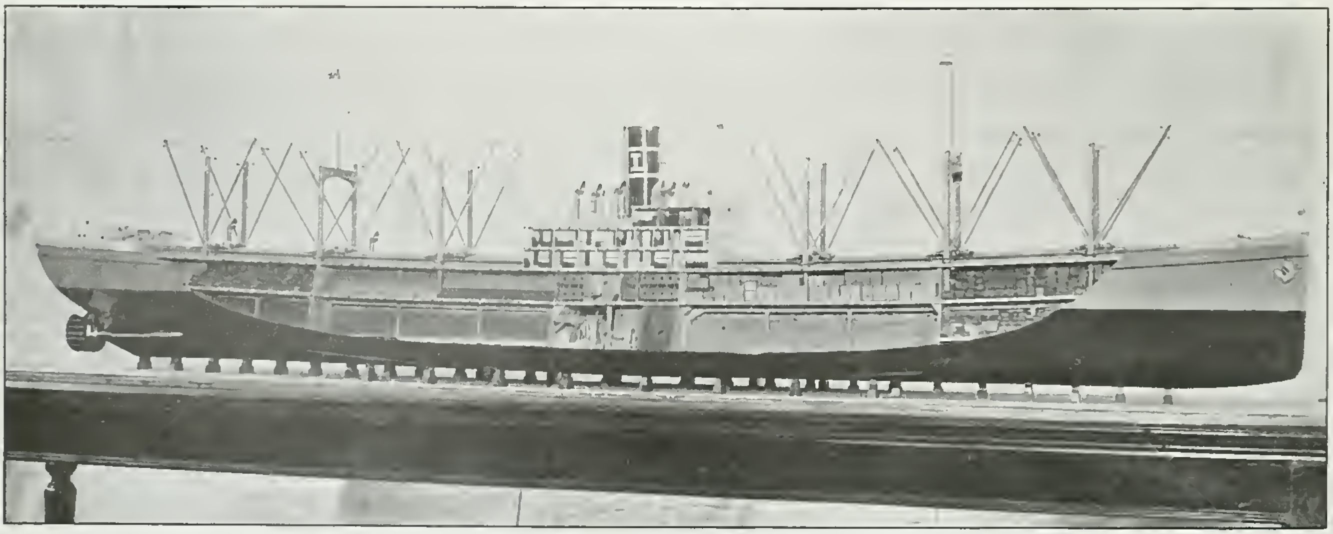
Transcontinental Rates the Crux

No good reason existed why Seattle and San Francisco might not maintain different rates on commodities originating in their own districts. On flour and lumber, for example, San Francisco might quote much lower rates than Seattle and Portland and still be unable to attract any business whatsoever because of the added cost of delivery at the Golden Gate; and a like situation would obtain in regard to California oils, which could not conceivably be attracted to Portland and Seattle. The crux of the whole rate situation on the Pacific is the overland business, for which the different ports must contend not only with one another but also with the Atlantic. As a result, the disbandment of the San Francisco committee of the Pacific Westbound Conference and the consequent uncertainty that obtained as to ruling rates, would have an immediate effect on the Northern ports of the Pacific and on the entire Atlantic as well. This was true although the Shipping Board conference continued to function, for it did not publish its rates and foreign lines and other non-members did not have access to its meetings as they had to those of the Westbound association.

Try to Restore Conference

Both Seattle and New York were exercised at the disbandment of the San Francisco committee and made efforts to restore the organization. New York sent Jack Meehan of the Barber Lines, who said that he bore authority of the North Atlantic-Far East Conference, and J. Sinclair of the New York Shipping Board office. Immediately upon their arrival in San Francisco the third week in May they sought interviews with the trans-Pacific operators and succeeded in bringing about a general meeting at which all lines except the China Mail were represented. That company held to its withdrawal from the old Pacific Westbound committee and declined to entertain any suggestion of rejoining, although it stated that conference rates would be protected except in the event of cutting by members. In this there was no cause for alarm, however, and prospects for reforming the conference appeared bright.

When a meeting was held, however, the Java-Pacific declined to acquiesce in certain conditions that both New York and Seattle had pro-



Model of the Luckenbach steamship Lewis Luckenbach, which was recently placed on exhibition in the Merchants' Exchange, San Francisco. The side of the hull has been cut away to show the interior arrangement of the vessel and the stowage of cargo posed, such as the posting of a $2000 bond to guarantee maintenance of conference rates and a provision that a company withdrawing from the conference should give notice of ten days or more. Prospects of peace accordingly became poor, and a meeting that was to be held at Portland May 25, at which the Northern and Southern lines should arrange a working basis, had to be postponed because no San Francisco committee had been formed.

This condition obtained for a day or two only; then the Java-Pacific agreed to join, the proposals for the posting of bonds and the giving of notice of withdrawal having been dropped; and thus all became serene again. More serene than before, perhaps, because the North and South at last would be able to make their own local rates without interference by the other.

Railroads vs. Steamships

The extent to which the intercoastal steamship lines are taking advantage of the situation arising from the high railroad rates is indicated quite forcibly by different developments of the month.

A statement issued by the California Fruit Growers' Exchange says that in the week ending May 14 three steamships sailed from Los Angeles with 53 cars of citrus fruits. The Holland-America steamship Moerdyk took 20 cars of oranges in refrigeration for London and Rotterdam; the West Isleta of the Pacific Steamship Company took 12 cars of oranges and 21 of lemons for New York under ventilation. During the month of April the New York market bought 21,500 boxes of lemons shipped by water and 23,687 shipped by rail, so that the intercoastal lines already have moved close to the railroads in the volume of business handled.

Seattle states that Washington apple growers have guaranteed 4000 carloads of apples; but a statement of O. C. Soots of the Wenatchee Commercial Club indicates that refrigerated stowage will be necessary if the steamship lines are to solve the problem: "Fruit growers of Washington, Oregon and California during the coming season will have a total production of over 100,000 carloads, the larger portion of which should be distributed in the coastal zone of the United States. It is the fixed purpose of these growers, having a capital investment of over $300,000,000, to form a central organization which, acting in close co-operation with similar organizations of the Gulf and Atlantic Coasts, backed by commercial bodies of all municipalities within the territory mentioned, to present a powerful and united front in the fight for just and reasonable rail rates. The question of water transportation, as a means of solving the long haul problem of Pacific Coast growers, hinges upon the installation of refrigerated stowage on steamers engaged in intercoastal service and on ample storage facilities at the various ports."

Lumber Shipments via Canal

The most remarkable statement is that of the West Coast Lumbermen's Association, which says:

"Pacific Northwest lumber shipments through Panama Canal to Atlantic Coast markets, increased 3435 per cent the first quarter of 1921 compared with the same period of 1920. This illustrates something of the extent to which West Coast lumber, consigned to the Atlantic seaboard, has been diverted from rail to water transportation by reason of the 33⅓ per cent advance in transcontinental railroad rates. For the first three months of 1920, when long-established competitive rail rate relationships were still in effect, only 1,202,229 feet of Pacific Northwest lumber was shipped to Atlantic Coast points by water, although at that time West Coast mills were shipping to those markets more lumber than had ever before been sent east of Buffalo and Pittsburgh. For the first three months this year Atlantic Coast cargoes of Pacific Northwest lumber totaled 42,495,579 feet, according to the quarterly cargo report of the Pacific Lumber Inspection Bureau.

"Notwithstanding the big increase in the Atlantic Coast cargo movement, the Pacific Lumber Inspection Bureau report shows a decrease of approximately 10 per cent for all water-borne shipments the first quarter of this year, compared with the same period last year."

Total water-borne shipments for the first quarter of 1921 were 329,623,956 as compared with 361,122,072 for the first quarter of 1920. Cargoes to California declined by 50,000,000 feet; to Hawaii by 3,000,000; to Australia by 18,000,000; to Mexico by 1,000,000; to Europe by 8,000,000; to the West Coast of South America by 1,000,000; and the Cuban and South African business, aggregating more than 8,000,000 feet, disappeared completely. The Philippine trade, on the other hand, increased by 5,500,000, and New Zealand increased from 6018 to 3,866,386.

Western Pacific Is Active

The railroads are deeply concerned over the loss of business to the intercoastal lines and indications are that reductions in transcontinental rail rates must be made. Something has also been accomplished toward reducing the import and export rail rates. Archibald Gray, general freight agent of the Western Pacific Railroad Company, in a communication to the foreign trade department of the San Francisco Chamber of Commerce, stated that his company had succeeded in getting the Toledo, St. Louis & Western, the Ann Arbor Railroad, and possibly others, to concur in the publication of import and export rates via San Francisco on basis of the rates now in effect to and from Chicago.

Rates are now in effect to and from points Chicago and west, but lines east of Chicago have consistently refused to join the Pacific Coast lines in making rates that would give the rail carriers and steamship lines operating to and from the Pacific Coast ports a fair share of this business. The traffic officials of the Western Pacific Railroad Company feel that with the winning over of these two roads, others may follow, in which case it will have the effect of diverting through Pacific Coast ports traffic that heretofore has been moving via Atlantic and Gulf ports.

The Western Pacific has been consistently active in endeavoring to bring about readjustments of the import and export rail rates since the increases of last August.

Mr. Kruttschnitt's View

In spite of the evident effect of high railroad rates in driving transcontinental freight to the intercoastal steamship lines, Julius Kruttschnitt, chairman of the board of the Southern Pacific Company, says that "there is the strongest reason to believe that the very great reduction in traffic has been due almost entirely to business conditions. . . . Notwithstanding these low rates (in ocean transportation) ocean traffic shows as great stagnation as rail traffic and millions of tons of shipping here and abroad are rusting away in idleness." There is no question that business stagnation is the primary cause of the decline in traffic the world over; but no one can ignore the fact that intercoastal business increased at the time when general business, including that of the railroads, was declining. This was due to the lower rates and the more satisfactory service of the steamship lines. Those who believe otherwise would do well to consider the lumber statistics quoted above. A good deal of the edge is taken from Mr. Kruttschnitt's statement by the announcement that the Southern Pacific had restored the old relationship in Pacific-Eastern and New Orleans-Eastern sugar rates, which results in substantial reductions. If the railroad rate increases did not depress business, how can decreases stimulate business?

Lumber Rates Uncertain

Trans-Pacific lumber rates continued to agitate Pacific Coast shipping circles in May, and the month closed with the future still clouded. As has been stated previously, the Pacific Westbound Conference and the Shipping Board had decided to increase the rate to $15 effective July 1. The announcement of this intention naturally resulted in a scramble of every shipper to book his cargo at the ruling rate of $10, which may have been effective with some private lines but which found the Shipping Board quite tired of handling the cargo at what it regarded as an unprofitable rate. The Board accordingly put down its foot and refused to book more lumber at $10, offering, instead, space at $12.50. Some shippers acquiesced and booked, so that some cargoes will be moving at $10 and others at $12.50, while the proposed $15 rate of July 1 appears somewhat less certain in view of the recent $2.50 increase.

The Admiral Line loaded the West Kasson with a full cargo of parcel lots and the Columbia-Pacific did likewise with the Bearport, the former sailing from Puget Sound and the latter from the Columbia River, both at $12.50.

Sacked Fruit vs. Dried

A solution of the vexed question of sacked and boxed fruit rates has been arrived at by F. L. Murphy, traffic manager of the Shipping Board, who has ruled that the same rate shall apply to both. Those who follow rate fluctuations will recall that the Pacific Coast-North Atlantic Eastbound Conference had named a rate of 60 cents on sacked fruit as opposed to a 90 cent rate on processed, and that the California packing companies had protested vehemently against the favorable differential for the sacked goods. While their appeal to the Shipping Board was pending the Isthmian Line cut the processed rate from 90 to 55 cents, so that the other companies were compelled to do likewise; and now the ruling of Mr. Murphy forces the sacked rate to the same level.

Against his ruling, however, the Luckenbach, American-Hawaiian and Matson companies have protested. They do not understand why they should not be permitted to carry sacked fruit at a rate less than 55 cents if they desire. (The differential favoring the sacked was the cause of the upheaval in California packing circles.) Mr. Murphy's decision does not go to the extreme demanded by the packers, who were insistent on a 20 per cent differential for processed fruit, on the plea that without it the packing industry would be transferred to the Atlantic; on the other hand, the ruling does lower processed rates to a point that is hardly regarded as profitable, at least not profitable in comparison with the same rate on sacked fruit.

Freight Report

May 11, 1921.

Our last circular was dated a month ago. Just about that date, Kerr, Gifford & Company chartered steamer Meanticut for April loading to the United Kingdom, Continent or Mediterranean, at 70/-; and one week later M. H. Houser chartered Dutch steamer Alkmaal for June loading at 57/6 for United Kingdom, 60/- for Continent, Bordeaux to Hamburg, and 62/6 usual Mediterranean.

About April 30, Kerr, Gifford & Company again came into the market for prompt May loading, and took Shipping Board vessel Apus at 65/-; at the same time M. H. Houser chartered Shipping Board vessel Eelbeck at the same rate, both for United Kingdom or Continent, Hamburg to the West Coast of Italy range.

Kerr, Gifford & Company chartered steamer Ceylon for June loading on private terms, presumably 60/-, at which the Portland Flouring Mills have taken steamers Benledi and Benalder for late May or early June loading.

From San Francisco, one early May loading vessel got 70/- for about 4000 tons of barley to Hull, and space for 3000 to 4000 tons on the motorship Canada and motorship Borgland has been arranged for account of Strauss & Company at 65/- to Leith and Hull, respectively.

At the present writing, the United States Shipping Board rates remain unchanged at 65/- for the United Kingdom or Continent, Hamburg to the West Coast of Italy range. The strike has stopped the chartering of Shipping Board vessels, but the impression is gaining ground on the street that with the firm stand of Admiral Benson of the United States Shipping Board the strikers will very likely give in; and it certainly seems in order that they should help the merchant marine of this country to live, by reducing their wages 15 per cent and amending the evil practices of overtime as they have been working heretofore.

General business has been very slack. For reasons that we mentioned before, our sailing fleet is practically all tied up on account of the low ruling rates.

Two more vessels, the Alta and Muscoota, have been chartered for coal from Newcastle to San Francisco by J. J. Moore & Company, on private terms.

The only other charter to report is that of the steamer Canadian Highlander to carry ties and lumber from the North to Niuchwang, by H. R. MacMillan Export Company, Ltd., at $12.50 Canadian currency a thousand feet.

The latest time charters have been those of the Windber, taken by the General Steamship Corporation for the West Coast of South America, and that of the Paraiso by the Pan-American Steamship Line, also for West Coast, both on private terms.

Swayne & Hoyt have chartered the little steel motorboat Casco to the Hudson Bay Company, on a bare charter, for about six or seven months, to trade in connection with fishing, etc., on the shores of Siberia.

We have only heard of one sale, that of the Thorbjoerg, ex George W. Fenwick, which has been sold by the Norwegians to Sudden & Christensen at a reported price of about $120,000, delivered at San Francisco.

There is a rumor on the street that the Wansbek, one of the ex-German sailers now on shore near Guaymas, has been sold, but no details are available as to who the purchaser is, or what was paid for the ship. Probably she was bought for a very low price, considering the cost of getting her off the beach.

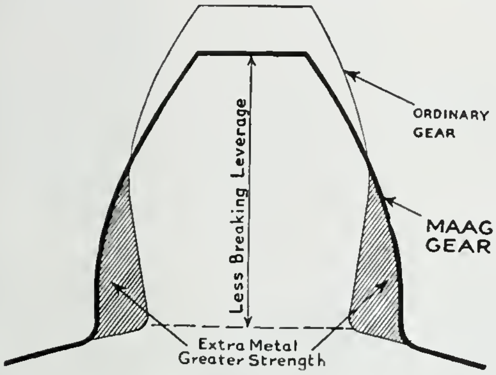
PAGE BROTHERS, Brokers.

Super-Accurate Gears for Marine Turbine Use

HITHERTO the one weak spot in steam turbine practice has been the reduction gears. These have never been quite satisfactory because of two reasons—lack of accuracy in the gears and lack of strength in the pinions. Maag Gears overcome both these obstacles to success.

Cut, first of all, with an accuracy far beyond that possible in ordinary gears, Maag Pinions for high speeds are case hardened and then GROUND to final perfection.

By case hardening, the originally very strong Maag tooth—which is strongest at the base where other gears are weakest—is made still stronger. By grinding, any distortions due to the hardening process are not only remedied to produce a tooth outline of superaccuracy, but the grinding actually increases the resistance of the metal to wear and tear.



Maag turbo-reduction drives, made in this way, have given results that approach 100% efficiency. For example a standard set of Maag Gears, after being more than 12 months in continuous service, have shown no discernable wear whatever; the original fine grinding lines still remaining visible and unchanged.

We'll be glad to give you figures on high speed Maag Gears for steam turbine, rotary pump, and electric motor reductions.

MAAG GEARS

NILES-BEMENT-POND CO.

111 BROADWAY NEW YORK CITY

See them at the Marine Show, January 24-29, Grand Central Palace, New York.

About People

David Sarnoff, formerly commercial manager of the Radio Corporation of America, has been appointed general manager. In general, Mr. Sarnoff will have charge of the corporation's high-power and low-power ship stations and their operations as well as be responsible for their up-keep and the maintenance of their service· He will be charged also with the corporation's transoceanic communication system; the selling and rental of apparatus and the solicitation and negotiation of contracts.

Mr. Sarnoff has been commercial manager of the Radio Corporation since its organization and is now rounding out fifteen years of service with this corporation and its predecessor, the Marconi Wireless Telegraph Company of America. His extensive experience covers practically every branch of the radio communication art. He was born in Russia in 1891, came to the United States in 1900 and was first employed as a wireless operator at the Marconi station, Seasconset, Massachusetts. Later he became manager of the Marconi station at Sea Gate. Mr. Sarnoff is vice-president and a director of the Pan-American Wireless Telegraph & Telephone Company and was secretary of the Institute of Radio Engineers from 1915 to 1917. He is the author of several important papers on radio.

T. Park Hay has been placed in charge of the Shipping Board office in St. Louis. He will furnish information as to trade routes and American merchant marine facilities.

James Lee Ackerson, vice-president of the Merchant Shipbuilding Corporation, was elected president of the Atlantic Coast Shipbuilders' Association at the annual meeting. Other officials are: vice-president, George H. Bates; treasurer, Sidney M. Henry; secretary, Clarence Samuel King; members of the administrative council: New England, E. B. Hill of Bethlehem; New York, George H. Bates of Staten Island; Delaware River, J. Harry Mull of Cramp, M. A. Neeland of New York, John G. Pew of Sun; Baltimore, Sidney M. Henry of Baltimore; Southern, F. P. Palen of Newport News; South Atlantic, Ernest Lee Jahncke of Jahncke Drydock, and William G. Coze of Pusey & Jones.

H. H. Raymond, president of the American Steamship Owners' Association, announces removal of the association's offices to the twelfth floor, No. 11 Broadway, New York.

E. M. Leaf, vice-president of the Los Angeles Shipbuilding & Drydock Company, has been elected to the governing council of the National Merchant Marine Association. Others elected to the council are: E. Kirby Smith, Shreveport, Louisiana; Hoke Smith, Washington, D. C·; John Walker Smith, U. S. Senate, Washington; Hugh Gallagher, Pacific S. S. Co., New York City; R. Goodwin Rhett, Charleston, South Carolina.

W. A. Harriman, chairman of the board of directors of the United American Lines, and Austin McLanahan, president of the Export & Import Board of Trade of Baltimore, have been added to the executive committee of the association.

Edwin J. Adams, for fifty-one years cashier of the New York office of the White Star Line, returned to his former home in England in April. Mr. Adams arrived in New York in July, 1871, with Captain Hyde Sparks, first White Star agent in America, to prepare for the arrival of the first Oceanic, with which the White Star opened its trans-Atlantic business.

Captain Paul Foley, U. S. N., has resigned as director of operations of the Shipping Board and has been succeeded by W. B. Keene, assistant. Captain Foley succeeded J. B. Cushing of San Francisco.

Captain H. W. Ravens, inspector of hulls at St. Michael, has been promoted to be traveling inspector. He has been succeeded at St. Michael by Captain Charles H. White, assistant at Seattle. Frank A. Turner has been appointed to succeed Captain James Guthrie, deceased, as hull inspector at San Francisco.

Clifton Curtis, president of the Curtis Line, will sail for the Orient late in May on business for his company.

Ernest Kellenberger, second officer of the steamship Governor, against whom a charge of inattention to duty was preferred by Inspectors Lord and Ames of Seattle, has been completely absolved of blame for the disaster and will not be tried. He had gone on watch four minutes before the collision, which then had become imminent.

Joseph N. Teal, former member of the Shipping Board, was the guest of honor at a dinner given by the Portland Chamber of Commerce on April 20.

Harris Livermore, president of the United American Lines, who returned in May from a trip to Germany, believes that American materials will be preferred by the Germans to British and French, other things being equal. As to shipbuilding Mr. Livermore said: "In the shipyards at Hamburg there is considerable activity. The vessels under construction are passenger and freight carriers and are not large, although I understand that later passenger ships for first, second and third-class, of about 20,000 tons will be built. I saw no construction of tankers under way·"

Wallace M. Alexander, president of the shipping and commission firm Alexander & Baldwin, Ltd., was elected president of the San Francisco Chamber of Commerce at the meeting of the new board of directors May 17. He succeeds Atholl McBean of Gladding, McBean & Company, who retires after two years of service in that office. A. B. C. Dohrmann of Nathan-Dohrmann Company, was selected to succeed Wigginton E. Creed, president of the Pacific Gas & Electric Company, as first vice-president of the chamber. There were no changes in the other executive offices. Robert Newton Lynch was re-elected vice-president and manager; George C. Boardman of Boardman Brothers & Company continues as third vice-president; Stuart F. Smith, vice-president of the Bank of California, remains in the office of treasurer, and Louis M. King was re-elected secretary.

Henry T. Gerdes, manufacturer and mechanical engineer of New York, has been elected president of the Hauck Manufacturing Company, Brooklyn, succeeding the late Arthur E. Hauck. Mr. Gerdes is a graduate of Stevens Institute of Technology and for several years was manager of the Treadwell Engineering Company, Easton, Pennsylvania. He has a practical knowledge of the manufacture of oil-burning torches and appliances.

M. C. Hauck has been elected first vice-president of the Hauck Company and A. B. Hauck second vice-president; H. H. Kress third vice-president; A. H. Stein treasurer, and J. Lutz secretary.

Carlos F. DeBerna has joined the staff of the Anglo California Trust Company as business representative. His many friends will remember his connection with the Rolph Mail Steamship Company, which was introduced to South American shipping circles by Mr. DeBerna personally. His close touch with the various importers and exporters in Latin America should be of great assistance to clients of the

SUTTER 44-19

"Yes, Captain, this is SUTTER 44-19."

"Sure, we'll help you—are sending an adjuster at once."

"No, you can not make the cargo pay part of your sacrifices due to your own negligence."

"Why not? — because your Bill of Lading does not contain the JASON CLAUSE."

MORAL

The time to have us advise you regarding your Bill of Lading conditions is *BEFORE* your vessel gets into trouble.

Any information we can give to help a client we consider as much a part of our duty to them as the proper placing of their insurance or collection of their losses.

SUTTER 44-19

FRANK K. HITCHING

244 California Street Phone Douglas 4705-6

AGENT FOR

YAMASHITA KISEN KAISHA

Australasian Direct Service

REGULAR MONTHLY SERVICE

100 A1 Steamers

— TO —

Auckland, Sydney, Melbourne

(other ports if inducements offer)

	Seattle	Vanc, B C	San Francisco
YOSHIDA MARU No. 1	Aug. 7	Aug. 9	Aug. 15
YOSHIDA MARU No. 2	Sept. 7	Sept. 9	Sept. 15

(Via Los Angeles if inducements offer)

bank doing business in those countries.

John A. Donald, the single Shipping Board commissioner besides Admiral Benson, has resigned after a service of four years to open an office in New York. He will serve shipping interests in a consulting capacity.

Deaths

Alonzo Gartley, vice-president and manager of C. Brewer & Company, Honolulu, and a graduate of the Naval Academy, class of 1890, in Honolulu April 21.

Captain Alexander Woodside, San Francisco shipowner, in El Paso on April 28.

Harry Olsen, a survivor of the Hesper, the mutiny of which is a classic of the Pacific, in San Francisco April 22.

Louis Weinmann, retired secretary of the Fireman's Fund Insurance Company, in Alameda, California, April 25. He is survived by a widow, Mrs. Arvilla Weinmann, and two sons, William L. and Judge L. R. Weinmann.

T. C. (Tommy) McCombe, purser of different vessels of the Toyo Kisen Kaisha and formerly of Oceanic steamships, in Oakland, California, May 23.

A record shipment of vinegar. This solid train of 25 cars of California apple cider vinegar, containing 156,422 gallons, manufactured by Jones Brothers Company, Watsonville, California, was shipped May 5 to California and Eastern wholesalers

IN THE FAR EAST

(Continued from Page 340-C)

ried as of 400,702 gross tons, the valuation being yen 65,657,734, or yen 164 ($82) a ton.

The N. Y. K. is reported to have made net earnings for the last business term of yen 5,500,000, a decrease of yen 4,000,000 as compared with the preceding term. Earnings are sufficient to pay 10 per cent, but a larger dividend, to be paid in part from funds carried forward, is anticipated.

A Loadline Law

An act having been passed by the Diet providing for load-line regulations, the Department of Communications has taken up the drafting of regulations. About 1070 steamships and 195 sailing vessels will be affected, small craft being exempt from the law. Determination of load lines of vessels already afloat will be carried through during the next three years. Foreign vessels in Japanese waters will be exempt on a reciprocal basis.

Keijiro Hori, president of the O. S. K., has been elected chairman of the Japan Shipowners' Union, succeeding the late Baron Kondo. Members of the association number 106 and they own 773 vessels of 2,368,527 gross tons.

During March four merchant vessels of 21,380 tons gross were launched in Japan, vessels of less than 1000 tons being excluded. Yokohama Dock, Osaka Iron Works, Mitsui and Ishikawajima built one each. The O. S. K. is reported to be building an 8000-ton motorship at Yokohama Dock, which appears to be the first for any Japanese company.

The O. S. K. has reduced wages of seamen 20 per cent. Unemployment is increasing, although the number of idle seamen is given as only 5000 or 6000 at the first of May.

An interesting experience was reported by the steamships Suwa Maru and Hawaii Maru, which arrived at Yokohama from America April 16. A dust-storm, similar to one experienced in Japan, was encountered at sea, the clouds being so thick that navigation was practically impossible and soundings were taken. The assumption is that the dust had been blown from the plains of Mongolia. Unfortunately, the accounts received in this country are too short to answer many questions that arise.

In order to give the shipping and shipbuilding industries of Japan closer touch with Lloyd's Register of Shipping, a Japanese committee has been formed with Kakichi Uchida, former vice minister of communications, as chairman, and a large number of representative Japanese as members.

Williams Gets Kennecott

John W. Chapman, Pacific Coast manager of the Williams Steamship Company, announces that his company has taken over the new 6000-ton motorship Kennecott, which will be immediately added to the Williams fleet of cargo carriers operating in the intercoastal trade.

The Kennecott will sail from New York via Philadelphia and Baltimore with a full cargo for San Francisco and other coast ports June 8. Thus the Williams Line becomes the pioneer of motorship operators in the intercoastal trade, and the performances of the Kennecott will be watched with more than passing interest by the shipping public as well as by shipping men generally.

A complete description of the Kennecott has already been published, but her entry into the coast-to-coast trade revives many points of interest regarding the vessel. The Kennecott makes 270 miles a day loaded on 55 barrels of fuel oil, as against about 165 barrels for a steamship of the same tonnage and speed. Furthermore, she carries an engineroom crew of only eight men, as against twenty or more in a steamship.

The Kennecott was built by the Todd Drydock & Construction Corporation, Tacoma, for the Alaska Steamship Company. She was commissioned in March and on her first trip carried lumber from the Northwest to San Pedro. On her return to the North she loaded a cargo of 3,300,000 feet of lumber for New York.

On her first trip to San Francisco in the Williams service she will arrive at Pier 28, July 4, and will be in port about four days before proceeding to Portland and Seattle. Mr. Chapman is arranging to send out invitations to shippers and shipping men to inspect the Kennecott.

Setting the broken nose of commerce

THE oxy-acetylene welding and cutting torches—those twin metal surgeons—are indispensable in ship yards.

Wherever metals must be cut or joined neatly, quickly and economically the oxy-acetylene process is invaluable.

Prest-O-Lite
DISSOLVED ACETYLENE

because of its portability, has made it possible to weld or cut in the most inaccessible places. Wherever the job may be—below or aloft, inside or out—Prest-O-Lite goes to the job!

Forty Plants and Warehouses insure a constant and unlimited supply of uniformly pure gas. Write us about the Prest-O-Lite nation-wide service plan.

THE PREST-O-LITE COMPANY, Inc.
General Offices
Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco
In Canada: Prest-O-Lite Co. of Canada, Limited, Toronto

PW-503-21

THE HOME OF XXXX NICKEL BABBITT

GROWING from a very humble beginning in Chicago thirty years ago, the Great Western Smelting & Refining Company has taken a pre-eminent position in its line, and has become an international institution with plants and offices spreading over the two continents of America, France and England, with representatives in the Hawaiian Islands and the Far East.

Throughout the territory covered by the branch refineries of the Great Western Smelting & Refining Company this institution has made it possible through the medium of an efficient sales organization to serve the many users of babbitt metals with the well known grade, XXXX Nickel Babbitt.

The essential characteristics of a high grade babbitt metal are compressive strength, tensile strength, wear resistance, heat resistance and anti-frictional efficiency. It must possess sufficient compressive strength to enable it to carry a maximum load per square inch without squashing out; it must also have sufficient tensile strength to withstand vibration and shock such as occur when it is used in the bearing of an internal combustion engine. Given the maximum of tensile and compressive strength it naturally follows that such metal will also have a great wear resistance. Next in value is heat resistance, for should bearings become hot, the alloy must stand the greatest possible heat before fusing. The feature of anti-frictional efficiency is important only in connection with the above mentioned qualities, for anti-frictional efficiency alone is of little value.

Of the many users of babbitt metals who rely on the Great Western Smelting & Refining Company may be mentioned the largest steamship and shipbuilding companies and street and interurban railroad systems on the Pacific Coast; the copper mines of Arizona and Utah and the builders of heavy duty gas and oil engines. Recently the use of XXXX Nickel Babbitt has been extended to aeroplane fields and during the recent period Liberty motors built in California have been fitted with this metal.

The company's claim to superiority in the manufacture of babbitt metals is based upon the experience gained through many years of experimenting with all classes of bearing conditions and metals. In this connection it might be interesting to know something of the evolution of babbitt metal.

About sixty years ago Isaac Babbitt compounded a formula of 88.9 per cent tin; 7.4 per cent antimony and 3.7 per cent copper. At that time one of

Battery of Swartz furnaces at the Great Western Smelting & Refining Company

Pouring Babbitt Molds, Great Western Smelting & Refining Company

Great Western furnaces in operation

Controlling the Electrical Equipment for Merchant Ships.

*Electric Steering Gear Equipments

From the beginning of time until the year 1866, hand power was the only method which has been employed for the steering of vessels. In that year a wonderful advance was made by the introduction of a steam gear equipment on the "GREAT EASTERN" as designed by McFarlan Grey. Improvements have been made in details, but, nevertheless, the present steam equipments do not vary greatly from the first one installed.

A still further advance was made by the introduction of electricity for this purpose, one of the first successful gears being installed in 1902 on the liner "FINLAND" and a few years later in the Navy on the cruiser "DES MOINES." Since these early electrical installations many others have been installed on naval vessels, including battleships and cruisers of the first class, and during the past seven or eight years, on a considerable number of merchant vessels; particularly those of the motorship type.

By the use of the electric drive a reduction in the weight and space occupied by steering gear equipments has been accomplished; heat is suppressed in the space adjacent to the gear; accidents are eliminated which may occur from the bursting of steam pipes; a reduction of vibration and noise is produced; a mechanism is secured very much more efficient in its operation than the steam gear; also an increase in the rapidity and accuracy of response of the rudder to the movements of the controlling mechanism is obtained.

The direct application of electric drive for steering gears, where a motor is geared directly to the transmission, was employed in all the early installations and is still recommended for equipments of moderate horsepower. For those of large horsepower, however, the hydro-electric merits particular consideration owing to its efficiency and the consequent saving in size of electrical equipment.

The use of electricity for steering of vessels has now been thoroughly tried and its advantages clearly demonstrated. It can be furnished with control either of the follow-up or non-follow-up type, opinions amongst sea-faring men still being very much divided as to the wisdom of the use of the non-follow-up gear in the merchant marine. The non-follow-up control is, however, being used on a number of merchant vessels with perfect success and its later universal adoption is confidently predicted.

The Cutler-Hammer Mfg. Co.'s engineers have been associated with the design and production of electric steering gears since the earliest installations. The company is prepared to supply complete electrical equipments for this purpose and to furnish you with general and detailed information on request.

MARINE DEPARTMENT

THE CUTLER-HAMMER MFG. CO.

50 CHURCH ST., NEW YORK CITY

C-H

District Offices: Chicago, 323 No. Michigan Ave.; Pittsburgh: Farmers Bank Bldg.; Boston: 77 Franklin St.; Philadelphia: Commonwealth Bldg.; Cincinnati: Gwynne Bldg.; Cleveland: Guardian Bldg.; Detroit: Kresge Bldg. Selling Agents: H. B. Squires Co., San Francisco; 583 Howard St., Los Angeles; 308 E. 3rd St., Seattle; 552 First Ave. So.; Igranic Electric Co., Ltd., Bedford, and London, Eng.

*"DECK WINCH EQUIPMENTS" will be discussed in the next advertisement of this series.

the chief claims of Mr. Babbitt was that he produced a coarse-grained metal which acted as natural oil-ways by permitting the oil to remain in the interstices until consumed. The mechanical world quickly grasped the theory and babbitt metal rapidly came into general use. However, it required but a few years to demonstrate that the coarse-grain theory, so far as retaining the oil was concerned, was a delusion, for upon examination of bearings made of babbitt metal it was found that the surfaces of the bearings were as smooth as plate glass and consequently could not retain the oil as claimed.

Nevertheless a good impression was created and since then many improvements and discoveries have been made. One of the recurring puzzles to many in the various branches of business in which machinery plays a part, is the selection of the right sort of babbitt metal for bearings in their plant. The metallurgical side of bearing metals is so hampered by big words, tables and tests of all sorts and so bound up with laws about coefficients of friction, degrees of hardness and such things, that the average man is obliged to give up the whole matter and trust to luck. To him babbitt is babbitt, despite the fact that he knows he gets different results from different kinds of babbitt metals.

Part of Chicago plant of the Great Western Smelting & Refining Company

After all, confidence is the supreme consideration and so when it comes to specifying a certain grade of babbitt metal for specific work the Great Western Smelting & Refining Company can be relied upon to give the correct babbitt metal for special requirements and it is on account of this built-up confidence that the Great Western today is looked upon as the leading manufacturer of bearing metals in the United States.

The refineries are situated in Chicago, Seattle, St. Louis, Vancouver, B. C., and at 75 Folsom street, San Francisco. They maintain offices and warehouses in all of the large cities. On the Pacific Coast in Portland and Los Angeles they carry a warehouse stock.

In addition to the manufacture of XXXX Nickel Babbit and the various grades of babbitt metal, they also manufacture type metals, ingot coppe and brass. All of their plant are equipped with the lates improvements and they invit public inspection.

DOMINION ASBESTOS AND RUBBER

A STEADILY increasing number of shipping and allied industries are using Dominion Asbestos & Rubber Corporation's packing. This firm, although comparatively new on the West Coast, is firmly established throughout the East, and recently has become one of the dominating figures in the packing field on the Pacific.

In the face of the strongest competition the company was successful in closing contracts for the requirements of the year 1921 with the Pacific Steamship Company and at the same time with the Pacific Coast Engineering Company, the Pacific Coast Coal Company and all subsidiary companies. This contract was closed after thorough investigation of the products, the company's ability to make deliveries, as well as taking into consideration the fact that the quality of its goods was equal to any placed upon the market today.

The Dominion Asbestos & Rubber Corporation has adopted a new policy, for instead of shipping direct, it is closing its contracts and making delivery through local jobbers in each port, establishing each jobber as an exclusive distributor.

In Seattle the Whiton Hardware Company is carrying the complete Dominion line. In San Francisco and San Pedro, the C. J. Hendry Company has become identified with the Dominion Corporation. These jobbers are all protected by any contracts that the Dominion Asbestos & Rubber Corporation may make on the coast. In return the jobbers are carrying complete stocks of packings and following their usual custom give the best of service in the matter of delivery and adjustments.

The Dominion Asbestos & Rubber Corporation is not only obtaining considerable Pacific Coast trade but already has delivered to the Navy Department on the Pacific Coast more than 100,000 pounds of 92 per cent asbestos-content branded millboard in the past four months. The company also holds the Navy contract for high-pressure sheet packing.

These facts all indicate that the products necessarily must be of extremely high merit, the prices sufficiently interesting to have enabled the company to become one of the dominating factors in the packing field within such a short period.

The organization on the Pacific Coast consists of headquarters in San Francisco at 320 Market street, and branch offices in Seattle and Los Angeles, all three of which are managed by the Charles A. Dowd Sales Company, which maintains salesmen in each district and co-operates with the distributors. The Dowd company states that it is willing to demonstrate and back up the quality of its products through tests or demonstrations on behalf of its jobbers at all times.

Inasmuch as the Dominion Company not only is selling to several leading steamship companies under agreement, but also has succeeded in getting its products adopted as standard by oil companies and other industries, the corporation promises to be a worthy competitor of older manufacturers.

DUNTLEY-KING ANNOUNCEMENT

Last January the interests and all patents and patent rights of the Duntley Pneumatic Tool Company were acquired by the H. O. King Company, engineer and tool-maker, at which time Mr. King, president of the H. O. King Company, organized the Duntley-King Pneumatic Tool Company, an entirely new organization for the production of pneumatic tools and accessories. The acquisition of the interests of the former Duntley Pneumatic Tool Company was made possible by the company's lack of proper manufacturing facilities and consequent inability to fill its orders.

The new company has an organization and shop facilitie skilled in the production o precision machine work such a is required to produce high grade pneumatic tools on fairly large scale and is backe by ample capital. The ne company is now in productio on a full line of pneumati tools and accessories, with general offices and factory at 1143 45 Diversey Parkway, Chicag

SUPERHEATER OFFICES MOVED

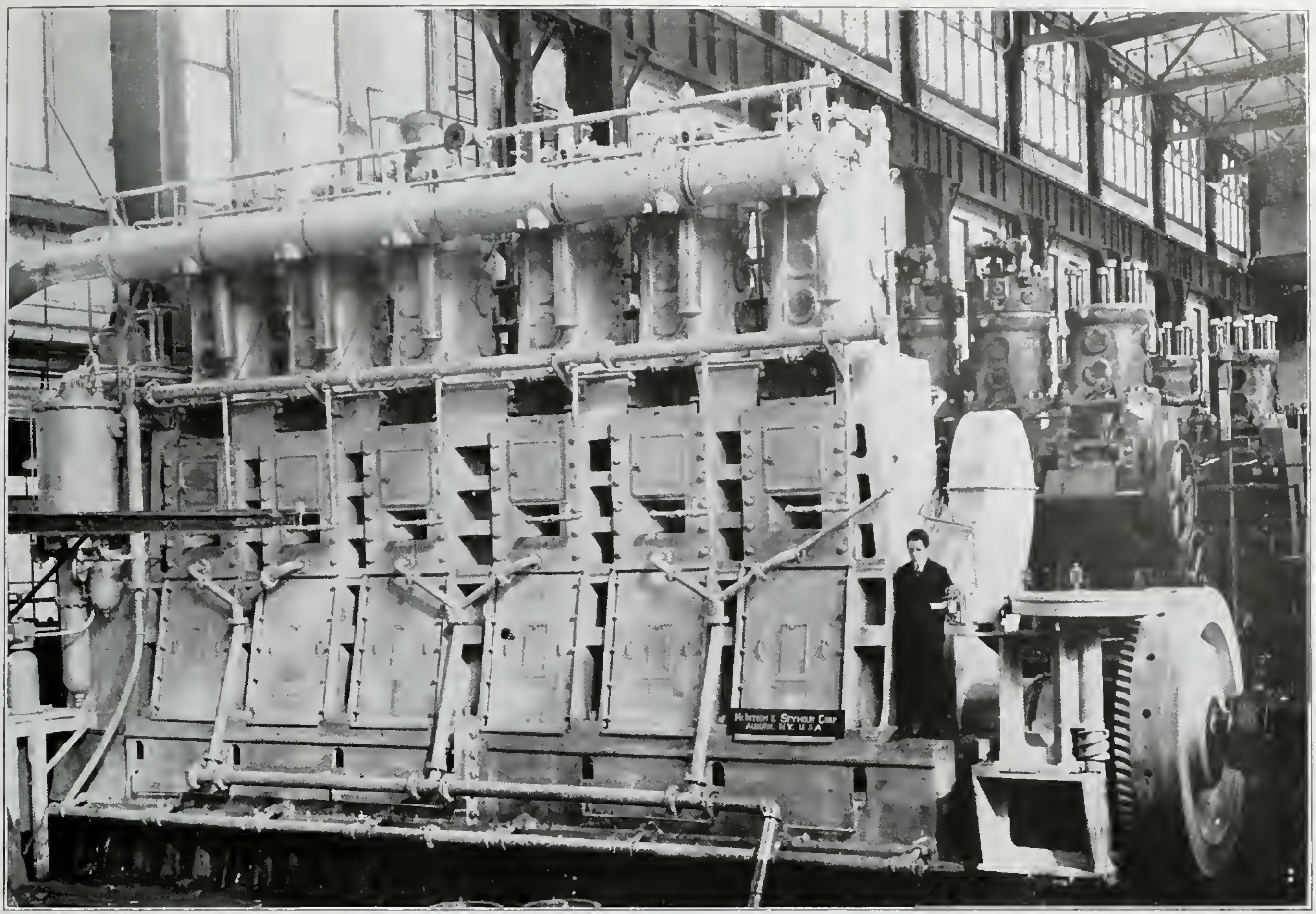
The Superheater Compan announces that on May 1 it general offices were move from 30 Church street to 1 East Forty-second street, Ne York City.

COBBLEDICK REMOVAL

The Frank M. Cobbledic Company, dealer in engineerin specialties, has announced th removal of its offices and entire stock of ball bearings fro 693 Mission street, San Francisco, to 1031 Polk street, between Geary and Post.

P. & H. OFFICE MOVED

Pawling & Harnischfeger announce that the San Francisc branch has been moved fro the Monadnock building to 3 Beale street, where the part and service departments, offices and display rooms will b situated. A complete line o P. & H. products will be carried.



The above picture shows one of our 1200 I. H. P. Directly Reversible Marine Engines on the test floor. A pair of these engines have been installed on the M/S "KENNECOTT."

Other sizes available for Marine work, 390, 640, 1550, 2000 and 3000 I. H. P. all four cycle and directly reversible.

DIESEL TYPE MARINE ENGINES

HEAVY DUTY

McINTOSH & SEYMOUR CORPORATION

AUBURN, NEW YORK

149 BROADWAY
NEW YORK

412 BISBEE BLDG.
JACKSONVILLE, FLA.

815 SHELDON BLDG.
SAN FRANCISCO, CAL.

THE WINTON DIESEL ENGINE

THE Diesel electric drive yacht Guinevere, which is illustrated herewith, was built for Edgar Palmer by George Lawley & Sons of Neponset, Massachusetts. She is a three-masted schooner yacht with a length of 195 feet, a beam of 32½ feet, and displacement of 642 tons.

Winton Diesel electric drive yacht Guinevere

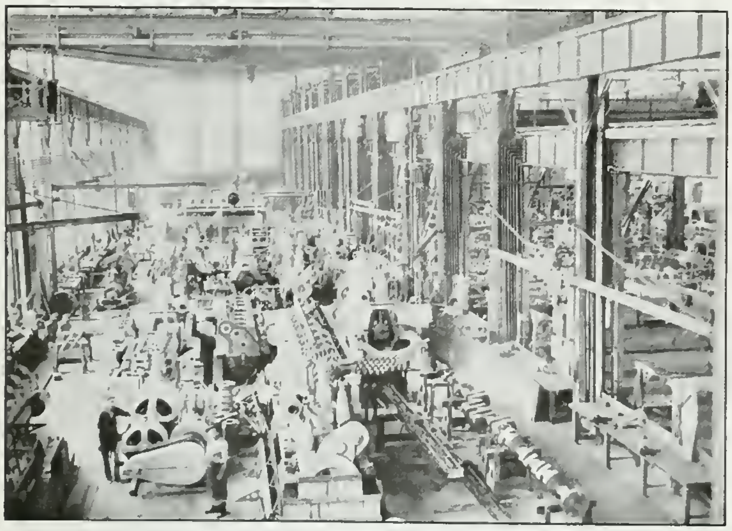
Her auxiliary drive consists of two 350 B. H. P. Winton Diesel engines each driving a direct connected Westinghouse electric generator. One of these sets is shown in an illustration reproduced herewith. Power from these generators is delivered to a 555 horsepower Westinghouse motor directly connected to the yacht's propeller. This drive will produce a maximum speed of 11½ knots, or the vessel can be run at about 8 knots with one generating unit only in operation.

The Guinevere was launched on April 21.

This Winton - Westinghouse Diesel electric drive is becoming very popular for yachts and other relatively small vessels on account of the extreme flexibility of control, it being possible to have a number of control stations on deck or in the pilot house, from which all maneuvering of the vessel can be directly controlled. The Winton organization is stressing very strongly the standardization of Diesel generating sets for use in these Diesel electric marine propulsion installations.

We are glad to be able to show with this article some views in their shops at Cleveland, Ohio, which under the able supervision of George W. Codrington, general manager of the Winton Engine Works, have been brought to a state of very high efficiency for the manufacture of this particular line. A detailed description of the Winton engine will no doubt be found interesting to our readers.

The crankcase is of gray iron and cast in one piece, of skeleton construction; that is, the sides have large openings opposite each throw of the crankshaft, each of which is provided with a cover plate affording easy access to all parts of the interior. A main bearing for the crankshaft is provided on each side of each throw of the crankshaft, each bearing being supported by heavy ribs, so that the crankcase is extremely rigid. The lower part of the crankcase is enclosed by a trough-shaped casting which extends from the timing gear in the front to the rear of the thrust bearing at the back end of the engine. The crankshaft and connecting rods are thus fully enclosed, so that there is no possibility of oil being splashed outside of the engine. The bearing caps are each bolted up to the crankcase by four large studs and nuts. The bearings themselves are heavy shells lined with high quality babbitt metal. Each bearing has an individual oil lead from a header running the full length of the crankcase. This header is connected to a two-cylinder reciprocating oil pump which maintains constant oil pressure on the bearings. Further details of this pump will be given later.


Main assembly aisle, Winton Engine Works

Crankshaft

The crankshaft, because of the considerable weights and sizes of the forgings involved, is made in three pieces, two sections each having three or four throws for the power cylinders, and a single throw section for the air compressor. These sections are flanged and bolted solidly together before being assembled into the crankcase.

From each main bearing of the shaft a hole is drilled through the adjacent web to the crank pin. These holes register with grooves in the main and connecting rod bearings, so that the connecting rod lower bearings are also lubricated under pressure directly from the pump.

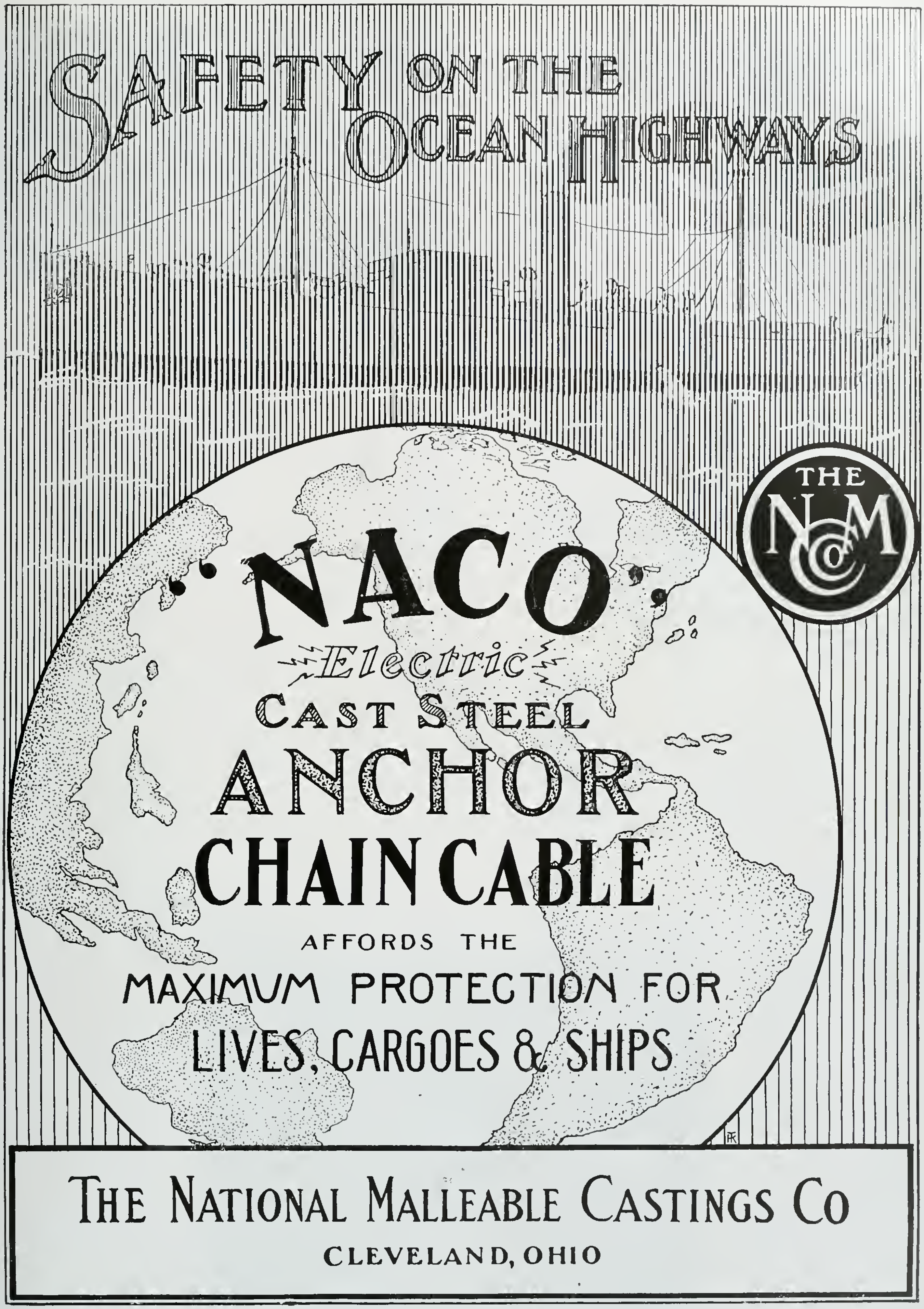
Connecting Rods

The connecting rods are I-section forgings, split at the upper end and clamped around the piston pins, and formed into a T-head at the lower end, to which two half-boxes and a supporting cap are bolted. Each rod has an oil-tube connecting with the groove in the upper half-box and leading upward to the piston pin. The piston pin itself is hollow with its ends plugged, and is drilled near each end so that oil is fed directly to the bushings in the piston. The tube and piston pin are thus filled with oil under pressure from the pump, and adequate lubrication of the piston pin insured. The piston pin is case-hardened and ground, and bears on bronze bushings pressed into the bosses in the piston.

These piston pin bushings are grooved so that the oil will reach all the pin bearing surfaces. The surplus oil escapes onto the cylinder wall providing ample lubrication for the pistons. Any excess oil works down and collects in the crankcase. It is thus seen that all bearing surfaces are assured of positive lubrication.

Pistons

The trunk pistons are about 75 per cent greater in length than in diameter. The piston pin bosses are located about one-third of the distance up from the bottom of the piston which brings them to about the center of the effective bearing surface. The length of the bosses is such that the bronze bushings can be inserted from the inside. As each bushing is flanged, it is effectively locked against end wise motion when the connecting rod is in place. The piston has the usual saucer-shaped top to give the necessary compression space, there being heavy ribs from its top to the side walls and the bosses. The piston is also strengthened by a rib around the inside, just above the bosses. To prevent oil splashing up under the lower side of the head where it would be burned, the hole through this rib is closed by a light sheet metal plate. This simple feature has great influence in maintaining the quality of the lubricating oil, which would otherwise rapidly become very dirty. The usual piston rings are carried at the upper end of the piston. To prevent oil working up past the piston rings, a groove is turned immediately



SAFETY ON THE OCEAN HIGHWAYS

THE NMCo

"NACO"
Electric
CAST STEEL
ANCHOR
CHAIN CABLE
AFFORDS THE
MAXIMUM PROTECTION FOR
LIVES, CARGOES & SHIPS

THE NATIONAL MALLEABLE CASTINGS CO
CLEVELAND, OHIO

George W. Codrington, general manager, Winton Engine Works

below the lowest ring and from this groove a number of holes lead back into the inside of the piston.

To permit the handling of the bolt which clamps the upper end of the connecting rod around the piston pin, each piston has a hole through each side midway between the pin bosses and slightly above them.

Cylinders

The cylinders are cast individually with integral water jackets, there being large cover plates so that the jackets can be readily cleaned out if necessary. The cylinders are bored and then ground to very close limits, assuring an excellent fit of the piston and rings.

The cylinder heads are attached to the cylinders by studs and nuts so arranged that the pressure is uniformly distributed. Each head carries five valves, two for the incoming air, two for the exhaust, and one for the injection of the fuel. Each pair of inlet and exhaust valves is operated from the camshaft by a single rocker arm; the valves being connected by a T-head guide on which the end of the rocker rests. The guide is carried in contact with the rocker at all times by a coil spring in the center of its hollow stem. Each end of the guide carries an adjusting screw and locknut, by which the clearance between the ends of the valve stem and slide can be adjusted. This clearance should be about .015 inch for both main inlet and exhaust valves. These pairs of valves are used instead of single large valves, as the small valves are much less apt to warp under the high temperatures to which they are exposed.

Fuel Injection

The fuel injection valve is located in the center of the head, and is also operated by a rocker from the camshaft. The adjusting screw for this valve is set to leave .025 inch clearance when the valve is closed. All these clearances are those for a cold engine, and will be somewhat less as the engine warms up.

High-pressure injection air flows during all the time the injection valve is open. Fuel is injected, however, during part or all of this period, depending on the amount of power required from the engine. The amount of fuel is controlled by a centrifugal governor which limits the duration of the fuel pump suction as may be required to maintain the engine speed.

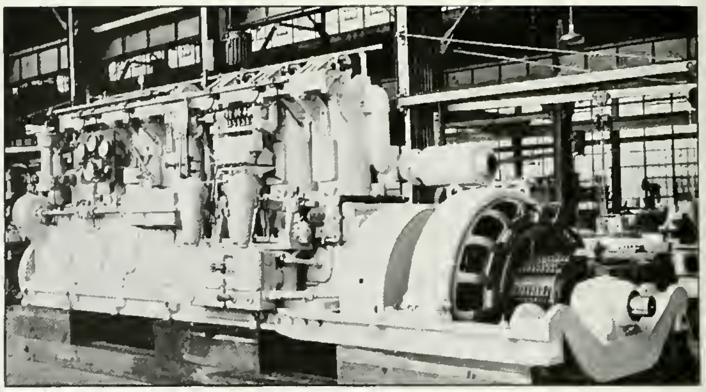
The fuel pump is of the plunger type, with one plunger for each power cylinder. It delivers the fuel to the fuel injection valve under a pressure of 850 to 950 pounds, depending upon the pressure of the fuel injection air. The stroke of the fuel pump is constant, the amount of fuel delivered being controlled by the governor by the early or late closing of the pump inlet valve, as noted above. The action of the governor is very delicate, as the speed variation with varying loads is very slight. This is, of course, a great advantage in a marine engine on which the loads may vary from one extreme to the other as the ship's propeller is deeply submerged or approaches the surface of the water in rough weather.

The fuel oil is lifted to the fuel pump from the tanks by air at 10 to 15 pounds pressure, insuring plenty of fuel at the pump inlet valve.

The engine cylinders and air compressor are provided with circulating water by a 4-cylinder plunger pump, operating from the same crankshaft which handles the oil circulating pump.

Lubrication

The oil circulating pump, which provides lubrication for all the main bearings of the engine, really consists of two single-cylinder pumps. The one driven from the end throw of the crankshaft operating the circulating water and lubricating oil pumps, draws the oil from the sump in the lower half of the crankcase and forces it through a cooler and a strainer to a storage tank. The other single-cylinder pump draws the oil from this storage tank and forces it into the header from which it is piped to the bearings, as described above. The discharge side of the pump is provided with an air-chamber to insure constant pressure being carried on these bearings. The circulating water pump is of the four-cylinder type, and also has an air-chamber on the discharge side to insure steady circulation of the water. The cylinders, pistons and stuffing box glands are made of noncorrosive bronze to prevent injury by the water.



Six-cylinder Winton full Diesel engine direct-connected to 225 K. W., D. C., 225 R. P. M. Westinghouse generator

Camshaft

The camshaft is supported in a long box-shaped casting open at the top, which is in turn supported on brackets from the cylinders. This trough is partly filled with oil, insuring ample lubrication to the cams; the camshaft bearings are lubricated under pressure from the pump, as are its driving gears.

The camshaft is driven by bevel gears from a vertical shaft near the center of the engine, which in turn is driven from a lay-shaft and a train of spur gears at the front end of the engine.

The camshaft is provided with two complete sets of cams, for forward and reverse motion, respectively. Shifting the shaft endways by means of a hand wheel and suitable mechanism brings either set of cams into operation. The shift from full speed ahead to full astern is guaranteed in six seconds, and is frequently accomplished in five seconds. Considering the weight of the parts which must be brought to rest and started in motion again, in the opposite direction, this is a wonderful performance.

Maneuvering

The procedure required to reverse the engine is as follows:

1. Close fuel oil supply valve.
2. Shift camshaft.
3. Open fuel oil supply valve.
4. Open the valve controlling starting air.
5. Close starting air valve.

The supply of air for starting the engine is carried in steel air bottles which are from 12 to 18 inches in diameter and ten to twenty feet long. These are stored wherever convenient on the ship and connected by heavy brass tubing to a header running the full length of the engine. At the point where the pipe from the air bottles joins this header, is located a valve which can be opened by pulling on a long handle. This admits the air to the header. Each cylinder is connected to the header by means of a pipe in which is located a valve operated regularly by the cam shaft. The end of this pipe connected to the cylinder, is fitted with a special casting containing three valves. The first is a check valve, to prevent the compression or power stroke pressure from escaping from the cylinder. The second is an overload or safety valve, which is set to open if the pressure in the cylinder exceeds normal power stroke pressure. A valve of this type is necessary to prevent damage to the cylinder or piston in case water or oil should accidentally collect in the cylinders. If this should happen and the engine were started, the top of the piston would probably be broken out as water or oil is practically noncompressible. The third valve in this casting is operated by a small hand wheel, and is opened only when it is desired to attach an indicator to deter-

Main machine shop, Winton Engine Works

mine the work being done by the cylinder.

The air inlets for both the air compressor and the main cylinders are connected to a large header, into which air is taken through a muffler at each end. This arrangement of drawing air for the engine directly from the engine room has the decided advantage of constantly drawing fresh air into this room, thus insuring ventilation.

Thrust Block

The thrust block at the rear of the engine has one unique feature, in that the thrust surfaces are lubricated under pressure from the engine oil pump. The thrust block consists of a short, heavy shaft, flanged at both ends; one flange being bolted to the rear flange on the crank shaft. Turned integral with this shaft are a number of large collars, between which the horseshoe-shaped thrust segments are mounted. Each of these segments is faced with babbitt on both sides and has a connection at the top to an oil lead from the pump. The babbitt facings are grooved, so that the oil is distributed under pressure over the entire thrust surface. The segments are held in the proper position by nuts on heavy threaded shafts along each side of the thrust block. They are consequently readily adjustable for wear. They also are reversible so that should the babbitt wear or burn off on one side, a new bearing surface can be brought into operation by a few minutes' work.

In general, the design has been very carefully worked out. The best of materials have been selected for each part, and the workmanship is excellent. All these features contribute to obtain the excellent results which are reported each time a Winton engine equipped ship reaches port.

TRADE LITERATURE

Superheaters for Stationary Power Plants. Bulletin No. T-7 of the Superheater Company, New York.

An eight-page reprint from "Industrial Power" setting forth the advantages of superheating in stationary power plants and illustrating and describing some of the installations of the Elesco superheater in this class of service.

For reciprocating engines in stationary plants it is recommended that 100 degrees Fahrenheit of superheat be installed with practically no change and that 150 degrees Fahrenheit of superheat can very frequently be adopted with perfect safety without changing the piping. It is claimed that the steam consumption of simple engines can be lowered by 22 per cent or better by the use of 150 degrees of superheat. Compound engines with the same superheat can be improved from 16 to 19 per cent; triple expansion engines from 14 to 16 per cent; and uni-flow engines from 10 to 12 per cent.

With turbines the pounds of steam per kilowatt hour are said to be reduced about 1 per cent for every 12½ degrees Fahrenheit of superheat up to 200 degrees, which, with average boiler and turbine efficiencies, would mean a theoretical fuel saving of between 8 and 12 per cent resulting from the installation of 200 degrees Fahrenheit superheat.

Catalog No. 58, Lunkenheimer Company. Cincinnati, Ohio.

A 570-page book bound in red buckram with black stampings describing the complete line of valves, steam fittings, pumps, oiling devices, etc., manufactured by the Lunkenheimer Company. Sixty pages at the back of this book are devoted to convenient tables and useful data for the engineer. The book is completely cross-indexed and makes a very handy reference book on the subjects of valves and steam fittings.

In 1862 Frederick Lunkenheimer established a factory for bronze specialties. He set at the beginning of his efforts a very high standard of quality, and a remarkable growth in the organization established by him has been the result, the Lunkenheimer Company now being "the largest manufacturers of high-grade engineering specialties in the world."

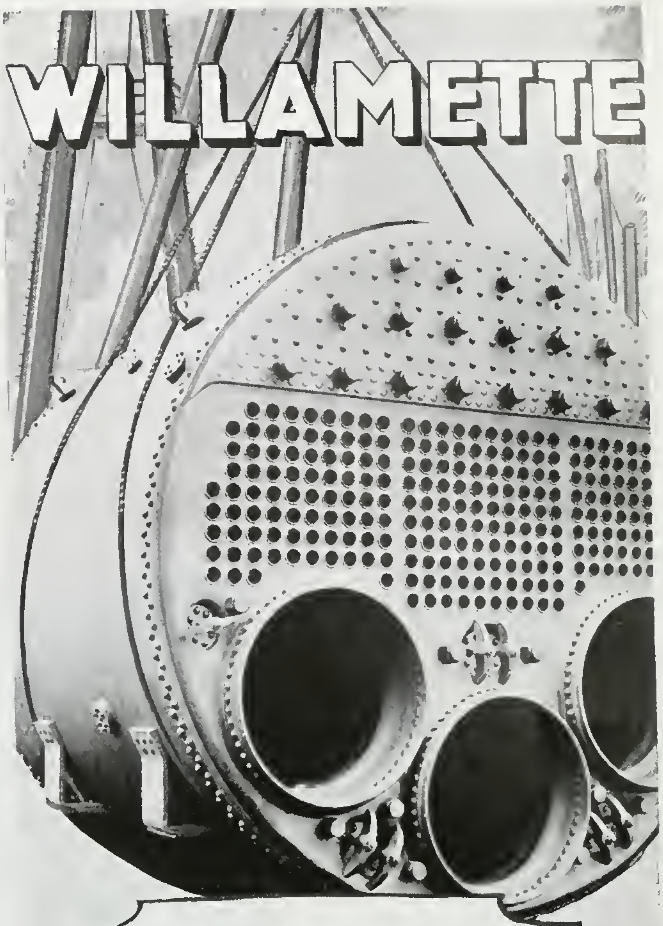
The Research Department of the Lunkenheimer Company has developed some excellent specialties in the way of metals especially adapted to the manufacture of valves, such as the Lunkenheimer "valve bronze," "valve nickel," "valve iron" "valve semi-steel," and "valve steel."

Every engineer who has any need for valve information should procure a copy of this book for his reference library.

Engberg Vertical Enclosed Self Oiling Engines. Catalog No. 301 of the Engberg Electric & Mechanical Works, St. Joseph, Michigan.

Thirty-six pages bound in art-board describing the vertical single cylinder enclosed steam engines manufactured by the Engberg Works for all classes of service where a rugged, dependable prime mover is needed. These engines are equipped with automatic or throttle governors and are built in a variety of designs with bedplates especially arranged for direct connection either to pumps, generators, air compressors or fans or are equipped with belt pulleys for general power work.

The Engberg engines were installed on a large number of the vessels built for the Emergency Fleet Corporation of the United States Shipping Board and have made a very good record for reliability and close control on the auxiliary generating sets.



REINFORCED by wide experience covering many important marine operations, the Willamette plant is well prepared to undertake and complete your work with satisfaction, economy and dispatch.

MARINE MACHINERY
MARINE AND STATIONARY BOILERS
DECK MACHINERY AND AUXILIARIES
MARINE REPAIRS OF ANY CHARACTER

Willamette
IRON & STEEL WORKS
Portland, Oregon, U. S. A.
1043 Monadnock Bldg.,
San Francisco, Cal.
1920 L. C. Smith Bldg.,
Seattle, Wash.
Canadian Office
916 Rogers Bldg.,
Vancouver, B. C.

A STABILIZER AT WORK

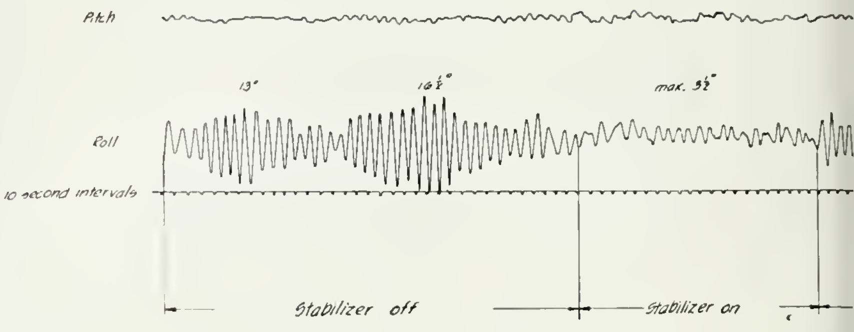
THE information and illustrations composing this article are taken from a very interesting story entitled "Southbound with the Lyndonia" published in No. 8, Volume 2, of the "Sperryscope," that story having been written by one of the Sperry Gyroscope Company's engineers who accompanied the vessel on her first run after delivery to the owner.

The Lyndonia is Mr. C. H. K. Curtis' private yacht and, as will be seen from the accompanying picture, she is a very graceful, clipper-bowed vessel. Her dimensions are: 230 feet over-all length, 30 feet beam, 14 feet 6 inches draft. She displaces about 1100 tons when fully loaded and has a cruising capacity of about 3000 miles. She is beautifully fitted in every way, but we will not stop now to describe her accommodations, as that would occupy space enough for a separate article.

The gyroscope stabilizer fitted to this yacht by the Sperry Gyroscope Company is 6 feet in diameter and weighs a little under ten tons. At its full speed the periphery of this wheel runs at from four to five miles per minute, and the machine is fitted with an automatic vacuum pump which during the operation of the gyro at these high speeds exhausts the air from the casing so as to eliminate air friction.

During this first trip considerable rough weather was experienced and an opportunity given to observe the behavior of the boat with and without the stablizer in action. The difference is graphically shown in our illustration of a partial record from the gyro roll and pitch recorder. Members of the engine room crew testify to the almost human intelligence of the stabilizer. The stabilizing force of the large gyroscope is at all times directed by the small controlling gyro, and it

Record made by gyro roll and pitch recorder of the movements of the Lyndonia on a voyage from New York to Charleston

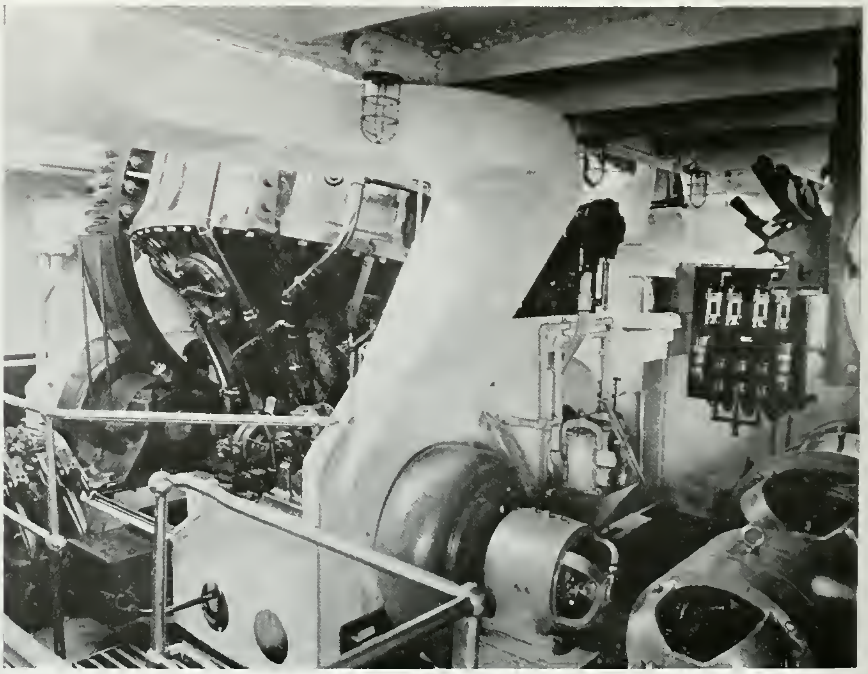


gyroscope, there would be quite is related that, watching the big an interval, perhaps several minutes, when there would be no perceptible motion of the casing. Then would come a slow, full swing or precession and, on looking through the port hole, they would see coincidentally a large wave passing by.

The captain of the Lyndonia was emphatic in his endorsement of the apparatus. Said he: "The stabilizer worked most satisfactorily; in fact, far exceeded my expectations. I never thought it would really quench all the roll. I figured it would reduce the roll a bit, but could not conceive of it fighting off all wave action, but we were held so steady that no extra lashing for the boats was required, although we were heavily loaded up forward with oil and ordinarily would have wallowed badly."

The marine engineering world is looking forward with great interest to a very much larger installation of this interesting adjunct to marine comfort and economy which will be fitted to the 18,000-ton passenger liner Huron, and we have no doubt that the results will be as satisfactory with the liner as they have been with the yacht.

It is not only in the added comfort to sea voyages that the Sperry gyroscopic stabilizer commends itself to marine operators, but in the matter of commercial savings on fuel bills and in less liability to damage suits, both as regards cargo and passengers, and there is ample room to figure actual direct net profits along these lines from the stabilization of ocean-going freight and passenger vessels.



Sperry stabilizer and stabilizer compartment of the Curtis steam yacht Lyndonia

A HOIST

with 20 years of experience back of it.
Built right here at home.
Dependable—Durable—Compact—Accessible.
Stationary or monorail travel.
Operated from floor or cab—or remote control.
1000 to 10,000 pounds capacities.
Any standard motor A. C. or D. C. can be used.
No more headroom than a chain block.
Office and Works:

STAMP ELECTRIC HOIST COMPANY
1500 Seventeenth Street SAN FRANCISCO, CALIF.

STAMP

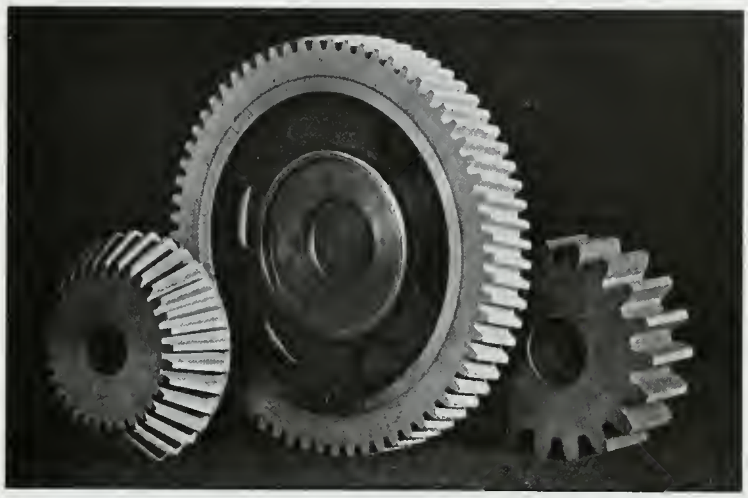
"H'IST 'ER UP" with a "STAMP"

NON-METALLIC GEARS

THE accompanying illustrations show a few of the various forms of gears and pinions cut from Bakelite Micarta-D blanks by the Pacific Gear and Tool Works.

Bakelite Micarta-D, as is hown in these pictures, is built up of canvas. A very special, heavy duck of uniform weave is used, and this is bonded together with Bakelite by heating while under enormous pressure. The material is manufactured in plates or sheets approximately 36 inches square nd up to 2 inches in thickness, and it is supplied to gear manufacturers either in the sheets or in blanks cut according to pecifications.

The Bakelite Micarta-D material has been developed by he Westinghouse Electric & Manufacturing Company and is upplied by them to representative gear manufacturers in all of the large manufacturing centers. The gear blanks are usually cut from the plates by the gear manufacturer. These blanks re either cut with saws or with a double trepanning tool on a boring mill or drill press. For ing gears where a large number of duplicated gears are wanted, they are best made by molding to size, the duck being punched into the proper size ings or segments and these being Bakelized under pressure.



Gears and pinions cut from Bakelite Micarta-D

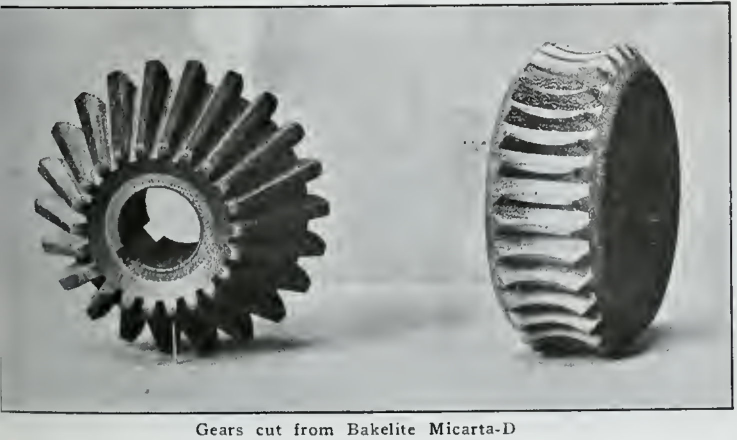
The physical properties of this material are quite remarkable. Under test it shows a tensile strength parallel to laminations of 10,000 pounds per square inch, a compression strength parallel to laminations of 17,000 pounds per square inch, and a compression strength perpendicular to laminations of 35,000 pounds per square inch. The transverse strength or maximum fiber stress both parallel and perpendicular to laminations amounts to 17,000 pounds per square inch. The coefficient of expansion is very low—.00002-inch parallel and .000085-inch perpendicular to the laminations. The specific gravity is 1.4, which gives a weight per cubic inch of .05 pounds. The shrinkage up to 100 degrees Centigrade is practically zero, the oil absorption zero, and the water absorption negligible.

A standard system of tooth forms and dimensions and of gear construction has been worked out to cover all the ordinary gear uses, and formulas have been arrived at for figuring transmission capacity, horse power rating, and tooth design, which cover practically all cases where this material would be considered permissible.

Bakelite Micarta-D is not subject to corrosion and, where properly installed and cared for, will often outlast cast iron and brass gears.

Some of the advantages derived from its use are: assured silent operation and elimination of wear on the mating gear; it has been used with great advantage on the drive and immediate gears on lathes, planers, punch presses, paper mills, cement mills, loom motors, crane motors, camshaft gears, magnetos, speedometers and washing machines in sizes varying from 1½ inches diameter, 3/16 inch face, to 22 inches diameter, 11 inches face.

Pacific Gear & Tool Works are licensed under the Westinghouse patents to use this material and have made very successful installations of Bakelite Micarta-D pinions and gears for varied uses in the San Francisco Bay district.



Gears cut from Bakelite Micarta-D

Merchant Expansion

THE Merchant Shipbuilding Corporation, which operates a modern $6,500,000 plant covering fifty acres at Chester, Pennsylvania, has decided to immediately branch out in general engineering lines, embracing steel construction in general, manufacturing and power plant equipment, machinery and machine work, railroad equipment and material, and plate shop work. This will be in addition to the general shipbuilding business now conducted, including ship conversion and repair work.

The yard is adequately equipped for extensive work along these lines, especially in shipbuilding and kindred work. Ships up to 15,000 d. w. t. capacity are now being built. Every facility is available for the conversion of previously built steamships to Diesel motorships, electric drive or geared turbine drive.

It is also stated from an authoritative source that this corporation has obtained a license to build Diesel engines. This branch alone would give employment to hundreds of additional men in the Chester yard.

These new lines recently decided upon by the directors of the Merchant Shipbuilding Corporation hark back to the days when the yard of that pioneer in American shipbuilding, John Roach, was known as the Delaware River Iron Shipbuilding & Engineering Works.

STAMP ELECTRIC HOISTS

Stamp electric hoist in operation

EXPERIENCE gained in more than twenty years devoted to the manufacturing and the application of hoists and cranes is embodied in the products of the Stamp Electric Hoist Company, which is now manufacturing hoists and cranes at 1500 Seventeenth street, San Francisco. C. E. Stamp, president of the company, also is president of the Charles E. Stamp Company of Cleveland, which he founded twenty-one years ago. C. S. Somers, vice-president and engineer of the Stamp Electric Hoist Company, was chief engineer of a large and successful Eastern builder of electric hoists for eleven years and he has been engaged in the business for twenty-three years. Such long experience as that of Messrs. Stamp and Somers indicates that the products of the San Francisco company will be among the best.

The Stamp hoist embodies the experience of both these men. It is simple and neat in appearance, is rugged, compact and accessible in construction and dependable always. The frame is a one-piece casting, one end supporting the motor, which may be of any standard make; the center supporting the winding drum; and the other end being a casing containing all the gearing and the mechanical brake, which run in an oil bath. A cover bolted to this casing makes the compartment oil-tight. The advantage of a one-piece frame is that there are no bolted connections to work loose and the shafts, having two or more bearings, are prevented from getting out of alignment. Jigs are used in the machining, assuring interchangeability of parts. By removing the cover of the casing, all gearing, shafts, bushing and the mechanical brake may be removed and repaired or replaced without taking the hoist from the runway or support. One man can disassemble the hoist in ten to fifteen minutes.

Both a motor brake and a mechanical brake are used on all hoists, which assures absolute control of the load under all conditions. A limit switch of a simple and ingenious design shuts off the power when the hook has reached the safety limit of upward travel and thus prevents damage to the hoist. The controller is of the drum type, so arranged that adjustments or replacements can be made without removing it from the hoist or disconnecting any wires.

The Stamp Electric Hoist Company is constructing four types as follows: Type A, a stationary or suspension hoist. As its name indicates, it may be bolted at any fixed point where lift only is required. It may be bolted to the mast of a jib crane or by the use of a suspension yoke may be hung on a trolley for travel on the bottom flange of an I-beam or the trolley of a hand-power or motor-driven crane.

Type B is equipped with a trolley the sides of which are rigidly bolted to the hoist frame. This type, in sizes up to two tons' capacity, usually has a plain trolley and is moved along the runway beam by pushing on the load. Type B1 also has a geared trolley and is moved by pulling on a hand chain.

Type C has a motor-driven trolley. This is used where long distances are to be covered or where greater speed is desired.

Stamp electric hoist, showing a lift of 3000 pounds on a hoist ha a rated capacity of one ton.

The first three types usually operated from the fl by pendant ropes and ordir ily only one man is required operate the hoist and att ard detach the loads.

Type D has a cab for operator attached, in which located the controllers.

CAM, CRANK
STEAMSHIP
SHAFTING, SHOES
AND DIES, PUL-
VERIZING BALLS

Forrest
FORGINGS

OIL AND WATER
WELL MACHINERY
TOOLS AND
SUPPLIES

EDWIN FORREST FORGE COMPANY

OAKLAND
SAN FRANCISCO

A 300 H. P. MOTOR TUG

Γ is being more generally recognized with every pass- ing month among American p owners and shipbuilders t the motor cargo vessel vered with heavy oil inter- combustion engines is by the most efficient ocean rier, due broadly to econ- y of fuel consumption, sav- of space and weight, and uction in number of crew. r the same reasons the motor vboat propelled by an oil gine of established reliability show a big saving in oper- ng costs over the steam tug similar power.

The accompanying plans show 00 H. P. motor tug designed the Diamond P Boat Line Philadelphia by E. A. Ed- rds, naval architect in the rine department of Fair- ks, Morse & Company, Phil- lphia, Pennsylvania. The t is intended principally for and coastwise towing and sequently was limited to 7 t draft, but has been given good sheer and plenty of eboard so that outside trips be made with safety and nfort whenever desirable. e principal dimensions are as ows:

ength, O. A., 82 feet 6 hes; breadth, moulded, 18 t 6 inches; depth, moulded, eet; draft, 7 feet; shaft H. P., .

he scantlings are in excess American Bureau or Lloyd's requirements. The keel is of 7/16-inch plate; shell 5/16-inch plate with doublers at waterline forward for protection against ice; frames 2½x3x¼ angle bars spaced 20 inches on centers; reverse frames 2½x2½x¼ angle bars; stem 1½x5½ rolled steel bar; stern frame 2¼x5¼ steel casting; deck beams 3x3x5/16 angle bars on every frame; deck ¼-inch steel plate; house 3/16-inch steel plate.

There are four oil-tight transverse bulkheads, two forming the peak tanks and two the main fuel bunkers, as shown. The fuel compartment is also divided longitudinally into port and starboard tanks, the combined capacity of which is 29 tons. Additional fuel may be carried in the peak tanks if desired. Two daily service fuel tanks are located in the upper part of engine room.

Accommodations for seven men are installed, all above deck, and there is ample room for four men below decks forward, although it is very unlikely that this space will ever be used for anything but storage purposes as the total crew even for twenty-four hour service need not exceed five men.

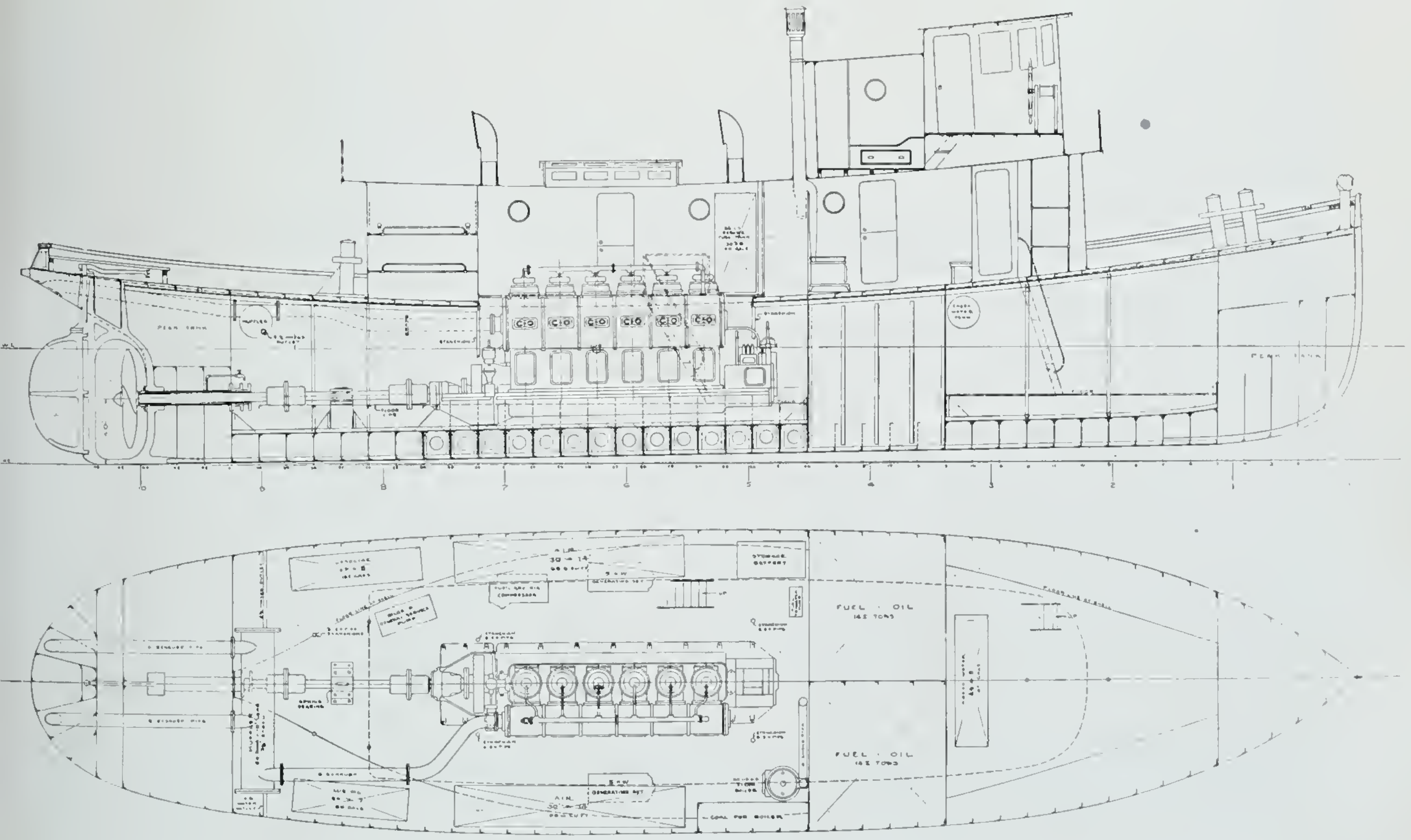
Machinery

The main propelling unit is a 6-cylinder, 14-inch bore, 18-inch stroke Fairbanks-Morse Type "C-O" direct reversible oil engine, conservatively rated 300 B. H. P. at 250 R. P. M. This engine is of the moderate compression, two stroke type with mechanical or solid injection. The auxiliaries are all electrically operated and consist of one 4½x5 Ingersoll-Rand Type 14 vertical reservoir cooled air compressor connected by short belt drive to a 5 H. P., 1150 R. P. M. Fairbanks-Morse Type CPB direct current motor; one 2-inch Blackmer rotary bilge and general service pump geared to a 3 H. P. --50 R. P. M. Fairbanks-Morse CPB direct current motor; one ¾-inch Blackmer rotary fuel transfer pump geared to a ½ H. P. 1750 R. P. M. General Electric Type RC direct current motor. Current at 110 volts is furnished by two 5 K. W. Winton gasoline driven generating sets, one being of sufficient capacity for ordinary use and the other being held in reserve a large part of the time. A slate panel switchboard with circuit breakers - and controls for motors and lights is located above grating in upper part of engine room. There is also a 56 cell, 110 volt storage battery for lighting purposes when generating sets are shut down. Starting and maneuvering air at 175 pounds pressure is carried in two tanks, one each side of engine room as shown. A small coal burning steam boiler for heating purposes is installed on starboard side of engine room.

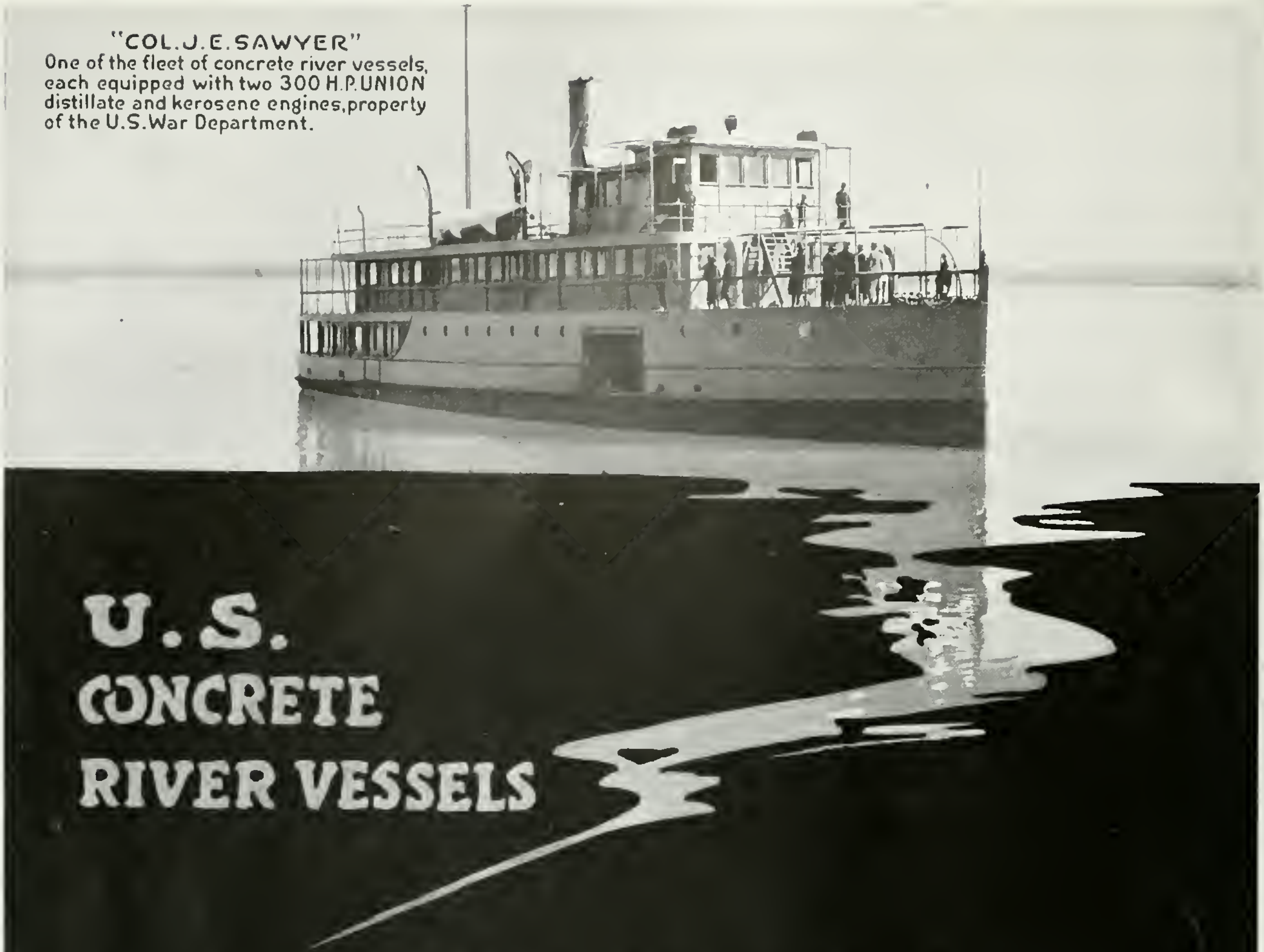
The fuel consumption of the main engine is approximately 22 gallons per hour at full load, so that with 30 tons of oil in her bunkers this tug can operate at full power for 409 hours. Working 10 hours per day this means that the boat will require bunkering only once in 40 days or thereabouts and in 24-hour service she can run for 17 days at full power. With fuel oil at 5½ cents per gallon, the approximate price today, the hourly fuel cost is only $1.21.

A boat of this type, used exclusively for towing, requires no inspection and no licensed officers, although the captain would naturally be a licensed pilot, and, as stated above, a total crew of five men is all that is necessary to operate the boat in 24-hour service. A tug very similar to this except that she is powered with a 200 horsepower engine of the same make, has been towing up and down the coast from Maine to Florida for the past year and a half with a crew of five men and there is not a steam tug in the business that can compete with her.

The tug as shown in the plans can be built, fully equipped and delivered to New York or Philadelphia at the present time for approximately $65,000.



Plans of a 300 H. P. motor tug equipped with Fairbanks-Morse engines



"COL. J. E. SAWYER"
One of the fleet of concrete river vessels, each equipped with two 300 H.P. UNION distillate and kerosene engines, property of the U.S. War Department.

U.S. CONCRETE RIVER VESSELS

Owing to a shortage of gas engineers, the War Department was compelled to assign steam engineers to its UNION-Engined concrete river vessels. The following are excerpts from a recent letter:

STURDINESS AND SIMPLICITY

"The fact that these steam engineers have been able to operate the engines successfully, without difficulty, indicates their sturdiness and simplicity of design."

RELIABILITY

"Engineers have reported universally that they can have the boats in full power within six minutes after receiving command to get their boat in readiness for a voyage."

ECONOMY

"The cost of fuel is actually less than a steam vessel, which is required to consume a large proportion of its fuel between trips, in keeping up steam."

"The engine room crew on each vessel consists of two men per ship."

UNION GAS ENGINE CO.

OAKLAND - CALIFORNIA

Pacific Marine Review

The National Magazine of Shipping

AN FRANCISCO
UBLIC LIBRARY

MATSON NAVIGATION COMPANY'S
S. S. MANULANI
BUILT BY MOORE SHIPBUILDING CO., OAKLAND

JULY
1921

Photo
MOULIN
S.F.

Pacific Marine Review, Vol. 18, No. 7. Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.

Doctoring a deck

DOZENS of time and labor saving applications have made the process of gas welding and cutting indispensable in ship yards.

Because of its uniformly high purity, exceptional portability and constant availability

Prest-O-Lite

DISSOLVED ACETYLENE

has proven the most satisfactory gas for welding and cutting in ship building and repairing.

Forty plants and warehouses insure immediate deliveries of Prest-O-Lite anywhere and in any desired quantity—a never failing service that has greatly enhanced the value of Prest-O-Lite in the hundreds of yards where it is regularly used.

THE PREST-O-LITE COMPANY, Inc.

General Offices: Carbide and Carbon Building, 30 East 42nd Street, New York   Balfour Building, San Francisco

In Canada: Prest-O-Lite Company of Canada, Limited, Toronto

PW-506-21

Pacific Marine Review

CONTENTS

JULY, 1921

Pacific Coast Operators—An Appreciation .... Frontispiece

Foreign Trade Council Speaks—Final Declaration of the Eighth National Foreign Trade Convention 389

Express Freighters—The Manulani 14,000-ton Carrier of the Matson Navigation Company Completes First Voyage 393

Colloidal Fuel 394

Long Time Credits—Their Value to the Exporting Manufacturer, by George R. Meyercord 396

Early Steam Navigation on the Pacific, by Elwin M. Eldredge 398

Editorial 400

Oil Engines and Motorships 404
Performance of an American Motorship—Kennecott Makes Good Record for Fuel Economy; Steamer or Motorship—An Instructive Comparison of Earning Capacities; Motor Shipbuilding in Europe.

Work at the Fletcher Yard 410

Marine Turbine Operation, by Sea Flame 412

Japan Adopts Electric Drive—New York Shipbuilding Company Gets Contract for Nippon Navy Collier 414

Bethlehem Delivers Tankers—Sparrows Point Plant Completes Two Fine Vessels for British Oil Company 415

European Marine Notes 416

Government Shipbuilding in Australia, by Trade Commissioner A. W. Ferrin, Melbourne 418

New Snubbing Device 418

Ship Repairs at Balboa—A Description of the Drydock and Shops of the Panama Canal 419

Marine Insurance 421

Full Speed Ahead 427

Pacific Machinery 449

YALE - HARVARD

THE WHITE COMETS OF THE PACIFIC

Daily Service Between San Francisco and Los Angeles

LEAVE PIER 7 SAN FRANCISCO, 4 P. M.

ARRIVE LOS ANGELES HARBOR 10 A. M.

SPEED :: COMFORT :: LUXURY

All Rates Include Meals and Berth

CUISINE IN CHARGE OF
AL. LEVY
The Wizard of Gastronomy

Standard Staterooms, 1 and 2 Berths; all equipped with Running Water and Individual Berth Reading Lights. De Luxe Rooms with Twin or Folding Beds, Private Showers and Toilets, Hot and Cold Running Water. Suites with Sitting Room, Bedroom, Bath and Toilet.

Los Angeles Steamship Company

San Francisco . . . . . 685 Market Street
Phone Douglas 2576

Oakland . . . 1422 San Pablo Ave.
Phone Lakeside 530

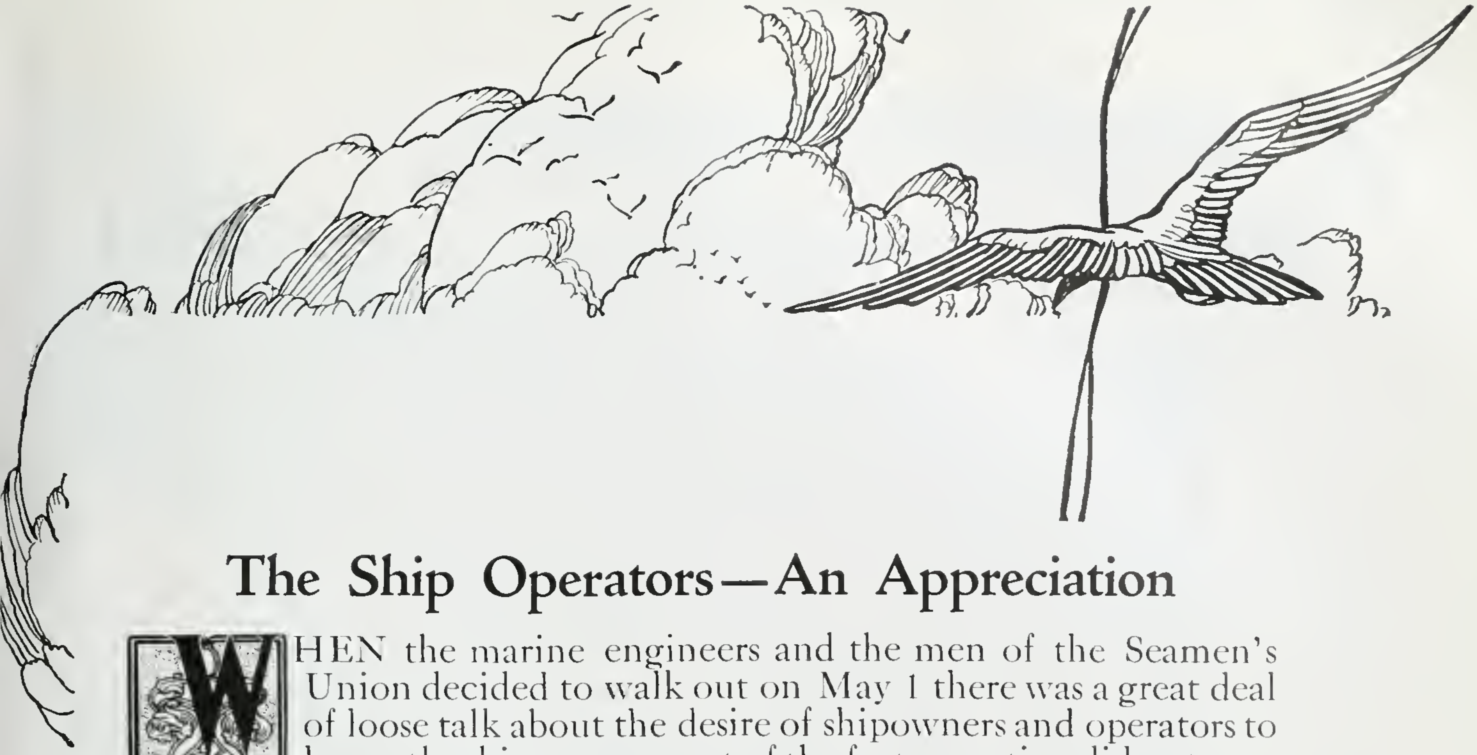
Berkeley . . . . 2127 University Ave.
Phone Berkeley 14

Los Angeles . . . 517 So. Spring St.
Phone 64114
63598
63701

Long Beach . . . 119 West Ocean Ave.
Phone Home 199

San Pedro . . . . . 629 Beacon Street
Phone San Pedro 98

Pasadena . . 116 East Colorado Street



The Ship Operators—An Appreciation

WHEN the marine engineers and the men of the Seamen's Union decided to walk out on May 1 there was a great deal of loose talk about the desire of shipowners and operators to lay up the ships on account of the fact operation did not pay.

Those operators, however, who were really in the shipping game realized their responsibility to passengers and shippers and made every possible effort to keep the ships running.

That they accomplished this task in the face of almost insuperable difficulties and in some cases at great personal risk is an achievement measuring up to the best traditions of the American merchant marine.

The discomforts and inconveniences which would have been caused by the suspense of the Coast passenger service are obvious to every one. Not so obvious but much more serious is the industrial distress which would have been caused by the failure of oil transport by sea. Many cities would have been in darkness and whole industries crippled, had our fleet of Pacific Coast tankers ceased to function.

We shall have more to say later about the details of this achievement in marine transportation, but we wish here and now to register our appreciation of the men to whom its accomplishment is due, the shrewd, quiet, brainy men who manage the ships, our Pacific Coast operators.

Character - Service Craftsmanship

Character—What It Means

IN the construction of the greatest, most complicated and most beautiful machine devised by man—the ship—there is no element more important than Character.

Character in shipbuilding means character in the ship, expressed in a long life of useful and economical service.

Character is the expression of an organization in which every man, from the lowest to the highest, is animated by a keen sense of loyalty to his company and a pride in his work that finds expression in doing that work honestly and well.

NEW YORK SHIPBUILDING CORPORATION
Camden, N.J.

Pacific Marine Review

The National Magazine of Shipping

July, 1921

Copyright, 1921, by J. S. Hines

FOREIGN TRADE COUNCIL SPEAKS

Final Declaration of the Eighth National Foreign Trade Convention

THE Eighth National Foreign Trade Convention, composed of upward of 1200 delegates, representing every part of the United States and every factor of our international commerce, met in Cleveland from May 4 to 7, 1921, to study the problems confronting our foreign trade as a result of present world-wide conditions. As a brief statement of the conclusions reached from consideration of the addresses and discussions at its various sessions, it submits its Final Declaration and recommends these opinions and recommendations to the thoughtful attention of the government and the people of the country.

The Situation Today

The world is suffering today from unbalanced exchanges. Notwithstanding the position of the United States as a creditor nation, the present unstable financial condition of a large part of the world, especially of Europe, is the fundamental cause for our own business depression. A return to normal conditions in our own country depends in large part upon an improvement of our foreign trade. The present retrogression is clearly evidenced by the maximum of the country's export trade $928,000,000 in June, 1919, decreasing in October, 1920, to $751,000,000, and in March, 1921, to $384,000,000.

Foreign nations whose imports exceed their exports have been compelled to curtail purchases because of inability to pay by exports. The result of this would be eventual restoration of more normal exchange, but the requirements of international commerce and domestic prosperity in each country demand immediate relief from present stagnation.

The United States must continue to increase its imports of raw material and merchandise not detrimental to existing industry in order to receive pay for the exports necessary to stable employment of labor in agriculture and industry; and to permit of the liquidation of the obligations of the debtor nations. Continued liquidation in gold of foreign obligations to us will tend to renew inflation and arrest the beneficial readjustment of values on the basis required by present conditions throughout the world.

Long Term Credits

It is generally agreed that the solution depends upon our ability to create adequate facilities for the purpose of drawing upon surplus American investment funds in order that the long term credits so badly needed by the disorganized countries of Europe may be furnished. Most of the countries of Europe are unable to pay us now and for some time to come in gold or merchandise; and unless they are enabled to obtain credits to purchase the raw materials which they need, their business and ours will continue to stagnate.

We urge the immediate creation of financial institutions under the Edge law, whose machinery will facilitate extension of long term credits to promote free exchange of exports and imports. We commend efforts to acquaint our investing public with the necessity of purchasing debentures issued by such institutions against approved foreign securities for this purpose, so that eventually every community will serve its own vital interest in furthering our foreign commerce as a necessary component of domestic prosperity.

The reduction of loans and accumulation of banking reserves now permit, and the lower prices of many commodities justify the extension of credits sufficient to accelerate recovery in certain lines. This should gradually thaw frozen credits and end stagnation. It will further provide increasing export and import cargoes for our now practically idle merchant marine and contribute to restoration of economic equilibrium in countries suffering from war debts and inflated currencies and to a proper distribution of commerce in neutral markets.

Restoration of Normal Conditions

The increased confidence prevailing in the American business world denotes the disappearance of danger of financial panic. As liquidations progress and reconstruction in Europe proceeds, normal conditions will be restored. Nevertheless, after so great a disturbance in business and financial conditions, it is prudent to recognize that equilibrium will be restored and commerce resumed only by gradual process. Months may elapse before necessary liquidation will have been accomplished. It will continue to be the part of prudent commercial and financial interests to refrain from hasty and ill-advised expansion tending through renewed inflation to nullify quickly the present fruitful efforts of conservative business men to lead the country back into paths of safety and sanity.

It is manifest that while many products of our soil have been reduced in value to pre-war levels, a number of manufactured products remain too high in cost of production to compete in neutral markets with foreign goods. It is essential that the substantial reduction in cost of living, which has already occurred in food products and other basic commodities, shall be followed by economies in cost of production until a stable balance of values of all commodities and productive effort is established. No readjustment, however, can be complete without reduction of costs of railroad transportation both for domestic and export shipment. Continuance of our present cost of finished merchandise would maintain unreasonable expense of living and put our products in a non-competitive position in markets of depleted purchasing power.

American Maritime Policy

Congress has declared in favor of private ownership of our merchant marine as soon as practicable, but under present conditions it is impracticable to dispose of any considerable proportion of our merchant marine to private owners at fair prices.

So much of the fleet as can not be chartered on a bare boat basis or time charter to private operators, should be laid up pending the revival of world commerce; meanwhile the fleet will serve our national security as a naval auxiliary, in case of necessity.

The plan should be abandoned of allocating ships to load at ports and for trade routes irrespective of the tonnage of cargo offering or of the losses to the government attendant on this policy.

While it is obvious that the ultimate sale price will be measured by the world market for similar ships, such parity of price and successful operation can be obtained only if the operating costs are approximately equal to those of our foreign competitors.

Present shipping laws requiring larger crews subject American vessels to a disadvantage estimated at 5 per cent on the capital investment, while the compulsory advance of half wages in any foreign port of call adds a further burden of cost by involving excessive delays.

As continued maintenance of the American merchant marine is of vital interest to American producers, exporters and importers, they should require the employment of American vessels in the carrying of their shipment of exports and imports to such extent as they are able to exercise preference or control, and in any case they should prevent discrimination against American ships in such transportation.

It is believed that the adoption of these recommendations will save the government its present large loss in carrying on the existing plan of operation and will insure ultimately the retirement of the government from the shipping business through the sale to private owners of the fleet at reasonable prices.

Between the United States and its possessions and foreign ports, rapid, regular combined passenger and freight service should be maintained for the prompt and regular carriage of the mails, express, freight and merchandise.

Marine Insurance

The State and Federal governments are urged to remove those disabilities caused by non-uniformity of state laws and excessive taxation which place American insurance at a disadvantage with the foreign insurance market in which they must compete. We urge the enactment of the marine insurance measure now pending in Congress, a model upon which uniform state legislation may be based.

Burdensome Taxation

Excessive governmental expenditure in all countries imposes upon the commerce of the world a burden, the further increase of which can end only in disaster. Provision of facilities for commerce is futile if every business activity continues to be oppressed by a multiplication of taxes. For the recovery of normal prosperity the utmost economy in governmental expenditures should be accompanied by unremitting frugality in private business.

Arbitration and Standardization

Throughout the world the stress of readjustment has been attended by deplorable violations of the sanctity of contracts, emphasizing the absence of adequate international machinery for the enforcement of awards of commercial arbitration. This deficiency should be promptly remedied. In many instances all parties affected by breaches of contracts sincerely believe themselves in the right, as numerous commodities in foreign trade are not standardized. Standardization of grain, cotton, iron ore and other staple trades has protected them from the defaults so numerous with merchandise to which standardization should, so far as practicable, be applied. Business interests should co-operate with the United States government to this end.

Through the initiative of the National Foreign Trade Council standard definitions of shipping terms (F.O.B., C.I.F., etc.) in foreign trade have been generally adopted in the United States. The concurrence therein of commercial organizations abroad should be sought by the Council. Revision and uniformity of ocean bills of lading are greatly to be desired now that the hazards of war are removed.

We commend the efforts of the American Bankers' Association and other organizations to adopt uniform standards of Letters of Credit.

Persistent Effort Essential

American export business has been injured in the past by lack of persistent effort to hold markets already gained. American producers are urged not to abandon or lose interest in their foreign trade because it shows no profit for the moment and to remember that in many cases it will cost much more to regain in the future a business lost now through lack of courage and foresight.

The Bargaining Tariff

The vast market which the United States offers to other nations on a basis of equality, and the supplies of American raw material exported without taxation or discrimination, entitle the American export and import trade to equality of treatment in all foreign markets.

To insure such equality of treatment, the American tariff, whatever its underlying principle, should provide for additional duties on imports from nations discriminating, by tariffs or administrative practices, against the trade of the United States.

Development of Government Service

The Foreign Service of the United States should be reorganized and established under a unified supervision which will promote its efficiency, both in diplomatic representation and in the collection and dissemination of commercial information. This reorganization should provide for a permanent career through the establishment of a national training academy for the foreign service, which will attract competent and ambitious young men into a life work of constructive effort in their country's service.

Foreign Trade Education

Scientific educational training is as essential for our business agents as for our official representatives. It should equip them with accurate and practical knowledge of foreign markets and languages, as well as of the economic, social and political conditions prevailing in other lands. The exchange of scholarships, already established with several countries, is a most helpful means to this end, and should be widely encouraged.

Necessary Legislation

The convention urges upon Congress the vital importance of prompt action upon measures affecting our foreign trade now pending before it. Chief among those calling for immediate enactment are the increases of appropriation that will provide for much needed expansion and improvement in the Bureau of Foreign and Domestic Commerce and in the Bureau of Standards in the Department of Commerce.

We urge the earliest possible enactment of the China Trade Act, which will permit the formation of

American companies to trade in China on a plane of tax equality with their competitors of other nationalities.

We submit that the policy of taxing Americans abroad upon income derived from within the country of residence is fundamentally uneconomic, is really restrictive rather than productive of revenue, and is a handicap upon the promotion of American commerce dangerous to the success of American enterprise abroad and bound to react disadvantageously upon industry at home. The United States is the only great commercial nation which pursues this policy, and we urge Congress to abandon it in the forthcoming revision of the revenue laws.

The steady maintenance of a prosperous foreign trade is as vital to the successful operation of government as to the welfare and contentment of all our people, and we submit that the time has come when the two houses of Congress may well consider the establishment of separate standing committees on foreign commerce as a means of insuring more prompt and effective handling of measures affecting foreign trade.

Increased Mail Service Desired

We commend the improvement of foreign postal communications and the extension of international parcel post service recently accomplished; and urge upon Congress the revision of the revenue law necessary to permit the negotiation of a parcel post convention with Cuba, so that our manufacturers and exporters may be enabled to enjoy the same means of access to that market now available to their European competitors.

It is essential to the best development of the trade and commerce, both domestic and foreign, of the United States, and for defensive purposes in time of need, that our national waterways should be developed adequately and fully utilized.

Use of Foreign News by Our Press

The popularization of overseas trade by those news and trade publications and press associations which have given valuable space and journalistic skill to the gathering and dissemination of accurate foreign news is recognized and appreciated. In certain sections of the country the supply of foreign news is inadequate for the needs of their industries, and this condition retards public understanding of foreign trade policy, and of the true relation of foreign trade to the welfare and prosperity of our people.

International Communications

Expansion of the systems of international telegraphic communication, under American control and operation, is essential to proper development of our foreign trade.

In the international conventions necessary to establish equal opportunity of all nations in the development of their communications, we urge the importance of separate treatment of the two chief methods of communications on radio and cable.

Mandates

This convention, representing every section of the United States, and without regard to politics, approves the policy of the State Department regarding mandates as expressed in its recent notes to the principal powers, and pledge thereto our full support.

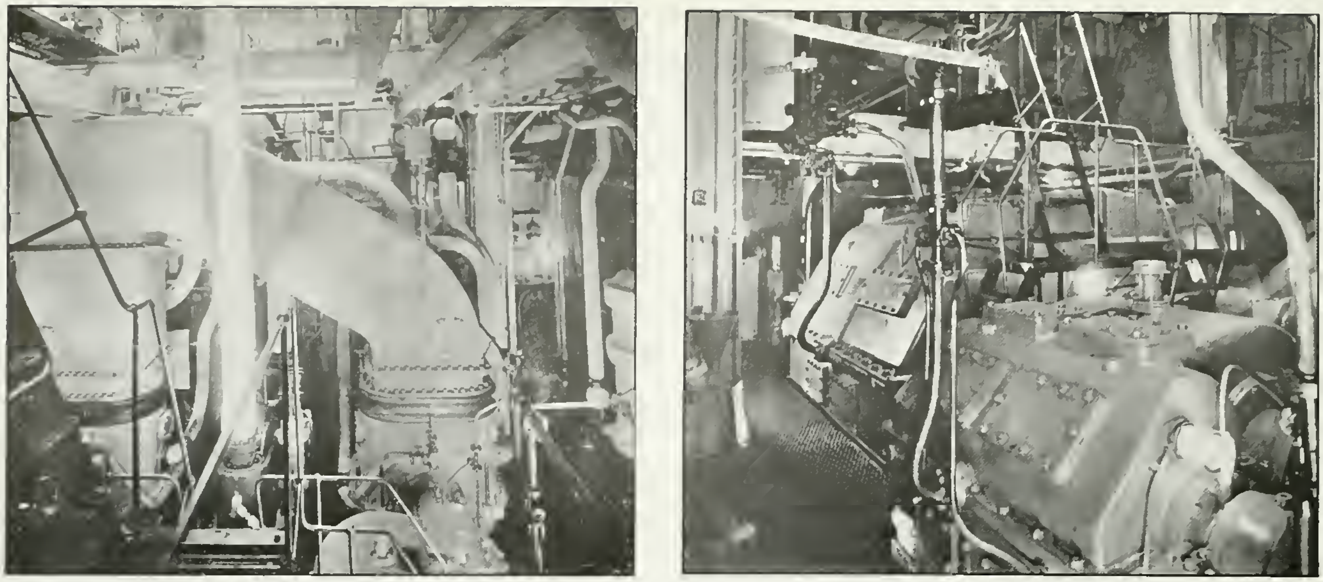
SEAMEN'S WAGES ON BRITISH AND FOREIGN VESSELS, 1920.

—	Chief Officer.	2nd Officer.	3rd Officer.	4th Officer.	Carpenter.	Boatswain.	Quartermaster.	A.B. Sailor.	O.S.	Chief Engineer.	2nd Engineer.	3rd Engineer.	4th Engineer.	5th Engineer.	6th Engineer.	Storekeeper and Donkeyman.	Greaser.	Foreman.	Trimmer.	Watchman.	*Increase in cost of living, September, 1920, over July, 1914.
	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	Per cent.
British cargo steamer, 7,500 tons gross.	**29 0**	**24 5**	**20 0**	—	**17 0**	**16 0**	**15 0**	**14 10**	**9 5**	**35 0**	**29 0**	**24 5**	**17 0**	**16 0**	**16 0**	**16 0**	**15 10**	**15 0**	**14 10**	—	**170**
French steamer, 7,000 tons gross, 25–40 passengers	**16 19**	**14 12**	**12 1**	—	**7 6**	**7 11**	—	**6 11**	**5 9**	**33 2**	**21 12**	**16 7**	**13 2**	—	—	—	**7 11**	**7 1**	**6 11**	—	**300**
	40 3	34 10	28 11	—	17 5	17 7	—	15 9	12 18	78 6	51 1	38 13	31 0	—	—	—	17 17	16 13	15 9	—	
Spanish cargo steamer, 7,000 tons gross	**29 4**	**21 18**	—	—	**8 4**	**9 3**	—	**5 10**	**5 2**	**54 16**	**29 4**	**21 19**	**18 5**	—	—	**6 11**	**6 4**	**5 10**	**4 19**	—	**100 (?)**
	39 19	30 0	—	—	11 5	12 10	—	7 10	7 0	74 19	39 19	30 0	25 0	—	—	9 0	8 10	7 10	6 15	—	
Italian cargo steamers, 4,000 to 8,000 tons gross	**11 3**	**9 4**	**8 0**	—	**5 19**	**6 2**	**4 18**	**3 15**	—	**14 11**	**11 3**	**9 4**	**8 0**	—	—	**6 2**	**6 2**	**5 3**	**4 14**	**3 16**	**296†**
	45 12	37 14	32 15	—	24 8	25 0	20 0	15 15	—	59 10	45 12	37 14	32 15	—	—	25 0	25 0	21 0	19 5	15 9	
Dutch cargo steamer, 7,000 tons gross	**33 15**	**25 6**	**17 15**	—	**13 6**	**12 18**	—	**11 11**	—	**46 13**	**31 19**	**23 2**	**17 15**	**14 4**	—	**12 18**	**12 18**	**12 0**	**10 4**	—	**117**
	31 8	23 11	16 11	—	12 8	12 0	—	10 15	—	43 8	29 15	21 10	16 11	13 4	—	12 0	12 0	11 3	9 10	—	
German cargo steamer, 7,000 tons gross	**5 10**	**4 18**	**4 6**	**3 18**	**3 4**	**3 3**	**3 3**	**2 18**	**1 11**	**6 9**	**5 10**	**4 18**	**4 6**	**3 3**	—	—	**3 3**	**2 18**	**2 10**	—	1,000–1,500 (?)
	68 11	61 4	53 17	48 18	39 16	39 3	39 3	36 0	20 0	80 15	68 11	61 4	53 17	39 3	—	—	39 3	36 0	31 2	—	
American single-screw, 11,000 d.w.	**62 17**	**54 19**	**48 8**	—	**27 9**	**26 2**	—	**23 7**	**17 17**	**91 7**	**62 17**	**54 19**	**48 8**	**27 9**	—	**26 2**	**26 2**	**24 15**	**20 12**	—	99
	47 1	41 3	36 5	—	20 12	19 11	—	17 10	13 8	68 8	47 1	41 3	36 5	20 12	—	19 11	19 11	18 10	15 9	—	
Norwegian cargo steamer, 7,000 tons gross (?)	**27 15**	**23 8**	**19 2**	—	**15 12**	**14 19**	—	**13 14**	**8 13**	**30 7**	**23 15**	**20 10**	—	—	—	**14 19**	—	**13 19**	**9 6**	—	**236**
	35 0	29 10	24 1	—	19 14	18 7	—	17 6	10 19	38 5	29 19	25 17	—	—	—	18 7	—	17 12	11 15	—	
Portuguese cargo steamer, 3,500 tons gross	**9 18**	**7 8**	**5 19**	—	—	**3 12**	—	**2 12**	—	**14 6**	**8 18**	**6 18**	**6 3**	—	—	—	**2 19**	**2 14**	**2 9**	—	—
	88 18	66 13	53 7	—	—	32 4	—	23 7	—	128 18	80 0	62 4	55 11	—	—	—	26 13	24 9	22 4	—	
Belgian cargo steamer, 7,000 tons gross	**12 10**	**10 14**	**8 18**	**8 9**	**7 12**	**7 3**	**6 14**	**6 9**	**3 16**	**17 8**	**13 8**	**10 10**	**8 18**	**8 9**	—	**7 3**	**6 18**	**6 14**	**6 9**	—	300 (?)
	28 0	24 0	20 0	19 0	17 0	16 0	15 0	14 10	8 10	39 0	30 0	23 10	20 0	19 0	—	16 0	15 10	15 0	14 10	—	

NOTE.—The figures in black type are British equivalents at rates current December 31, 1920. The figures in ordinary type are British equivalents at par rates of exchange.

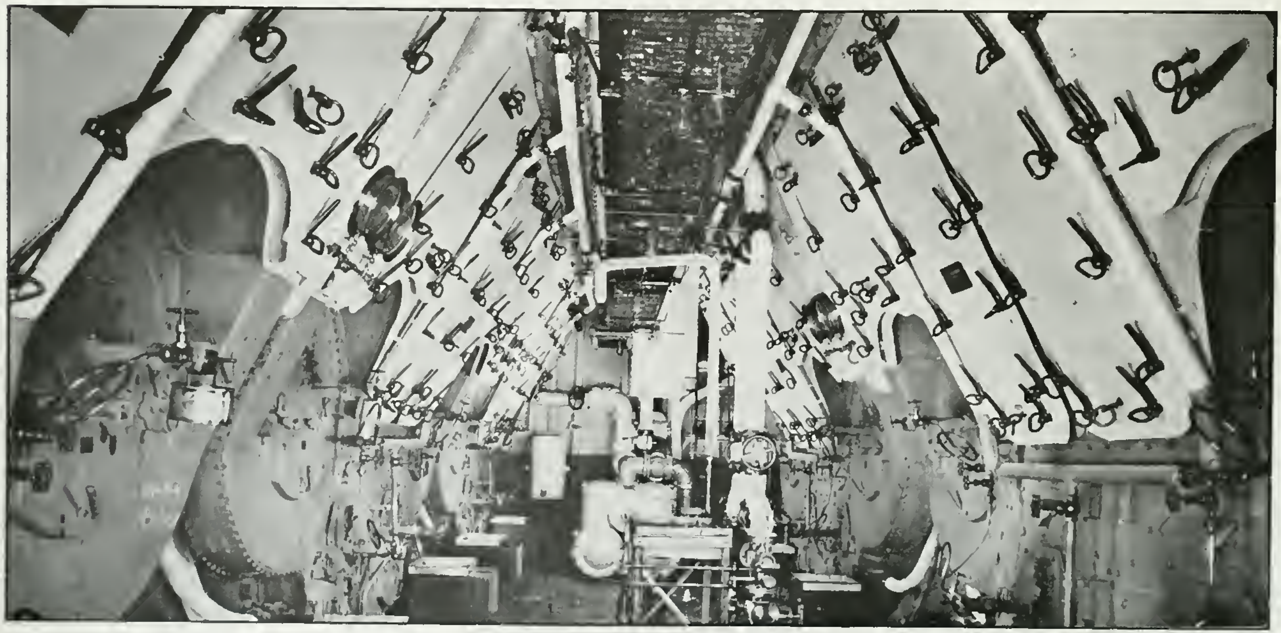
* Supreme Economic Council Monthly Bulletin of Statistics. † Mean of Rome and Milan.

The above interesting and comprehensive table is a reproduction from our British contemporary, Shipbuilding and Shipping Record. It was compiled by British shipowners to show the necessity for a general reduction in wages on British ships and is intensely interesting to American shipowners and maritime workers as showing the tremendous discrepancy between American wages at sea and those paid on board the ships of our competitors. Incidentally, it is to be noted that since the compilation of this table all of the classes of British workmen represented thereon have accepted a cut averaging about twelve and one-half per cent.



Two views in the engine room of the Matson Navigation Company's new freighter Manulani, showing the Westinghouse divided-flow turbine and Westinghouse double reduction gear

The Manulani at the San Francisco dock of the Matson Navigation Company just in from her first round trip to Honolulu

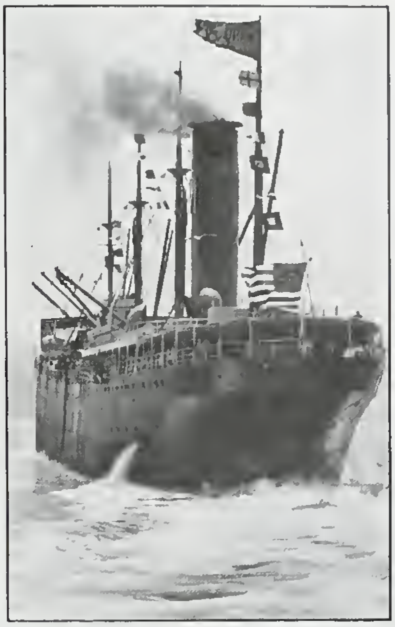


The boiler room of the Manulani showing furnace fronts fitted for oil burning

EXPRESS FREIGHTERS

The Manulani, 14,000-ton Carrier of Matson Navigation Company, Completes First Voyage

IN Pacific Marine Review for May, 1920, we published a description of two vessels to be built for the Matson Navigation Company for the Hawaiian sugar trade. As we stated at that time, the prime consideration facing the naval architect of the Matson Navigation Company was the maintenance of schedule and of turn-around of these ships at each end of the run.


Stern view of the Manulani on her trial trip

The vessels were built at the Moore Shipbuilding Company, and the Manulani, the first of the two, was delivered and has completed her maiden trip to the Hawaiian Islands. The second vessel, the Manukai, is at the present writing just completing her builders' trials.

The principal dimensions of these vessels were: length over all 497 feet, length between perpendiculars 480 feet, molded beam 62 feet, with a deadweight tonnage of 14,000 tons on a 30-foot draft. The machinery for driving these hulls was manufactured by the Westinghouse Manufacturing Company and consists of a divided-flow Westinghouse-Parsons turbine of 5500 S. H. P. running at 3500 R. P. M. connected to the propeller shaft through Westinghouse double reduction gear so as to drive the 4-blade propeller at 95 R. P. M. The ships were to have a speed of 12½ knots on their loaded draft.

The Manulani on her trial easily exceeded the contract speed and, as will be seen from figures given later, had no difficulty in maintaining or exceeding that speed at sea. Steam for the Manulani's turbines is provided by Scotch marine boilers fitted with Foster superheaters for 50 degrees superheat.

The table herewith shows an abstract of the engineer's log on the round trip from San Francisco to Honolulu. It wil be noted that the consumption of fuel, which includes all of the fuel for auxiliaries, is less than 1 pound per S. H. P. hour, both going south when the ship was comparatively light and going north when she was fully loaded and bucking head winds all the way. This is a very good record for fuel economy for a turbine installation of this size, and the low slip percentage of the propeller shows that the designing of that important adjunct to the power plant has been very well taken care of.

The cargo on the Manulani on the way home was approximately 13,000 tons—certainly not less than that amount—so on that leg of the trip she logged 27,040,000 ton miles on a fuel consumption of 2705 barrels, or roughly 10,000 ton miles per barrel, or 238 ton miles per gallon, which for a steamer of this size and class is doing exceedingly well.

The machinery on the Manulani worked perfectly for the round trip. Apparently the Westinghouse Manufacturing Company has succeeded in perfecting its methods of manufacturing marine reduction gears, for upon examination it was found that the tooth faces of all of the pinions and gears in the sets on this vessel were in perfect shape, showing the original tooth marks unaltered, although they must have withstood a terrific amount of stress and shock on the voyage north. In discharging cargo the deck machinery of the Manulani functioned perfectly, and on the bunkering of the ship at San Francisco on the return voyage it had certainly an oportupnity to show the stuff of which it was made.

The Manulani brought north 184,000 bags of sugar, 50,000 case of pineapple, 1800 bunches of bananas, and 1100 tons of miscellaneous cargo. In delivering the sugar at Crockett the high average of 1550 bags per hatch per hour was maintained, some of the hatches reaching a rate as high as 1800 per hour. The three hatches worked at Crockett discharged 37,200 bags of sugar per day of eight hours. In working at this rate the fuel consumption for auxiliary power amounted to 75 barrels of oil per day.

The two tables printed herewith are compiled from an abstract of the engineer's log during the first trip of the Manulani. Marine engineers will note with interest the very good fuel economy and the slip percentages indicating careful design of the propeller. The chief engineer confidently expects to better these records during the next few trips of the vessel, no effort having been made on this first trip to achieve a record.

MANULANI ENGINEER'S LOG - FIRST TRIP HOMEBOUND

Day	Distance	Time	Knots per Hr.	R.P.M.
1	223.0	18 hr. 48 m.	11.9	93.9
2	294.0	23 " 36 "	12.4	95.7
3	301.0	23 " 33 "	12.7	96.5
4	302.0	23 " 32 "	12.76	95.7
5	296.6	23 " 32 "	12.5	95.5
6	285.0	23 " 32 "	12.0	94.8
7	276.0	23 " 32 "	11.9	95.1
8	100.0	8 " 50 "	11.8	95.3

Total time	7 days 1 hr. 37 m.	Total fuel consumption	2705 bbl.
Distance ship	2080.0 knots	Consumption per hour	16.2 "
" screw	2337.3 "	" " SHP "	.968 lbs.
Av. speed ship	12.26 "	Miles per barrel oil	.74
" " screw	13.8 "	Fuel 17° Baume	
Slip	11%	Draft 28' 1" forward 38' 2" aft	
Main engine SHP	5500		
Auxiliary "	550		
Total "	6050		

MANULANI ENGINEER'S LOG - FIRST TRIP OUTBOUND

Day	Distance	Time	Knots per Hr.	R.P.M.
1	221.0	17 hr. 25 m.	12.67	92.5
2	318.5	24 " 18 "	12.80	94.5
3	320.0	24 " 21 "	13.10	95.0
4	338.0	24 " 23 "	13.86	96.0
5	334.0	24 " 22 "	13.67	96.0
6	318.5	24 " 23 "	13.11	94.5
7	236.0	18 " 2 "	13.10	93.0

Total time	6 days, 13 hr. 22 m.	Total fuel consumption	2284.84 bbl.
Distance ship	2080 knots	Consumption per hour	14.5 "
" screw	2153 "	" " SHP "	.95 lbs.
Average speed ship	13.22 knots	Miles per barrel oil	1.1
" " screw	13.63 "	Fuel 17° Baume	
Slip	3.4%	Draft 13' 6" fwd. 21' 6" aft.	
Main engine SHP	4900		
Auxiliary "	490		
Total "	5390		

COLLOIDAL FUEL

Almost since the beginning of the commercial use of fuel oil attempts have been made with indifferent success to produce a commercial fuel from a combination of coal and oil. During the fall of 1917 the unrestricted submarine warfare of the Huns caused the Submarine Defense Association to concentrate its attention on conservation of oil fuel, with the result that coal and oil mixtures or colloidal fuel again came to the front.

Mr. Lindon W. Bates, a member of that association, suggested to Mr. George Eastman of kodak fame that part of the laboratory staff of the Eastman Kodak Company be designated to assist in an investigation of the possibilities of producing a stable mixture of coal and oil. The result was that after considerable experimental work a new fuel series was developed ranging from a free flowing fluid containing 30 per cent of powdered coal, 69 per cent of oil and 1 per cent of fixeteur up to mobile mixtures containing as high as 55 to 60 per cent of coal.

The article here printed is compiled from interviews with and printed material submitted by Lindon W. Bates, who now controls the basic patents covering this process and who was recently in San Francisco interesting Western railroads in the use of the new fuel.

COLLOIDAL fuel is a stable liquid mixture of pulverized coal or coke suspended in mineral oil or blended oil and tar. It is atomized and burned as a liquid fuel, using the ordinary pre-heat of fuel-oil. To prevent sedimentation when storage for a period of time is contemplated, a stabilizing treatment is given. This consists in the use of one or more measures. Thus saponification affords protective action. (1) It may be applied by adding, for example, a lime-rosin soap to the mineral oil, thereby fixating it. About one per cent of rosin, or 20 pounds per ton of fuel, and half a per cent of lime, or ten pounds, are used. (2) Or by adding an alkali which saponifies with the rosinous content in the ingredients of the fuel. Some coals and oil contain sufficient saponifiable matter for stabilization in certain cases. A fraction of one per cent of alkali is sufficient in certain cases. The resinate of calcium gives the more persistent stability. (3) Stability is also promoted by digesting the coal in fuel oil with by-product-oven tar or water-gas tar and heat at about 180 degrees Fahrenheit for a short period.

The process is broadly covered by basic patent protection in the United States and in practically every foreign country. The combined process of colloidalizing and of removing ash from coal by fresh floatation is also covered.

Principal Advantages of Colloidal Fuel

By combining coal or coke, and tar if desired in limited amounts, with mineral oil, the available quantity of oil may be used to yield a considerably larger amount of liquid fuel. Colloidal fuel carries up to 45 per cent of coal or coke in liquid form and up to 55 per cent in a mobile form suitable for locomotives. It is manifest, therefore, that the amount of liquid fuel available with a given quantity of fuel-oil may be greatly increased.

The heat units in colloidal fuel are as efficient as those in oil and sometimes more so. The reason why in some cases there is greater efficiency may be attributed (a) to the explosion of the solid particles when the absorbed liquid vaporizes in the combustion chamber, thereby increasing the area for oxidation beyond the surface of atomized droplets, and (b) to less flue gas loss than with oil inasmuch as the hydrogen contact with the coal in the mixed fuel is less than that of straight oil.

Since in most localities the heat units in coal or coke are much lower in cost than the heat units in oil, the cost of heat units in the mixture will be lower than that of oil, until the cost of oil falls to so low a point that the cost of manufacture balances the economy. This will be when oil costs about 2 cents a gallon. For this reason colloidal fuel can compete almost everywhere with oil. It can compete with coal wherever oil can do so, and sometimes where oil cannot. The cost of manufacture is about from $1 to $1.50 a ton.

Since the specific gravity of colloidal fuel is greater than that of water, a conflagration can be extinguished with ordinary fire appliances. It is also possible to fireproof the fuel in storage by a layer of water on the top surface of the fuel. This means that colloidal fuel can enter cities, while for fire reasons oil cannot without risk or special precautions. In this connection, attention is called to the favorable report and rating given to the fuel by the Fire Council of the National Board of Fire Underwriters. There is therefore a wider market for colloidal fuel than for oil.

Owing also to the higher specific gravity of colloidal fuel than oil, the mixed fuel in which a good grade of coal or coke is used possesses greater heat value per unit volume than oil, although possessing less per unit weight. Like oil, it possesses, of course, much greater heat value per unit volume or per unit weight than coal. Fewer barrels or cars of colloidal fuel are required therefore to give the same amount of heat units as oil. Liquid fuel should logically be sold on a B. T. U. basis. There are usually more B. T. U. in a barrel of colloidal fuel than in a barrel of oil. Where storage is of importance, as it is on ships and locomotives and in houses, this greater "heat density" is of special advantage.

Small Colloidalizing Plant

The plant necessary for the colloidalization of oil fuels is comparatively simple and inexpensive. It is estimated that a plant with capacity to handle 2500 pounds of coal an hour would cost from $35,000 to

Fuel.	B.Th.U. per lb.	Cubic Feet per Ton.	B.Th U. per Cubic Foot.	Relative Heat Density.
Colloidal Fuel	16,675	33·3	1,115,232	100·0
Topped Mexican Oil	18,500	37·5	1,106,300	99·2
Anglo-Persian Oil	18,990	40·3	1,055,000	94·6
Paraffin	19,728	44·2	999,736	89·6
Petrol	19,962	51·6	870,543	78·1
Scotch Coal	13,800	46·2	669,000	60·0
Newcastle Coal	14,300	49·8	645,000	57·8
Welsh Coal	15,000	54·6	615,000	55·1
Pulverized Scotch Coal	15,000	56·0	600,000	53·8
Acetylene Gas	21,850	32,600	1,502	0·0013
Carburetted Water Gas	12,888	41,500	650	0·0006
Hydrogen	61,500	423,000	325	0·0003
Producer Gas	1,929	32,200	134	0·0001

Table showing the heat density of various fuels

$40,000 and one with double that capacity about $55,000.

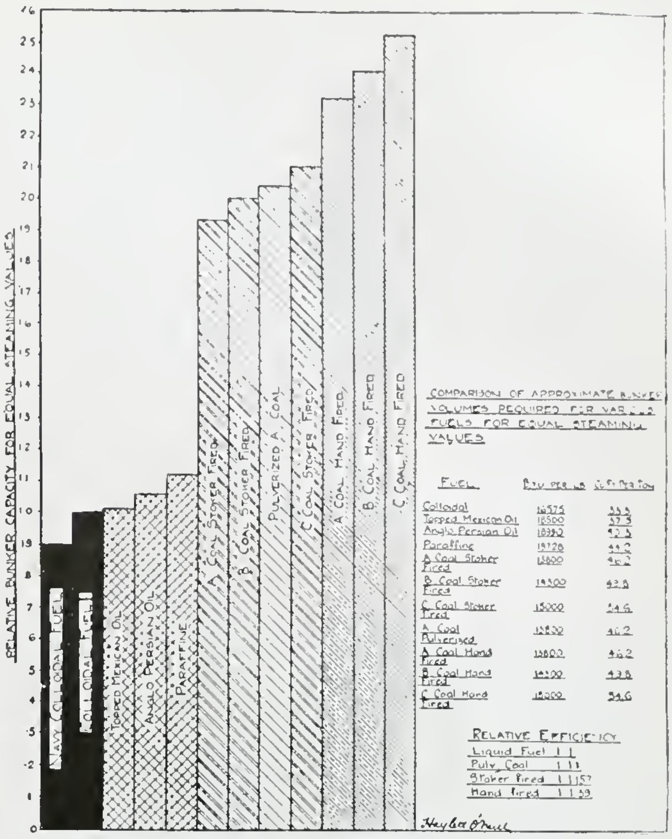
The flow of the material is as follows: Coal or coke is delivered to a rotary crusher, set to crush to ¼ inch, which discharges to a rotary screen perforated with 3/16x½ inch slots. The oversize is returned to the crusher by conveyor for regrinding, and the material passing the screen is carried by bucket elevator to overhead storage bins. From storage the coal or coke (or both) is delivered to a Trump calibrating device which delivers a predetermined quantity continuously to a steam jacketed conveyor box or pug mill which constitutes the receiver and mixer of the tube mill feed. Oil, tar and fixeteur, constituting the liquid elements to be used, are brought in separate lines to a special measuring device in which the liquids are kept at a constant level, with overflow returning to storage. From this device the liquids are delivered to a common discharge line and are pumped through a heater to discharge into the pug mill mentioned above. The liquid and dry elements, combined in the pug mill, are fed to the tube mill, the discharge from which flows by gravity to digesting tanks. From the digesting tanks the finished product is pumped to storage.

As laid out, the measuring devices and pug mill are driven from a common line shaft, so that the speed of feed to the tube mill may be varied at mill without disturbing the ratio of solid or liquid feed. The various ratios between coal, coke, oil, tar, etc., necessary for making different grades and types of fuels, can be effected by changing the initial settings of the measuring devices.

A separate drive unit includes the rotary crusher, screen conveyor and elevator. This unit is designed to have a capacity in excess of that of the tube mill, so that continuous operation will not be necessary.

The tube mill is driven as a separate unit, and the pump drives may be either by belt or individual unit drive, as local conditions may dictate.

The problem of the manufacture of colloidal fuels and their application in the industries and in transportation is one of intense interest to the Pacific Coast at this time, not only on account of the possible conserving of Pacific Coast fuel oil supplies by the application of colloidal mixtures, but also on account of the incidental and necessary additional uses for much of our merchant marine tonnage which will be brought about by any very wide application of this new idea. The bulk of the oil supplies on the Pacific slope is in fields located either in California or at coastal points south of California; the bulk of the low grade coal deposits on the Pacific Coast lies in our northwestern states, British Columbia and Alaska. It would, therefore, be apparent that any very extended use of colloidal fuels on this coast would involve the establishment of large colloidalizing plants at prominent ports in California and south and also at Puget Sound ports and north, oil from California fields being carried north by steamers supplying such plants and coal from the northern deposits being carried south, thus establishing a new permanent and profitable use for a large amount of merchant tonnage.



Graph showing the relative volume required by various fuels for equal steaming value

Example.	Paraffin Base Oil.	Asphaltic Base Oil.	Pressure Still Oil	Wax Tailings.	Coal Tar	Middle Fraction Coal Oils	Road Oils	Anthracite Coal	Bituminous Coal	Coke.	Fuel Specific Gravity.	Fuel Flash-point (Open Cup).	Fuel B.Th.U (per lb.).	Viscosity (Degrees Engler), 70°—100° F.	Suitable Preheat.	Stability (Minimum at 70° F.).
A	70 %	—	—	—	—	—	—	—	30 %	—	1·03	240° F.	17,100	170° E.	150° F.	3 months
B		—	35 %	—	20 %	10 %	—	—	35 %	—	1·12	250° F. ±	17,000	350° E.	160° F.	3 months
C	10 %	—	37 %	3 %	—	—	10 %	38 % (25 % ash)	—	—	1·15	300° F. +	15,300	200° E.	150° F.	10 days
D	10 %	30 %	30 %	—	—	—	—	—	30 %	—	1·08	266° F.	17,200	67° E.	150° F.	4 months
E	8 %	—	50 %	—	10 %	2 %	—	—	30 %	—	1·04	262° F.	16,650	452° E.	180° F.	4 months
F	—	60 %	4 %	—	—	—	—	—	18 %	18 %	1·05	273° F.	16,900	—	180° F.	6 months
G	—	54 %	4 %	—	—	—	—	—	21 %	21 %	1·08	280° F.	16,700	—	180° F.	8 months

Table showing the composition and characteristics of colloidal fuel of variius grades. Percentages of components are given only in round numbers

In the establishment of such colloidalizing plants it has been found entirely feasible and practicable to effect economies through a system by which crude petroleum is fed to the colloidalizing mill instead of fuel oil. The mill in ordinary running, as a result of grinding friction, maintains a temperature of about 190 degrees Fahrenheit. This by a speeding up of the mill and by proper controlling equipment could be raised to an appropriate point for the driving off of the gasoline and distillate fractions, and the mill could thus become a continuous still with three products, gasoline, distillates, and colloidal fuel. It can very readily be figured that in a colloidalizing plant of suitable capacity for ordinary railroad work the gasoline and distillate by-products of such a process would more than pay for the cost of colloidalization.

The possibilities involved in the manufacture and use of coal and oil mixtures are almost boundless. The use of these mixtures immediately increases the available fuel oil supply by from 35 to 50 per cent, at the same time producing a fuel which gives an equivalent B. T. U. content at a cost of from 15 to 25 per cent less as compared with fuel oil.

Some experiments that have been carried out would indicate the possibility of the practical use of this new fuel in Diesel engines, and certainly there is sufficient practical application of these mixtures to represent an aggregate annual saving running into the hundreds of millions of dollars.

LONG TIME CREDITS

Their Value To The Exporting Manufacturer

By GEORGE R. MEYERCORD*

President, Illinois Manufacturers' Association

THE Chicago newspapers carried an article a few weeks ago that was startling to me. The article stated that not one single incorporated bank in the state of Illinois had failed in the year 1920. When I contrasted this announcement with the tremendous mortality among the manufacturers of Illinois and the nation, it brought forcibly home to me one thought—namely, that Uncle Sam did a good job in the Federal Reserve system, in making it almost impossible for an honest banker to go bankrupt through frozen inventories. This situation of frozen inventories with the manufacturer has taken thousands of plants and put them into the hands of creditors' committees or into the hands of the courts.

As I view the Edge Law foreign trade financing machinery, it offers the first step whereby the manufacturer gets some reasonable measure of relief towards creating that highly desirable, stabilized situation whereby his frozen inventory is rendered more liquid. In other words, the only relief at the present moment for the manufacturer is to sacrifice at a frightful cut-throat price such excess inventory as he possesses at the time of a collapse in business.

Inventory

Let me carry you into the manufacturer's problem on inventory. I will recite the inventory facts of a typical manufacturing plant. This plant produces automobile accessories material. It buys its raw products—largely lumber—from the South and the Pacific Coast. On account of railroad congestion, its freight cars during 1920 averaged fifty-two days rolling. In other words, fifty-two days of inventory of raw materials was on the road to their plant. Many cars took eighty days to arrive. The fastest delivery was twenty-two days. It was necessary for this plant to figure sixty days' worth of inventory as impossible of stoppage of delivery should business depression set in. Any plant of this description of necessity had to figure forty or fifty days' supplies on hand. The complete shut-down of the auto industry in August last year created an almost impossible situation for this plant. Needless to say that this is typical of thousands of similar cases. This company had immediately maturing thirty-day obligations of such large volume that it could not possibly grant long time credits for its export business; in fact, where it had been granting ninety days, it now had to demand cash to realize; it instantly found itself under the necessity of curtailing its terms for export business, which acted as an immediate choke against liquidation itself. Had the Foreign Trade Financing Corporation been in operative existence, this firm could have liquidated considerable of its inventory on a long time credit basis and the bankers would have been more safeguarded; the write-off on inventory would have been smaller, as the frozen inventory would thus have been relieved. It must be apparent to any one that this firm was utterly unable to allow the lumber mill to make further deliveries against future contracts that it had placed. Surely, the mill without export trade supplying this manufacturer would be vitally interested in the Foreign Trade Financing Corporation, as its machinery would furnish relief to its customers who had export trade and who thus would have provided his mill with orders. It certainly would have stabilized his condition.

History to be Repeated

History will repeat itself in Europe. Countries now struggling bravely to regain their pre-war standing have lost little in natural resources or industrial competency. All they need is time—a little time—to recover. They are solvent. They furnish the most inviting field in the world for foreign trade, for they are in need of American goods. Their supply of machinery for production, agricultural implements, transportation equipment, tools, hardware, electrical supplies and innumerable commodities that can be supplied by our manufacturers, is exhausted or very low. They need above all the raw material or the partly manufactured stocks which can be furnished by this country, and which can fast be turned into money by the industrious millions of war-sick Europeans.

Our manufacturers, our mines and our farmers are willing and anxious to supply European needs. They expanded during the war, and overseas trade is essential to their enlarged capacities. But as they cannot always operate their plants on future promises to pay, no matter how dependable those promises are, they must have behind them some financial organization that temporarily will supply this money while the rich European trade is being garnered.

---

* Paper delivered at the Eighth National Foreign Trade Convention, Cleveland, Ohio, May 4-5-6-7.

Every day American manufacturers are being offered profitable European business that they reluctantly are obliged to decline because this country has lacked the foreign trade financial machinery that has been developed so successfully by Great Britain. Here is a typical example:

Typical Example

A flour miller receives an inquiry from Czecho-Slovakia for one-half million dollars' worth of flour. The Czecho-Slovakian government wants six months' credit. The inquiry comes from the flour millers through the government. The government to get credit for its flour dealers offers to put up a lot of beet sugar margined down below the market value, plus its own bonds and plus the credit standing of the flour dealers.

All this collateral and moral responsibility should make the transaction good. Certainly it is legitimate.

At first blush the average person would say, "Why doesn't the Czecho-Slovakian government sell the sugar?" The answer, of course, is perfectly simple. Supposing the entire corn crop of Illinois was dumped on the market at one time, six months too soon. It is obvious that the sugar would be unsalable. Time must be given to liquidate the sugar, and for that purpose time must be given in which to pay for the flour.

Another flour deal tendered offers some other home commodity of which the country has a surplus. For instance, Roumania would have oil; Bulgaria, wool; Jugo-Slavia made a tender for a lot of flour, offering to margin down copper that she had. She wanted six or nine months' credit in which to make the turn and so as not to sacrifice her copper. She offered bank endorsements, government bonds, plus the copper margined down.

Nine Months' Credit Wanted

A case that has come to my notice within the past few weeks is that of a manufacturer of high tension electrical apparatus who had an offer of an order for several hundred thousand dollars' worth of his goods, provided he would give six to nine months' credit. The buyer was a Scandinavian municipality and the security, besides the city bonds, was the tax warrants due six to nine months later, and the amount of the tax warrants offered was many times in excess of the amount of the purchase.

Another Scandinavian transaction was that of a large pulp and paper company or timber company who wanted to buy logging machinery—upwards of one-half million dollars' worth. The high credit risk in this case was supplemented by the willingness to store enough of its manufactured product to guarantee ample security.

Instances of this nature are legion and merely illustrate the daily tenders that are coming along.

A Balkan Tender

Let me illustrate a composite of such transactions in the form of group purchases tendered through the Honorable Charles J. Vopicka, the American minister to the Balkan countries:

February 22, 1921.

Mr. George R. Meyercord, President,
c/o Illinois Manufacturers' Association,
76 West Monroe Street,
Chicago, Illinois.

Dear Mr. Meyercord:

In answer to your letter of February 16, I beg to make the following statement regarding the necessity of the organization which is to be known as the Foreign Trade Financing Corporation of New York.

America has a better opportunity at the present time to do business with Europe and other parts of the world on account of the conditions which the world's war brought about.

It is impossible to do business for cash money with Europe because our dollar is too valuable in comparison with their money.

America can remedy these conditions without any sacrifice. These countries need credit for the time being. They do not require any cash money from America, but they do want raw material and finished products of our factories.

The United States government during the war advanced money to these countries, for the purpose to be able to help us in the war, but now that the war is over our government does not wish to continue to make loans, and therefore it depends on the individual American banker, business man and manufacturer to give credit to these countries. There is no doubt that these countries, after a few years, will be able to pay their indebtedness in full.

I have received orders from Roumania, Bulgaria, Yougo-Slavia and Czecho-Slovakia, amounting to over twenty million dollars, consisting of fifteen different varieties of merchandise, which could keep many factories busy if it would be possible to obtain credit from the banking institutions at the present time, but owing to their banking rules and different laws, it is impossible to obtain these loans from them.

Therefore, it is necessary that this new financing corporation be supported by all business men and manufacturers, and I most emphatically recommend subscriptions to the stock of this new Foreign Trade Financing Corporation of New York, through which body manufacturers and business men can afford to give credit. But in this connection I beg to call your attention to one point, which must be made clear, that this new corporation is to aid all the firms in the export business, not only one or two large corporations; I mean to say that all the exporters from all parts of America should get benefit from this new corporation.

I am sorry not to be able to be present at your meeting on account of my needed presence in Washington, but I shall take up the matter of subscriptions with you as soon as I return to the city.

Hoping that the manufacturers will see it with the same eye as I do, I am,

Sincerely yours,
(Signed) CHARLES J. VOPICKA.

Mr. Vopicka's list of orders mentioned in his letter includes the following:

- Railroad equipment
- Condensed milk
- Leather
- Tin-plate
- Paper
- Automobiles
- Caustic soda
- Rosin
- Cotton
- Agricultural machinery, which includes about nine different items—plows, cultivators, etc.

Surely American industry at this time needs these orders.

Edge Law Solution

The Foreign Trade Financing Corporation, to my mind, offers the solution of the manufacturers' problems. As I view the big fundamental thought back of the Edge Law, I see in it this problem solved—let

(Continued on page 403)

EARLY STEAM NAVIGATION ON THE PACIFIC

By ELWIN M. ELDREDGE

See note below on this page

STEAM navigation on the Pacific Ocean, as near as records show, commenced with a small steamer of 109 tons, known as the Beaver. She was built by Messrs. Green, Wigram & Green, at Blackwall, on the Thames, in 1835. She measured 101.4 feet by 20 feet beam by 11 feet deep. Her machinery was made by Boulton & Watt, the builders also of the engine for Fulton's Clermont, the first recognized successful commercial steamboat.

The Beaver

The Beaver, rigged as a brig, left England on August 27, 1835, for the Pacific under the command of Captain Home, and had the bark Columbia as her consort. She made the voyage to the Columbia River in 204 days, arriving there on March 19, 1836. Her engines being placed in commission, started her trial voyage on May 16. It is recorded in her logbook as follows: "Carpenters stripping paddle-wheels. At 4 p. m. engines got up steam, tried the engines and found to answer very well; at 5 o'clock, came to anchor and moored in our old berth; at 8 o'clock all hands were mustered to splice the main brace." The nautical phrase "splice the main brace" is used in reference to a custom, then common, of celebrating particular events by serving out a liberal supply of rum. (Happy days of '36.)

The Beaver was built for the Hudson's Bay Company, but continued her rounds between Puget Sound and Alaska under different owners, with remarkable regularity and success. She was wrecked by running upon the rocks near the entrance to Vancouver Harbor in July, 1888.

First American Line

Before 1845, our experience with ocean steamships had been very limited and, in fact, 1847 marks the first American ocean steamship line.

When the gold fever broke out in this country in 1848 there were not more than six or eight ocean steamships in service and they were on established lines. The "old" Pacific Mail Line had, at this time, two side-wheel steamers under construction for the California trade. Sailing vessels were first used by those who ventured West at the time. In October, 1848, the first three vessels sailed, being sent by the War Department. The greatness of the fever is shown by the fact that in one month from December 14, 1848, there were cleared from New York for the West, six ships, five barks, five brigs and one schooner, carrying approximately about 665 passengers and each ship loaded with freight to the limit of its capacity; and from Boston, during the same intervals, nine sailing vessels, carrying 325 passengers and freight. During the year there left here nearly 30,000 persons in all classes of ships, among which there are records of but eleven steamers.

Days of Forty-nine

It was during the latter part of 1849 that the real starting West was apparent, as before then news of the prospects was vague. Vessels of all sorts were purchased and refitted for the voyage. Many were designed for our inland and short coast routes and totally unsuitable for so long and hazardous voyage.

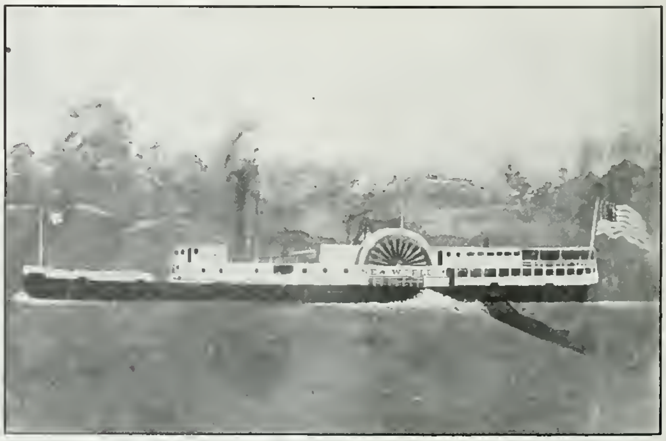
One of those that took the risk was a small stern wheeler from Oldtown, Maine, called the Governor Dana. She was only 130 feet long and yet this small vessel arrived in safety on the Pacific side, and records show she was in service until 1864.

There sailed from New York a steamer known as the New World. She was about 210 feet long and very similar, as the illustration shows, to the sound steamers of that date. She was in command of Captain Edward W. Wakeman.

It is related of this ship that there were some debts due certain people for material used in her construction, and as the time for launching approached, the sheriff placed officers on board with a process. The vessel was launched with steam up and made a trial trip immediately afterward and carried these process servers down the bay. Having thus been kidnapped, these officers had the choice of going to California with the vessel or ashore in a small boat. They followed the latter course, and the New World proceeded on her voyage.

The vessel made San Francisco in 152 days and was afterward placed on the Sacramento run and commanded by Captain Samuel Seymour until his un-

Editor's Note: The illustration in the insert at the head of this page is taken from an old stereoscopic photograph published by Bradley & Rulofson, Gallery of Photographic Art, 429 Montgomery street, San Francisco. From the inscription on the back we learn, "This magnificent establishment employs the most skillful artists, produces the finest portraits, is the largest and best appointed gallery on the Pacific Coast, and has the only elevator connected with a photographic gallery in the world."



Steamship New World. From an old painting in possession of the author

Paddlewheel steamer Senator. From an old painting in possession of the author

timely death in 1859. The New World was the winner of many races with other rival steamers and was known as the Favorite on the river. Captain Seymour also commanded the Senator, of which we shall speak later. He was one of the best known and highly respected of early California sea captains.

Two other vessels that made the voyage round the Cape were the Antelope and Confidence, comparatively new steamers built for New York Bay service.

The Wilson G. Hunt, a small river boat that had seen service on the New York and Coney Island run, met with many mishaps on the way. She sailed from New York on March 3, 1850, encountering a very severe gale on March 9 and narrowly escaped foundering, her upper works being almost wholly wrecked from the terrific violence of the storm. She put into one of the Bermuda Islands for repairs and proceeded later on her journey.

The Rhode Island

The story of the Rhode Island's fatal journey and of her foundering on January 30, 1850, is of interest. This steamer was built for the New York and Providence run in 1836, but had outlived her usefulness on that line and had been laid aside as a spare boat. She was sold at a high price and only scantily refitted or prepared for her journey. She sailed from New York on January 25, 1850, heavily loaded with provisions and coal, and with little or no freeboard. Four days later she ran into a heavy gale, and after laboring heavily in the violent seas for some twelve hours, began to leak; her engine refused to work, while her steering gear became deranged, and after a few hours of horrible torture to the crew and passengers, she sank. There were some thirty-two souls that lost their lives. About twelve passengers and crew escaped in a small boat to a passing schooner.

The Senator

There was still another type of vessel that started on the long journey via the Straits of Magellan. These vessels were from the coast of Maine and built more substantially than those already named. Of this type were the Senator and W. J. Pease. They had also run outside from New York to Philadelphia.

The Senator was built for Mr. James Cunningham in 1847, and was commanded while on the Philadelphia run by Captain Samuel Seymour, who afterwards went to California to command her there. The Senator on her first trip to Sacramento was found to draw too much water and was placed on the coast runs. She was later sent to Australia and broken up about 1876.

Two screw steamers of about 300 tons each, the General Warren and the Commodore Preble, that had been on the New England coast, also started on the trip. They were nine months in arriving at their ultimate destination, as they were detained at some ports on the Pacific side for repairs, and at others for the scarcity of coal.

A New York and Sandy Hook tug boat named Goliah also made a successful trip and was in service on the Pacific Coast until about 1897. The Goliah was built in 1849 at New York, and measured 154 feet over-all, 30-foot beam and depth of hold over 9 feet. Her tonnage was 235.86 gross. She left New York April 1, 1850, and reached San Francisco on January 1, 1851. The crew of that vessel had the trial of their lives on the voyage. She was 279 days between ports.

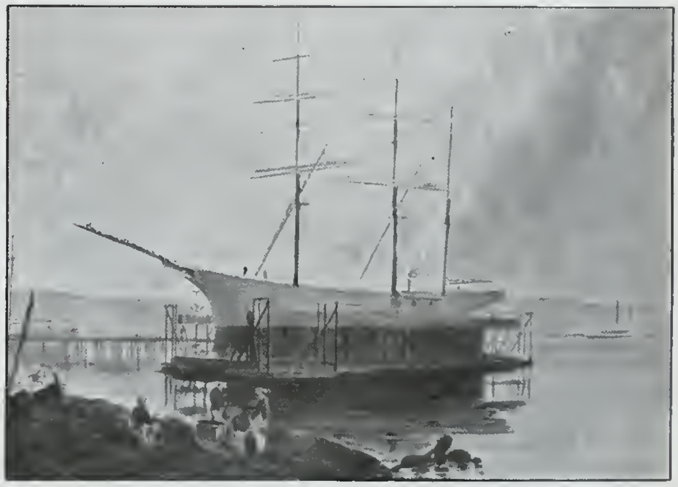
A vessel named the New York, a sister ship of the New World, started for the same destination a few months later and was four months reaching Rio Janeiro, and beyond there all trace of her is lost.

The Wilson G. Hunt was very unfortunate, as has been noted. She was laid up at Montevideo for nearly three months for a crew and at other ports for repairs. The trip took her 322 days.

There were many more vessels of the types mentioned that left Atlantic ports at the same time and encountered the same difficulties and trials. Many were never heard from after leaving the home port. Those that were so fortunate in reaching their destinations were compelled to call at every principal port on the way for coal, water, provisions and repairs to the vessel, and in many cases were detained by illness of crew from fever contracted in the warm climate.

The first American steam vessel that was engaged in the foreign trade on the Pacific Coast was the propeller Constitution of 500 tons, built at Philadelphia, Pennsylvania, in 1848, which arrived in San Francisco from the Sandwich Islands in 1851. There were also the New Orleans, a steamer also built in the East, which arrived from Sydney, N. S. W., in 1853, and the City of Norfolk, which arrived from Honolulu during the same year.

In the early fifties regular steamship lines were established on the Atlantic and on the Pacific Coasts with connections across the Isthmus of Panama, and it became a comparatively easy and regular jaunt for business men and others to go back and forth between San Francisco and New York. If these few disjointed notes of the earlier pioneer voyages through the Straitc of Magellan serve to quicken the memories of some ancient mariner, they will have served their purpose.



Cousins drydock at the foot of Chestnut street, San Francisco. From a painting by Harry Eastman. This is said to have been the first floating dock in San Francisco Bay.

Pacific Marine Review
The National Magazine of Shipping

576 Sacramento Street
SAN FRANCISCO, CALIFORNIA U. S. A.

Official Organ of the Pacific American Steamship Association

Subscription Price, per year (Domestic) $2.00
(Foreign) $3.00
Single Copies . . . . 25 cts

J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor

NEW YORK OFFICE
339 at 30 Church Street
M. B. STEWART, Manager

Pacific Marine Review is sold at all leading News Stands
Entered as second class mail matter at Postoffice
San Francisco, California

Published on the First of Each Month. Copyright
1921 in the United States by J. S. HINES

NEW SHIPPING BOARD

AT last, after many months of patient waiting, we have the announcement of the personnel of the complete Shipping Board appointed by President Harding and confirmed by the Senate. We append hereto the list of the personnel of this complete board, together with a brief summary of their experience and present status in the business world.

Two facts stand out prominently in this personnel—first, neither of the principal ports of the United States, San Francisco and New York, is represented on the board; second, there is almost no practical shipping experience represented. We take it for granted that President Harding, having put so much thought upon the matter of the selection of this board and feeling very keenly his own responsibility for the problems which await solution in the future of the American merchant marine, has made his selections with a definite policy in view. We know that the policy of the administration, as expressed in any public utterances, is that the Shipping Board shall get out of active participation in the shipping business as quickly as possible, and we gather from the composition of this new board that the President wishes the policy of the board to be one of supervision over our maritime trade and our participation in international shipping policy.

Mr. A. D. Lasker, the chairman of the new board, brings to the solution of the problems facing him in his new position a very wide experience as an executive and administrator of large business affairs and a tremendous fund of energy, both of which should stand him in good stead in the task that is before him. He bespeaks from the nation the confidence and patient co-operation of its business men and promises to put into effect immediately a good business administration throughout the Shipping Board offices. Mr. Lasker has also had a very wide experience in what might be termed business diplomacy and has gained for himself a very enviable reputation for the prompt and quiet settlement of business disputes to the satisfaction of all parties concerned. This sort of experience is very much needed in official life at Washington and particularly it seems in all matters pertaining to the Shipping Board, and we are hoping that under the new regime we will see less talk and more action, less investigation and more accomplishment.

The personnel of the full board is as follows:

A. D. LASKER, Chicago, chairman, representing the interior states; head of the Lord & Thomas Advertising Agency of Cnicago; professional advertising man and business advisor; prominent in Republican politics; a stockholder and director in numerous important industrial corporations; inexperienced in shipping problems but an expert organizer and executive of large business concerns.

ADMIRAL WILLIAM S. BENSON, representing Atlantic Coast States; Democrat; former chairman of the Shipping Board; wide experience as a naval officer, and for almost a year in sole charge of all of the affairs of the Shipping Board.

GEORGE E. CHAMBERLAIN, Portland, Oregon, representing Pacific Coast States; Democrat; has served as governor of Oregon; two terms as United States Senator from Oregon, during which time he was a member of the Senate committee on commerce; has always been regarded as a safe, conservative student of and friend to the American merchant marine.

MEYER LISSNER, Los Angeles, representing Pacific Coast States; attorney; Republican politician and publisher who has been prominently identified with the development of the harbor of Los Angeles.

T. B. O'CONNOR, Buffalo, representing Great Lakes States; Republican; president of the International Longshoremen's Union and prominent in many negotiations for the settlement of disputes between marine workers and shipowners.

EDWIN C. PLUMMER, Bath, Maine, representing Atlantic Coast States; Republican; admiralty lawyer, prominently identified with sailing ship operation; secretary of the Atlantic Carriers' Association.

FREDERICK I. THOMPSON, Mobile, Alabama, representing Gulf States; Democrat; newspaper publisher; no connection with shipping affairs; appointed member of the Shipping Board by President Wilson and serving ad interim.

SELLING SHIPS

IT has been stated by those in position to know that the present book value of the fleet of steamers owned by the Shipping Board is very close to $5,000,000,000, including the monies expended in plant, the monies lost in operation, and all of the various overhead and other expenses not directly involved in the actual building cost of the ship itself. If this statement be correct, then the American people are due to write off as a loss about $4,000,000,000.

This sum, almost incomprehensible, is not nearly so staggering in its effect on the imagination when we consider that the money was all spent in America, the great bulk of it is still in America, quite a sizable proportion of it was gathered in by the United States government almost immediately after its expenditure in the way of excess profits and income taxes, and it is not a loss which is to be incurred now but a loss which has already been largely absorbed by the people. The ships which are the result of this huge expenditure are in the main good ships. They are here for our use, and it will be the business of the new Shipping Board to see that we get as profitable use out of them as possible.

The first step toward making profitable use of the fleet is this writing off of a large proportion of the value. It is not at all likely that a large number of the ships will be sold immediately, even with this great reduction. As we have pointed out frequently in recent issues of Pacific Marine Review, the present ship market will not absorb a large amount of tonnage, even if that tonnage should be a free gift.

Mr. James Farrell, president of the Foreign Trade Council, who is in a position to know as well as anyone in the United States, has made the statement that under normal conditions of trade it would take three years or more to absorb the present merchant tonnage of the world into useful and profitable trade routes. The problem of the Shipping Board in selling the ships is to make a market for the ships by removing as far as possible all of the legislative and other restrictions which now stand as a barrier to the successful competition of ships under American registry in foreign trade. This will take time—probably will be a matter of a number of years—and during the passage of that time the only sensible plan for the Shipping Board in the management of its fleet is the bare boat charter plan with charter rates based on a valuation of the fleet, which shall be on terms of equality with the current value of ships in the world market for ships.

EIGHT HOURS AT SEA

THE proposal to impose the eight-hour day conditions at sea is prominent to the front just at present on account of the issuance of a report from the International Labor Office at Geneva. This report was the result of an inquiry into the application of the eight-hour act in the French mercantile marine.

This French eight-hour act was passed on August 2, 1919, and supplemented by a decree on the 24th of February, 1920. Prior to the passage of the act of August 2, 1919, the rule was the two-watch system and the twelve-hour day. In the case of duty in ports and sheltered roadsteads officers and crew performed work on a basis of a ten-hour day.

It has always been maintained by shipowners that there was no real need or reason for the application of the eight-hour day at sea, as the work performed by the crew is never of a nature that is very fatiguing and, in the nature of the case, the crew is unable to leave the ship. Board, lodging and all other incidentals in the life of the workingman are provided, so to speak, at the point of application of the work and a considerable part of that work is in the nature of keeping in order the ship in which he lives. There is not the same necessity in such a case for the application of the eight-hour law, either from a physiological or sociological viewpoint, as there is in the case of the tradesman or office worker ashore, who frequently has to travel an hour or more in the morning and in the evening going from his home to his work, whose work is of a much more fatiguing character, and whose family is constantly making demands on his time.

That there is a great deal of truth in these contentions is abundantly proven by the report in question, which brings out the fact that the principal result of the application of the eight-hour law at sea has been increase in overtime paid to all classes of workers at sea, and particularly to the general service class such as stewards and waiters on ocean liners. The object of the passage of this eight-hour law is, therefore, in this particular application entirely vitiated. The government passing the eight-hour law for sociological reasons in an effort to improve the conditions of life of the worker is confronted with the hard fact that in this particular instance, to quote the report, "an appreciable part of the personnel on board ship is not unduly fatigued by its normal work. Its ambition is not centered on rest. On the contrary, it welcomes overtime work, which means increased earnings."

The report goes on to show that this system has brought about an increase in the expense of operating vessels which varies from 70.68 francs per gross ton per year for ocean going cargo steamers to 133.36 francs per gross ton per year for ocean going passenger liners. The report as issued by the International Labor Office features letters from M. Rio, under-secretary of state at the Ministry of Public Works in charge of ports, mercantile marine and fisheries. M. Rio writing from Paris takes the stand that socially the act is a great success, that this social program, however, is being effected at the expense of French shipping companies, that the added expense to these French shipping companies may be ruinous, and that the only remedy is the internationalization of such a law so that the expenses of the shipowners of all nationalities may be increased in like measure. In this respect the report is a rather dangerous document, and the question arises why should such national propaganda be issued by an International Labor Office.

There is nothing in the life of a deckhand or ordinary seaman on our modern ocean going steamer that necessitates any such limitation as an eight-hour day. Large portions of his time on duty are essentially not different from his time off duty. We believe that the marine worker should get a square deal from his employer, that he should have comfortable quarters in which to live and good food to eat, properly prepared, and an adequate wage for the service which he performs, but we do not see any necessity for the average officer or deckhand on a cargo steamer being given sixteen hours a day in which to "loaf," and it is very evident from the overtime records in the French merchant marine that the men themselves do not feel any such necessity.

THE ARMY TRANSPORT SERVICE

IN a letter addressed to William S. Greene, chairman of the merchant marine and fisheries committee of the House of Representatives, the Pacific-American Steamship Association urges favorable action on H. R. 5348, which would withdraw army transports from the Honolulu and Manila trades. The letter in itself is so forceful and logical that little need be added, but this may be said: The association has not brought forward all that it might regarding the inefficient operation of the service. Those who have seen army transports loading or discharging at Honolulu or Manila have had their eyes opened to the marked inefficiency of this branch of the War Department; they have watched the Dix, for example, working at a leisurely rate that would shame any commercial line of the world—at a rate, to speak conservatively, at least four times slower than any merchant vessel would employ. If it be argued that the War Department might as well berth the Dix at Honolulu as at Seattle, because there was no necessity of haste, then the retort may be made that the army has had considerable more tonnage than it required. The present is a good time to bring up the question, because the old transports must go to the scrap-pile soon. Their wasteful operation not only has cost the government large sums, but it has hindered the merchant marine greatly, for with the army and navy business as a nucleus, some American operator long ago would have established a direct line between San Francisco, Honolulu and Manila.

Direct Manila Service Opened

The letter of the Pacific-American Steamship Association to Mr. Greene follows:

Confirming our night letter of June 7, urging favorable action on H. R. 5348, amending Sections 17 and 19 of the Merchant Marine Act of 1920, beg to submit the following arguments for recommending a withdrawal of the United States Army transports from the trans-Pacific and Hawaiian trade:

First: The United States Shipping Board has allocated to the Pacific Mail Steamship Company three 522-type freight and passenger vessels, which are being operated direct between San Francisco and Manila and the East Indies, and five of the 535 - type freight and passenger steamers, which will be operated between San Francisco and Manila via Japanese and Chinese ports. These vessels will furnish practically three sailings per month. We append statement covering the particulars of these vessels which may be of interest.

Second: The above vessels are exceptionally well adapted for the handling of government freight and passengers and are much speedier than the present United States transports, and in this connection we append proforma schedules from which you will note direct monthly service and fortnightly service via Japan and China is provided to Manila or express sailings three times per month.

Matson Service to Hawaii

Matson Navigation Company also maintains a service between Pacific Coast ports and Hawaii. They are at present operating two of the large West-type vessels of the Shipping Board, carrying freight only, and two of the 535-type steamers out of Baltimore that touch in at San Francisco, carrying freight and passengers to Hawaii. In addition to these, nine of their own steamers, six of which are passenger vessels, are regularly operated in passenger and freight service from San Francisco to Honolulu, sailing once a week.

Third: At present these vessels are sailing from San Francisco only partially loaded on account of lack of tonnage, and the operation of the United States army transports in direct competition with them merely makes both Shipping Board and army vessels unremunerative at public expense.

Burden on Taxpayers

Fourth: The army transports, by reason of taking cargo in but one direction and maintaining separate forces and terminals, cannot transport freight as economically as merchant vessels engaged in regular trade and the continuance of the transports is merely entailing a large additional burden on the taxpayers of the country without any corresponding benefit.

Fifth: Owing to a large number of the United States Shipping Board vessels being tied up for lack of cargo, every effort should be made to try to reduce the enormous losses to the government by providing passengers and freight and the withdrawal of these transports would, to that extent, assist in this direction.

Sixth: The late war proved conclusively that transports cannot be utilized until after the navy has cleared the seas, and then the first call is for commercial vessels to transport troops and supplies, and if the American merchant marine is maintained and assisted it would furnish immediately available and invaluable assistance in case of war.

Buy Coal in Orient

Seventh: The operation of commercial vessels in competition with vessels of other countries necessitates the highest efficiency and economy, and the present system of carrying cadets and educating young men as officers would form a most valuable asset in providing a proper personnel (both officers and crew) for use in time of trouble.

Eighth: The United States army transports today returning from Manila purchase large quantities of Chinese or Japanese coal at very high prices for use in their operation, thereby depriving American firms of the sale of such fuel, whereas American commercial vessels utilize American oil and coal almost exclusively in their operation.

Ninth: All the leading maritime nations of the world transport their troops and supplies by private steamship companies under normal conditions, but maintain certain transports for the handling of large bodies of troops or live stock. If the experience of Great Britain and other nations has proven this the most economical and satisfactory method of handling their army supplies, it should be equally applicable to the United States.

Accommodations Guaranteed

Tenth: The Pacific Mail Steamship Company is prepared to handle immediately the entire army and navy freight requirements for Manila at rates as per tariff enclosed. It is also prepared to immediately take care of the normal movement of officers and enlisted men and will set aside accommodations to be held subject to government order at fares as per tariff attached.

Matson Navigation Company is also prepared to handle a movement of army and navy freight requirments to Hawaii.

Eleventh: In the event of any unusual movement of supplies or troops, both Pacific Mail Steamship Company and Matson Navigation could, with proper notice, readily provide additional tonnage.

It apparently resolves itself into the question of whether an antiquated and expensive system, based upon precedent, shall be continued without any resultant benefits, or whether this expense can be saved to a large extent by utilizing American commercial vessels and the American merchant marine be benefited to that extent.

The vessels of the United States Shipping Board belong to the people and are operated for their account and it would appear that another department of the government can have no excuse for maintaining a separate and expensive service for no apparent cause. We therefore respectfully urge that your committee favorably recommend passage of H. R. 5348.

The present American merchant marine which, ultimately, will be owned by private American companies will be able to perform every national function in times of both peace and war.

(Continued from page 397)

me first illustrate the point before drawing the conclusion.

At the present time the Roumanian, the Swiss, the Swede, or any other foreign nationality finds itself limited, in this country, to raising money only from its own former nationals. The Roumanian business house that wishes to get credit in this country can practically get credit only from the Roumanian-American; the Italian must go to the Italian-American, and so on down the line. Surely, the Roumanian oil wells, the Roumanian railroads or the Roumanian customs revenue means nothing to the average American investor The Roumanian business man cannot secure assistance, therefore, at this time, from other than people of his own race who have emigrated to America.

The Foreign Trade Financing Corporation through its debentures speaks in American dollars to the American investor, and the American investor need only have faith in the vast capital of the corporation and in its management. Surely, it is axiomatic that this faith will follow. It is unthinkable that the management will not be both able and of a superior order.

Possible Profits

From the standpoint of the manufacturer investing a reasonable amount in this enterprise, I draw the following conclusion as to profits. Let me illustrate again by example:

Take the case of a manufacturer doing $200,000 exporting annually. Grant his profit is 15 per cent net on his sales. Fully one-half to two-thirds of his tenders of orders at this time require long time, which he has not been in the habit of granting. He is, therefore, turning down orders daily. Assuming that only one-half of his prospects die by virtue of his inability to finance, that represents a profit of $15,000 that he is losing. Surely, such a manufacturer can afford to invest $10,000 in the stock of a corporation that will make it possible for him to earn $15,000 within a year.

It must further be obvious that this manufacturer will benefit by the freer movement of capital in foreign countries and a larger measure of short time payment orders will be given.

I cannot help but feel that the American investing public who now loan vast sums on the security of a farm, a house or a factory, will realize that the safety of the debentures contains within it more security than any such mortgages as he is now freely investing in. Back of the debentures will be the huge capital guaranty and back of that again, in each case, will be the large variety of collateral, which will in the aggregate create a law of averages that will be so certain to insure repayment to the corporation as to make the risk infinitesimally small to the investor in the debentures.

The manufacturer who invests in the stock of the Foreign Trade Financing Corporation will be amply repaid. It will be a profitable investment. It will help every manufacturer and business man in the country. It will solve employment problems and restore the general prosperity to which progressive industry is entitled.

Tariff Considerations

In closing I want to protest most strenuously against the viewpoint so prevalent and now so often expressed to the effect that we must keep down the tariff bars to our own markets. This viewpoint is on the theory that the only way Europe can pay is to flood our markets with goods. We could better afford to give our foreign friends the funds direct with which to rehabilitate themselves.

I submit that it is rank financial heresy to throw a $6 a day man out of a job in this country and substitute a $1 a day man in Europe, which is a starvation wage at best, and expect a saving to accrue out of the dollar that will compensate the American workman for the loss of his $6 a day job.

I submit further that the world's purchasing power has been reduced five-sixths under this plan and the American purchasing power has been reduced six-sixths. I desire to commend President Harding for his sane attitude on this thought. America's export business will never be built up on a foundation of destruction of its domestic market. I believe that the proper plan is to invest our surplus in foreign securities of the Foreign Trade Financing Corporation now organizing.

SHIP NAMES

A SERIES of errors in spelling of ship names which have occurred in Pacific Marine Review and which have also appeared in other publications leads us to observe, as we have often done before, that America seems very poverty stricken in proper names for ships. This series of errors culminated in a description of a shipbuilding program of an eastern shipyard in which the names of forty vessels were listed, and out of the forty ten were so misspelled that it was impossible to recognize in the names published the original names as given to the ships. On checking this matter up we found that the mistakes in spelling originated in the publicity department of the shipyard that had built the ships, and we of course were comforted by the thought that if a shipbuilder could not spell the name of a ship that he himself had built, a poor editor who had never even seen the ship should not be expected to be able to correct the spelling.

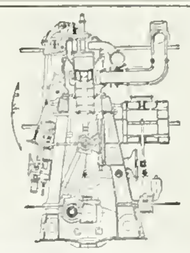
It has, however, occurred to us that while the Shipping Board was carrying out its emergency program and supplying names to the builders, the builders were all fiercely indignant about the character of the names supplied Much mirth was indulged in at the expense of various individuals who were supposed to have supplied these names. Now, however, when the yards are full of vessels building for private account, the names seem to be very little better. We are still getting all sorts of atrocities in the way of names not understandable to the common mind and not spellable by any rules in the dictionary. It seems as if the Shipping Board Emergency Fleet program has set the fashion and we are following like a flock of sheep.

It is time American ship builders realized the publicity value of having characteristically American names on American ships.

Since writing the above, we have accidentally stumbled on a "hunch" which indicates, dear reader, as plainly as the proverbial nose on your always "intelligent" face that the names now adorning the prows of the brave ships of our merchant marine are in all truth and soberness American names gathered from American sources. The names are taken from those characteristically American institutions, the Pullman sleepers.

This illuminating idea came to us with all the force of an inspiration one evening last week while listening to a college professor from Ohio entertain the assembled company with a recitation of Mr. Dooley's experiences on a sleeping car.

Oil Engines and Motorships



PERFORMANCE OF AN AMERICAN MOTORSHIP

Kennecott Makes Good Record for Fuel Economy

IN the May issue of Pacific Marine Review we described in a general way the propelling machinery of the motorship Kennecott built by the Todd Drydock and Construction Corporation of Tacoma for the Alaska Steamship Company and gave some figures for her performance on the initial run from Tacoma to San Pedro.

Since that article was published the Kennecott has completely vindicated our prediction that she would make a great record for herself as an economical cargo carrier. She has completed her voyage from Puget Sound to New York via Panama, and figures are available from the engineer's log to show just what her performance in the way of fuel consumption was on this 5800-mile run.

It will be remembered that the Kennecott is propelled by a set of McIntosh and Seymour 6-cylinder directly reversible full Diesel marine oil engines of 1200 I. H. P., each driving twin screws at 140 R. P. M.; that her auxiliary machinery is all electrically operated, power being provided for that purpose by two 100 H. P. McIntosh and Seymour full Diesel engines driving two 75 kilowatt General Electric generators.

Before taking up the consumption record of the main engines on this sea voyage, it is interesting to note the port consumption loading lumber at Aberdeen, Washington. The Kennecott had previously stowed in her holds at Tacoma a considerable amount of copper ore from the Tacoma smelter. At Aberdeen she loaded 2,500,000 feet of lumber which would weigh not less than 3600 tons. For the handling of this lumber and for lights on board and for galley stove consumption the total fuel used was 755 gallons. As the average galley range fuel consumption on this ship is one-half barrel daily, and this fuel record covered six days, there would be a galley consumption of 126 gallons which could properly be subtracted from the 755-gallon total, leaving 629 gallons as the fuel consumed in providing lights for the ship and power for the winches. This 629 gallons put on board 3623 tons of lumber, or 5.7 tons per gallon—239.4 tons per barrel, or 208,000 feet board measure per barrel of oil.

If steam schooner operators will compare these figures with the fuel consumption of ordinary steam winches in handling lumber, they will have their eyes opened to one of the great advantages of Diesel operation plus electric deck machinery which is not often thought of in comparing the ordinary steamer with the properly fitted motorship. Such a record for fuel consumption in cargo handling is made possible by the wonderful fuel economy of the full Diesel engine at fractional loads, combined with the efficiency of electric motors under all conditions of load and the diversified load factor. No such economy is even approachable with the use of steam supplied from either the donkey boiler or main boilers of a steamship. From figures available for some of the finest steam freighters on the coast handling uniform loads of sacked goods under the best possible conditions of dispatch we find that the tonnage per gallon of oil would figure less than six-tenths of a ton per gallon, so that for this particular record of the Kennecott her electrical equipment supplied by power from Diesel-driven generators may be said to represent an advance in fuel economy of between 900 and 1000 per cent over good commercial practice with the steam winch. As also noted in these columns in the June issue, the electrical deck machinery and the steering gear of the Kennecott were manufactured by Allan Cunningham Company of Seattle. For a more complete description of this apparatus the reader is referred to the article in the June issue.

After loading this lumber, the Kennecott's draft condition showed that with the lumber and ballast and some miscellaneous freight she had on board in the neighborhood of 5600 tons deadweight of cargo. From Aberdeen to Panama she logged 3895 miles at an average speed of 10.8 knots per hour on a total fuel consumption of 1030.7 barrels, while from Panama to New York she logged 1946 miles in eight days at an average of 10.1 knots per hour on a fuel consumption of 557.2 barrels, a total of 5841 miles with 5600 tons of cargo on 1587.9 barrels of oil, or 3.68 miles to the barrel. Reducing this to ton miles, we get 20,608 ton miles to the barrel, or in round numbers 490 ton miles to the gallon. This figure will prove another eye-opener for steamship operators if they will compare it with what they are at present getting on their oil-burning steamers of the same deadweight capacity and speed, and in making this comparison it will be borne in mind that we have here assumed from the draft conditions that the Kennecott was carrying only 5600 tons, whereas she has a capacity for 6500, and the additional load would have made little, if any, difference in her fuel consumption.

The entire voyage of the Kennecott was without incident in the engine room worthy of note. The engines and the auxiliaries functioned perfectly. In automobile parlance, they "never missed a shot."

We are glad to be able to record these figures and facts for the sake of American marine engineers who sem to have been blind in recent years to the tremendous advance that has been taking place in marine Diesel engineering across the waters and to the wonderful record which European motorships have been maintaining both in regard to economy and low maintenance costs and in respect to taking the business away from American and British steamships.

STEAMER OR MOTORSHIP

An Instructive Comparison of Earning Capacities

THE following tables and descriptive matter are taken from a very interesting paper on "The Internal Combustion Engine as Applied to Marine Propulsion," which was prepared by John F. Metten and J. C. Shaw and read before the Society of Naval Architects and Marine Engineers at New York, May 26, 1921. This comparison will be of especial interest to Pacific Coast operators and owners as the voyage for which the figures were compiled is that from San Francisco to the Orient. In this comparison all possible advantage is given to the steamer, and some minor savings usually effected by motorships in active practice are omitted.

The size of vessel chosen has the same general dimensions as the motorship Afrika, owned by the East Asiatic Company, and which is similar to the William Penn and the two motorships building for the United American Lines.

The steamer is single screw with double reduction gearing and compound turbines and Scotch boilers. The revolutions for the vessel are taken as seventy, which is conservative practice, to favor propulsive efficiency which for convenience here is assumed the same as the twin-screw vessel.

The ships are of the awning-deck type, having a nominal deadweight carrying capacity of 13,000 tons when loaded to 31 feet 5 inches draught. They are 445 feet between perpendiculars, 60 feet beam and 42 feet molded depth, with a block coefficient of .782. The shaft horsepower of the turbines is taken as 3500, which is equivalent to the 4500 indicated horsepower of the Diesel engines. The cost of the vessels to build, based on probable cost of labor and material in the immediate future, is assumed $150 per ton for the steamer and $165 for the motorship. The $200,000 additional cost of machinery for the motorship, including deck machinery, is considered fair where the Diesel work is well standardized.

The fuel oil consumption at sea for the steamer with 16 degrees Baume oil is taken as .95 pounds per shaft horsepower, all purposes, which should be realized in service with properly designed turbines and double reduction gears and co-ordination of auxiliaries. For the motorship, with oil of 22 degrees Baume, the consumption is taken as .31 pounds per indicated horsepower, all purposes, which is usual with motorships belonging to the East Asiatic Company. The cost of oil in American port, per recent quotations, is $2 for fuel oil for steamer and $2.30 for Diesel oil of gravity indicated. It is necessary for the steamer to take on additional oil in a foreign port which is assumed double that in an American port.

The route chosen is from San Francisco to the Far East and return, calling, for example, at Yokohama, Hongkong, Manila and Honolulu, with a total distance of 15,500 knots. The number of days at sea and in ports is taken from percentages for similar vessels operating over similar routes, and the number of days in port include that for loading and unloading, repairs and docking, holidays, etc.

The cost of personnel is based on scale of wages in effect the first part of this year with sustenance at $1.25 per man. This is estimated with 27 for the deck officers and crew for either vessel, and for the engine-room 19 and 14 men respectively for the steamer and motorship.

The freight rate for bulk cargo is estimated as $27 per 100 cubic feet and for deadweight cargo as $13.50 per ton, which is fairly well in accordance with present rates.

The itemized figures are as follows:

	Steamer	Motorship
Displacement, tons	18,690	18,730
Gross tonnage, tons	9,050	9,050
Actual mean sea speed, knots	11.5	11.5
Revolutions per minute	70	115
Indicated horsepower	....	4,500
Shaft horsepower	3,500	....
Total weight of machinery (tons), including pipes, ventilators, ladders, floor plates, spares, tools, outfit, propellers, shafting, etc.	690	911
Water in system, tons	115	14
Weight of deck machinery, tons	140	155
Weight of hull, fittings, equipment, etc., tons	4,575	4,600
Light displacement, tons	5,520	5,680
Capacity deadweight, tons	13,170	13,050
Capacity (bales), cubic feet	590,000	620,000
Oil bunker capacity, tons (double bottoms)	1,320	1,350
Oil bunker capacity, tons (tank between tunnels)	....	120
Oil bunker capacity, tons (settling tanks)	80	20
Total oil bunker capacity, tons	1,400	1,490
Oil consumption per shaft horsepower, main engines, all purposes, pounds	0.95	....
Oil consumption per indicated horsepower, main engines, all purposes, pounds	....	0.31
Oil consumption per day at sea, tons	35.65	14.95
Oil consumption per day in port, tons	5.5	.7
Number of days at sea, per annum	220	220
Number of days in port, per annum	145	145
15,500-Knot Voyage		
Days at sea	55.5	55.5
Days in port	36.5	36.5
Total oil consumption at sea, tons	1,980	830
Total oil consumption in port, tons	200	26
Reserve oil bunker (for about six days), tons	220	90
Total oil carried outbound, tons	1,400	946
Total oil burned on trip out, tons	1,090	428
Total oil necessary, homebound, tons	1,310	518
Oil to be purchased abroad, tons	1,000	0
Weight of crew and stores, tons	50	50
Fresh water on board at start of each leg, tons	300	75
Total weight of vessel, including fuel, water, etc., outbound, tons	7,270	6,751
Total weight of vessel, including fuel, water, etc., homeward bound, tons	7,180	6,323
Cargo capacity, outbound, tons	11,420	11,979
Cargo capacity, homebound, tons	11,510	12,407
Cargo capacity, average (two ways), tons	11,465	12,193

Cost of Operation per Voyage

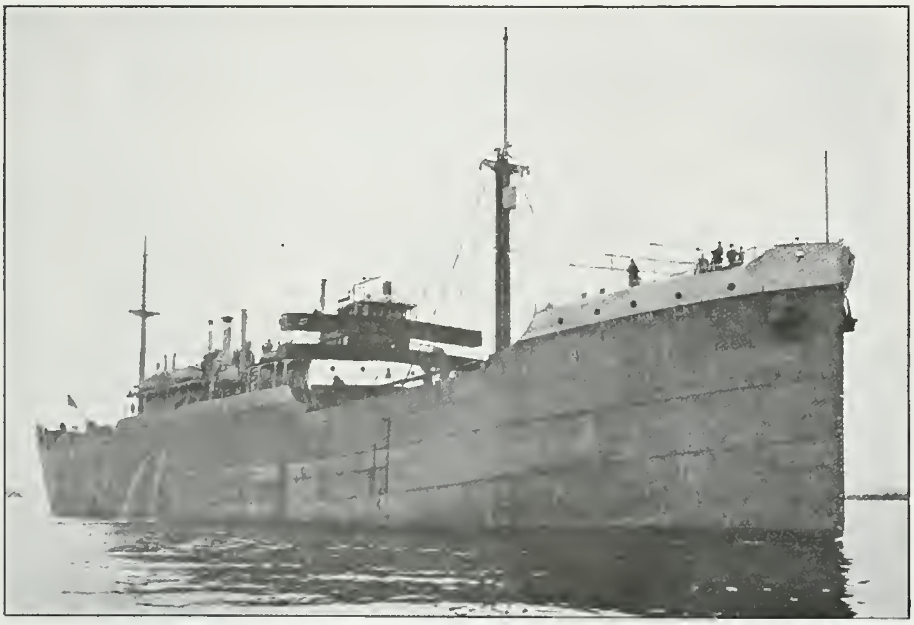
Insurance (4%); depreciation (5%), 92 days	$44,200	$48,800
Brokerage, at $.15 per ton cargo capacity	3,440	3,660
Overhead and general expense at $20 per gross ton, per annum	45,600	45,600
Fuel oil	45,900	15,260
Water, at $1 per ton	600	150
Deck officers, crew, stewards	12,200	12,200
Engineer personnel	9,300	7,600
General stores, deck, engineers and stewards	5,000	5,000
Totals	$166,240	$138,270
Loading and discharging of deadweight tons at $1 per ton and 75% of cargo capacity	$17,200	$18,280
Total	$183,440	$156,550
Loading and discharging of bulk cargo at $2 per 100 cubic feet at 75% capacity	$17,700	$18,600
Total operating cost for bulk cargo (per voyage)	$183,940	$156,870

Comparison of Earnings with Deadweight Cargo Carried

Tons per voyage outbound at 75% capacity	8,580	8,980
Tons per voyage homebound at 75% capacity	8,640	9,300
Rate per ton	$13.50	$13.50
Gross revenue per voyage at 75% capacity	$232,500	$246,780
Cost of operation per voyage	$183,440	$156,550
Net revenue per voyage	$49,060	$90,230
Net revenue per annum	$195,000	$358,000
Per cent earned on investment	10	16.65

Comparison of Earnings with Bulk Cargo

Cubic feet of cargo carried out and return at 75% capacity	885,000	930,000
Rate per 100 cubic feet	$27	$27
Gross revenue for bulk cargo	$239,000	$251,100
Cost of operation per voyage	$183,940	$156,870
Net revenue per voyage	$55,060	$94,230
Net revenue per annum	$218,500	$374,000
Per cent earned on investment	11.2	17.4



The new U. S. S. B. motorship William Penn, 12,375 d. w.t., engined with Burmeister and Wain direct reversible Diesel engine of 4500 i. h. p. on twin screws

From the foregoing it will be seen, for the particular conditions chosen, that the motorship has an increased earning capacity over the steam vessel of 66 per cent on deadweight and 55 per cent when bulk cargo is carried. In addition to the bulk cargo, there can be carried on the outbound trip 544 tons of oil, which at $13.50 per ton will increase the amount earned on investment from 17.4 per cent to 18.73 per cent, or 67 per cent better than the steamer.

The above figures can be used as a basis for working out a comparison for any route which will vary directly with length of voyage and the size of the vessels employed.

M. S. William Penn

A brief description of the motorship William Penn will be given, as it was the first large vessel of this kind owned by the United States Shipping Board. The performance of this vessel in service will be of particular interest, as it is to be operated over the same route and by the same operating company as the electrically driven ship Eclipse, recently put into service.

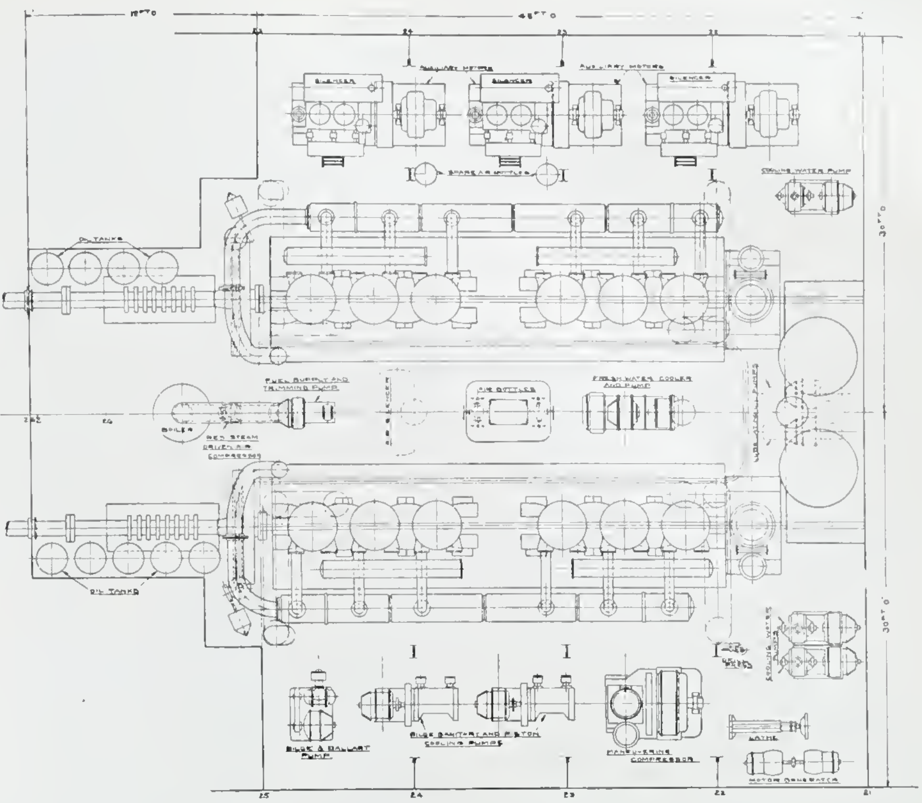
The hull, having been originally intended for a 3000 shaft horsepower single-screw turbine installation, is not exactly suitable to the Diesel engine installation of 4500 indicated horsepower, or 3500 shaft horsepower. For best efficiency, due to its high block coefficient, the vessel should not be driven over 10½ to 11 knots in service. The screws have accordingly been designed for lower turns than that for which the engines were intended, so that the designed mean indicated pressure, upon which the efficiency of engines somewhat depends, will be maintained.

The William Penn has a length between perpendiculars of 439 feet 6 inches, beam of 60 feet, depth molded to shelter deck of 36 feet 8 inches, and draught of 28 feet 4¾ inches, corresponding to 12,375 tons deadweight. The length of engine-room space was maintained the same as for the steam-driven sister ships. A built-up column was added to tie the middle of the engine-room double bottom to the shelter and bridge decks, to prevent possible synchronous vibrations being set up between the main engines and the hull's structure.

The main engines are, as previously stated, six cylinders, each of a bore and stroke of 740 mm. and 1150 mm., respectively. Along the port side are arranged the three auxiliary engines, each driving 65 kilowatt generators, and along the starboard side the maneuvering compressor and bilge and ballast pumps.

The lubricating and salt-water cooling pumps are placed near the forward bulkhead and the fuel oil pump and reserve air compressor aft, between the main engines. In this vessel a fresh-water closed cooling system, with cooler and fresh-water pump, has been added for the cooling of the cylinders and covers. This is a precaution against mud being deposited in the spaces.

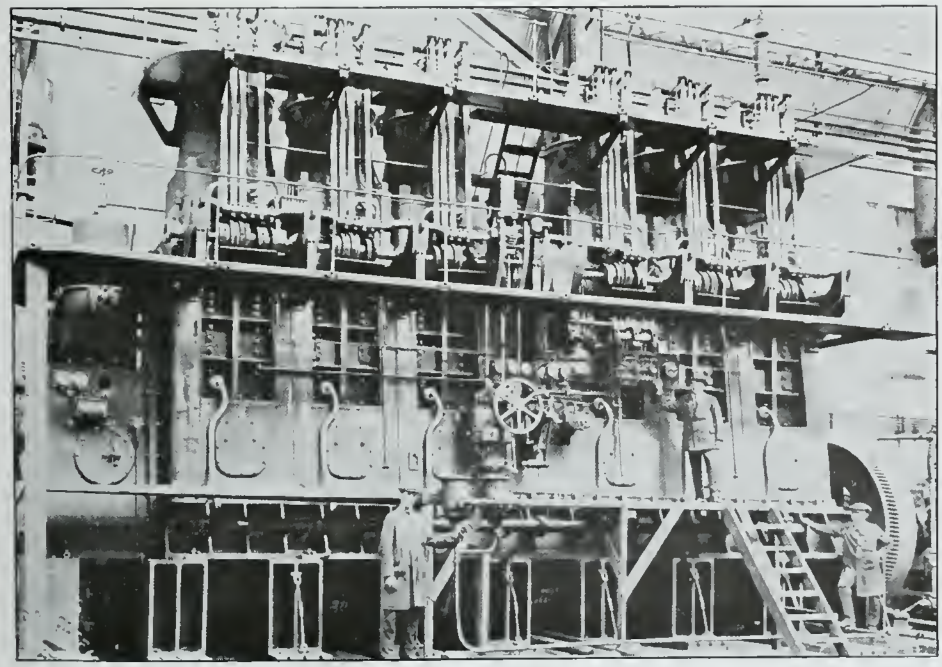
Editor's Note.—Additional interest is given to the comparison drawn in the above article by the evident intention of the new Shipping Board to immediately write off from their books a very large proportion of the cost price of their steamers. If they go at this kind of bookkeeping with sufficient resolution, the splendid steel steamers of the Shipping Board will be obtainable at a price which will enable private steamship operators to convert these steamers into profitable motorships and still have the motorship stand on the owner's books at a cost well within the limits of profitable operation at present freight rates.



Arrangement of Burmeister and Wain machinery in the new motorship William Penn

MOTOR SHIPBUILDING IN EUROPE

THE rapidly growing interest that is being shown in the motorship among shipowners in Europe is evidenced by the increased number of well known engine builders who are taking up the manufacture of machinery for installation in these vessels. Curiously enough, it is often the shipowners who force the engine builders to commence constructing Diesel machinery, for they are now invariably asking manufacturers to quote alternatively for steamers and motor vessels. During the past few weeks two of the largest marine engineering firms in Great Britain have arranged to build Diesel engines, these being Palmers Shipbuilding & Engineering Company of Jarrow-on-Tyne, who have acquired a Cammell Laird Fullagar license, and Kincaird & Company on the Clyde, who will build Burmeister & Wain machinery.



One of the Harland and Wolff 1600 i. h. p. direct reversible marine Diesel engines for installation in the new motorship Lobos for the Pacific Steam Navigation Company

It is a surprising fact that, although the first large Camellaird Fullagar engine has only just been completed, it is the most popular type among the engine builders, for there are now five of the largest concerns in the United Kingdom building this design—namely, John Brown & Company, Ltd., David Rowan & Company, Dunsmuir & Jackson, Palmers Shipbuilding & Engineering Company, and Cammell Lairds themselves. This fact forms striking evidence that engine builders do not always wait for results before they decide on the suitability of a new design, and it must be admitted that most European engineers are convinced that the Camellaird Fullagar engine has a very great future. There are now altogether twenty of the largest firms in Great Britain building motorship machinery, and it is a matter of interest that thirteen of these are constructing two-cycle engines.

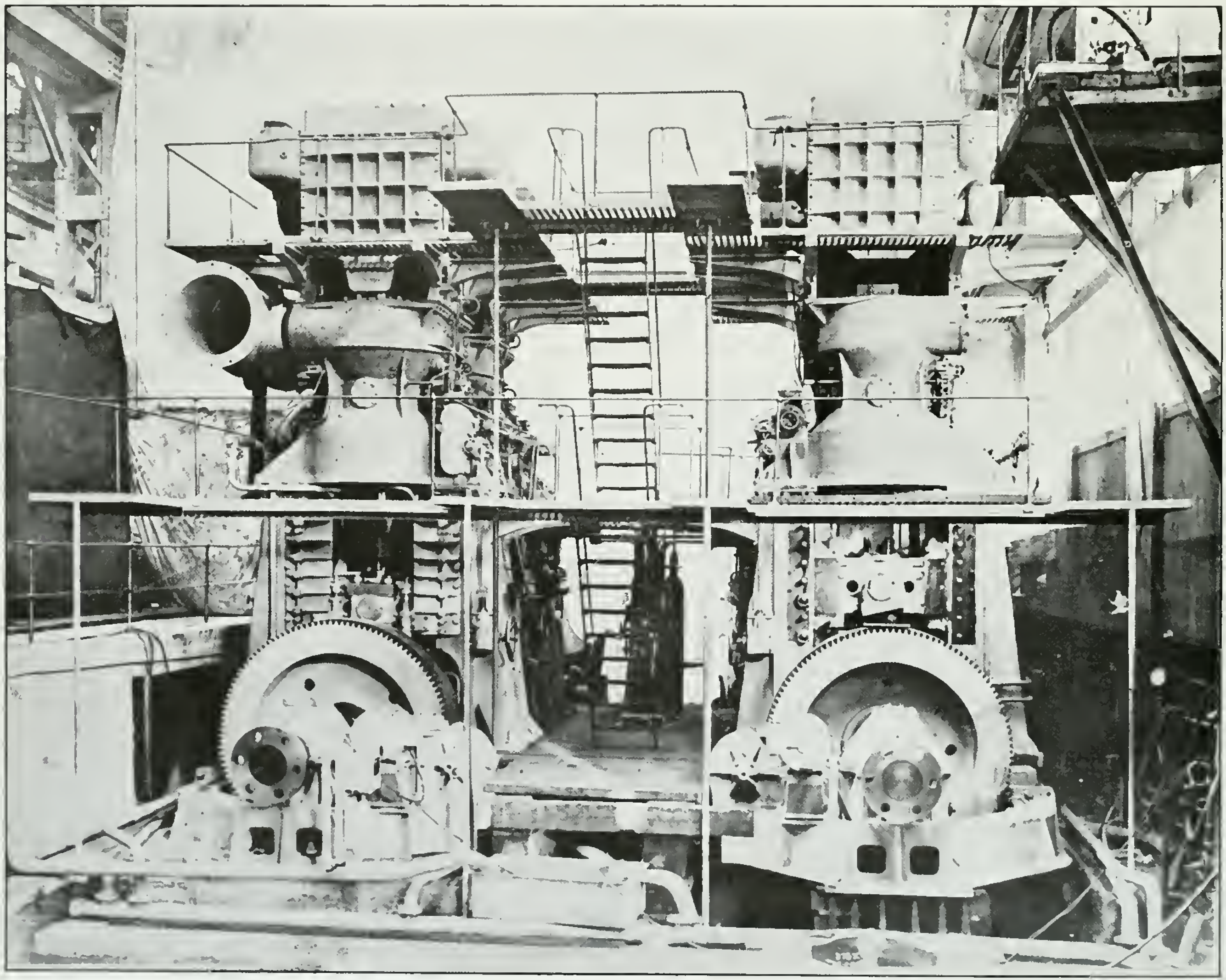
There is apparently quite a considerable amount of enterprise being shown in the large marine oil engine industries in Great Britain. Several manufacturers have had the temerity to build large engines before receiving any definite order, and this, in fact, was the policy adopted by Doxfords, who proceeded with the construction of four 3000 horsepower motors before an order had been received for any one of them. After the first was well on the way towards completion, the Transatlantic Steamship Company decided to order one, and as a result of the trials, placed orders for two more, so that three out of the four are now definitely contracted for. The fourth will be installed in a ship to Doxfords own account, if it is not disposed of before completion, which is highly probable.

5000 H. P. Camellaird Fullagar Engine

Somewhat similar enterprise has been shown by Cammell Lairds in the development of their remarkable Camellaird Fullagar engines, and although they have orders for two 500 b. h. p. sets and two sets of 1000 b. h. p., they were anxious to demonstrate the value of this type of motor for exceedingly large sizes, and therefore proceeded with the construction of four cylinders of a six-cylinder engine designed to develop 5000 b. h. p. when running at 95 r. p. m. This four-cylinder unit, therefore (which will be capable of extension to a six-cylinder engine), will develop about 3350 b. h. p. and will be the highest powered marine set that has ever been constructed. Most of the parts are now in the shops and erection will be proceeded with at no distant date. The cylinders have a diameter of 26 inches and the stroke is 42 inches; this size of cylinder for the relatively large output is, of course, extraordinarily small, so that the over-all length of the complete motor will be something of a revelation to those who are still skeptical of the possibilities of the Camellaird Fullagar engine, in the matter of space reduction in the engine room. The motor will be unusual in many respects, particularly in the arrangement of air compressors, since the designers have decided to fit two four-stage compressors on the engine, driven direct off the extension of the crankshaft. The main reason for adopting four stages is to equalize the upward and downward pressure and so obtain more perfect balance than is possible with a three-stage type. It is difficult to say what will be the ultimate destination of this engine, but it is not unlikely that a pair of these motors will be installed in a vessel for the Cunard Company.

Remarkably Low Fuel Consumption

A short description of the new 1000 b. h. p. Camellaird Fullagar engines may be given, as they differ in some respects from the 500 b. h. p. sets which have been already described and illustrated in Pacific Marine Review. The general principle of operation of this engine is well known. In each cylinder there are two opposed pistons, and the difference in application from the Doxford engine, which also is of the opposed piston type, lies in the fact that the cylinders are arranged in pairs and the top crosshead of the one piston is attached by diagonal rods to the bottom crosshead of the piston of the cylinder adjoining. It is claimed that by this means the engine is perfectly balanced, bearing stresses are reduced, allowing of the employment of shorter bear-



A pair of the popular Cammellaird-Fullagar opposed piston two-cycle type Diesel engines for installation in a motor cargo ship for the Brocklebank Line. These engines develop 1000 b. h. p. apiece ings, and that vibration is eliminated in spite of the fact that the engine is exceptionally high.

In the 1000 horsepower engines there are four cylinders arranged in four units of two cylinders each, and the cylinders have a diameter of 18½ inches with a combined stroke of 50 inches. As is usual in the opposed piston type of engine, the scavenging air enters the cylinder at the bottom through a row of ports occupying the whole of the periphery, while the exhaust gases are discharged at the top. Perfect scavenging is thus obtained and an exceedingly low pressure is possible, this amounting to only 1½ pounds per square inch. The arrangement of scavenging pumps is unusual; they are located at the top of each working cylinder and are rectangular in section. The object of this is to utilize the top crossheads as the pistons of the scavenging pumps. Air injection is used for the fuel and a three-stage air compressor is driven direct off the end of the crankshaft. The scavenging air is discharged from the scavenging pumps to a scavenging trunk around the center of the engine which forms the support for the cylinders.

It was found in the first Camellaird Fullagar engines that there was a danger of cracks developing in the cylinder liner at the center. This was on account of the fact that there were no fewer than four holes bored in the liner, comprising that for the fuel valve, air starting valve, relief valve, and the indicator gear. In order to overcome this difficulty in the new engine, the designers have provided only two holes, one at the back and one at the front. The former is for the reception of the fuel valve and the latter for the air starting valve, the relief valve and the indicator, all provided from the one hole. The result is that cracks around the center are now most unlikely to develop. The method has the disadvantage that the air starting valves must be operated by levers from the camshaft, which is naturally situated in the front of the engine.

The camshaft is driven from the crankshaft by bevel gearing and a vertical shaft in the usual manner, and on this camshaft are mounted four cams for each cylinder for the operation of fuel and starting valves, one for ahead and one for astern in each case. Reversing is effected by moving the camshaft fore and aft, bringing the astern cams into operation, and it is noteworthy that it is unnecessary to remove the valve levers from contact with the cams, since the lift of the fuel valve is so extremely small. This simplifies the reducing gear a great deal, and one hand wheel carries out all the movements necessary for setting the camshaft in the right position and admitting starting air and then fuel. The engineer therefore has only to turn the one hand wheel to the left or right to go ahead or astern, as the case may be. The engine is speeded up by means of the usual speed control lever acting on the suction valves of the four fuel pumps, and in addition there is another speed control lever for slow running which alters the lift of the fuel valves and thus economizes injection air. Clearly, with a two-cycle engine of this sort, the reversing mechanism and valve control gear are very much simpler than in ordinary four-cycle engines, where four valves are required to be operated in each cylinder, and the necessary ahead and astern cams provided in each case.

According to the test which was carried out on this 1000 horsepower engine, the remarkably low fuel consumption of 0.39 pounds per b. h. p. hour was attained. This, it will be noted, is probably the lowest recorded fuel consumption of any pure Diesel engine, whether two- or four-cycle, and comes within measurable distance of that attained with the Still combined steam and oil engine, which is said to be 0.32 pounds per b. h. p. hour. The question will naturally be asked whether the complication of the Still engine is desirable if the Camellaird Fullagar engine can approach so closely to the best results attained by it.

Geared Diesel Engines

It was in America that the idea originated of using geared Diesel engines on motorships and the Libby Maine, on which such installation was carried out, appears to have operated very successfully. The plan has now been copied by the Germans, but on a much larger scale, with a somewhat different object. The Hamburg America Line is showing great activity in motor shipbuilding, but the details are, as far as possible, being rigidly withheld. They are having a couple of 14,000-ton motorships constructed in which high-speed Diesel engines drive the propellers through gearing with a reduction of about four to one. These ships will be some of the most remarkable yet built, and the engines installed comprise a couple of 3000 b. h. p., six-cylinder Augsburg four-cycle sets, which were manufactured for the express purpose of installing in submarine cruisers of over 3000 tons displacement. They run at 390 r. p. m., have a cylinder diameter of 530 millimeters and a stroke of 530 millimeters. They represent the highest powered high-speed engines that have ever been built, but there is no great novelty in their design, since the cylinders are of exactly the same type as used for lower powered engines in which only six cylinders were employed.

There will thus be a total machinery power of 6000 b. h. p. in these ships, but presumably the engines will not be run at their maximum speed, in order that their life may be prolonged. The scheme is not one which would be proposed or recommended in the ordinary way, but the engines were available for immediate delivery and were, moreover, cheap, and if care is taken in the operation of the machinery, there is no reason why the vessels should not prove successful. The first ship is, it is stated, nearly completed at Hamburg and will shortly sail on her maiden voyage.

In other ways the Germans have made use of their war material and they have lately converted a couple of vessels originally built for torpedo boats into motor cargo carrying craft. These are compartively small and do not appear to make very satisfactory cargo vessels, since, although 280 feet in length, they have only a deadweight of 1500 tons. A Sulzer 420 b. h. p. two-cycle engine is installed in each case.

DRYDOCK RATE WAR

A rate war among the dry-docking plants in the New York district was precipitated June 7 when James Shewan & Sons, operating ten dry docks, announced a reduction in rates from 16 cents a day a gross ton to 5 cents a day. The same afternoon the Todd Shipyards Corporation with a total of twenty-three drydocks represented among its four subsidiaries announced that its rates, effective June 7, would be 5 cents for the first day on each registered gross ton and 5 cents for the following lay days. The prewar rates for drydocking ships were 12 cents a registered gross ton for the first day and 10 cents a registered gross ton for the succeeding lay days. During the past two years a number of smaller companies have sprung up and until the slump in shipping became so severe managed to keep pretty busy. It is believed that the smaller yards could not make expenses at 5 cents a ton, and that, if the rate war continued for a long while, it probably would result in breaking some of the plants, whose financial position is not as secure as the large yards.

WORK AT THE FLETCHER YARD

ONE of the quickest damage repair jobs that has recently been done in the East has been completed at the yard of W. & A. Fletcher Company, Hoboken, New Jersey, in the reconditioning of the amidship quarters of the steamship Acropolis.

The Acropolis, formerly the army transport Kilpatrick, was bought by Stephanidis, Benas & Company to run from New York to Constantinople. The Fletcher Company was awarded the work of reconditioning the vessel for this service. The work amounted to approximately $100,000 and involved the installation of a second stack, steerage quarters and the necessary heating, ventilation and painting work for 700 emigrants and cabin and stateroom quarters for 100 passengers. There was also considerable work in connection with renewing shell plates on the hull and making engine, boiler and deck repairs. This work was completed at 4 o'clock on March 30 and that evening at about 8 o'clock the vessel caught fire and was seriously damaged.

Fletcher Given Contract

A survey of the fire damage was made by underwriters, and it was decided to place the work out on bids.

The work was awarded to the Fletcher Company, as its was the lowest bid and as the vessel had to sail from New York within fourteen days.

The Fletcher Company is rebuilding the steamship Coppename of the United Fruit Company. This large contract includes entirely new refrigeration installation, new blowers, coils, decks and a complete overhauling of the machinery, boiler and deck equipment. The stern is being built up and a deck house to accommodate the crew is being installed on the main deck. This vessel is a sister ship of the steamship Saramacca and the steamship Surriname, which have been rebuilt recently by the Fletcher Company.

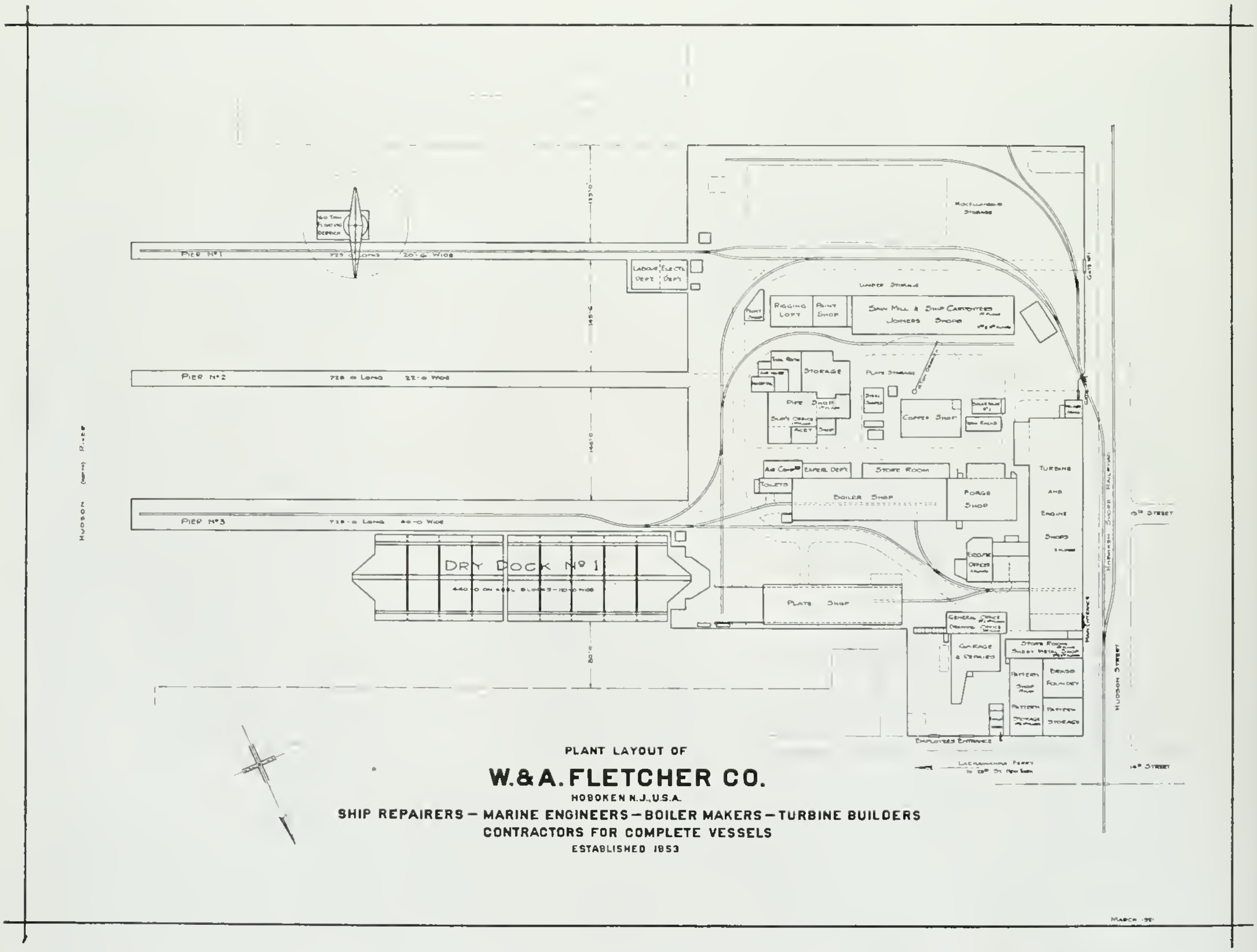
The steamship Pacific, a Norwegian vessel, is having new gears and other minor voyage repair work done. Among the other vessels undergoing repairs are the steamship Clarksburg and steamship Middlesex of the United American Line, the steamship Western Belle, belonging to the J. W. Elwell Company, the steamship West Hemitite, steamship Huguenot of the Shipping Board, etc.

The steamship Henry D. Whiton now being built by the Newburgh Shipyards, and the steamship Lio of the Baltimore Drydocks & Shipbuilding Company, are being equipped with Fletcher-Parson geared turbines.

Led in Engine Progress

Since 1853 the Fletcher Company has been closely associated with the development of the marine engine and is in no small measure responsible for the evolution of the present-day efficient installation. It is perhaps not too much to say that the company has done more than any other single shipyard or company to develop the crude steamboat of Fulton into the swift and reliable craft that ply the rivers, lakes and sounds of this country and the seven seas of the world.

The company has been identified with the production of more than



PLANT LAYOUT OF
W.&A. FLETCHER CO.
HOBOKEN N.J., U.S.A.
SHIP REPAIRERS — MARINE ENGINEERS — BOILER MAKERS — TURBINE BUILDERS
CONTRACTORS FOR COMPLETE VESSELS
ESTABLISHED 1853

Pier No. 2 at the Hoboken yard of the W. & A. Fletcher Company

320 American-built vessels, including every type from harbor tugs to palatial turbine-driven steamers. Space does not permit of the detail list of the fleet which bears the Fletcher nameplate, but it may be of interest to mention a few of the various types of vessels that carry their nameplate:

Tugs: N. Y. C. Tug No. 3 and Tug No. 9.

Steamers: Washington Irving, Robert Fulton, Hendrick Hudson.

Steamships: Yale and Harvard.

Ferryboats: Eight West Shore ferryboats of West Point type. Lackawanna Railroad, Chatham, Montclair.

Yachts: Corsair, Isis, Intrepid.

Cargo steamers: Fresno, Pasadena, Provincetown, Herman Frasch, Steel Engineer, Tuxpanoil, etc.

Tankers: Bethelridge, Bidwell, Clement Smith, etc., etc.

First Turbine-Driven Vessel

In the course of the development of marine propulsion, the members of the Fletcher Company foresaw the adaptability and practicability of using the steam turbine as a means of driving steamships and in the year 1906 the company built and equipped the first turbine-driven ship built in America, the steamship Governor Cobb. In the following year the company built the Yale and Harvard, which hold the record of being the swiftest passenger and freight vessels engaged in commercial work in this country. The Yale and Harvard recently were reconditioned at Los Angeles for the Los Angeles-San Francisco service of the Los Angeles Steamship Company.

Along with the building of new ships, engines and boilers, the company has developed an excellent ship repair yard, which last year was rounded into completion by the installation of an 8500-ton floating drydock, 440 feet long on the keel blocks.

Reconditioned Minnesota

Some of the large work done by the company was the reconditioning and rebuilding of the steamship Kroonland, steamship Finland and steamship Minnesota of the International Mercantile Marine Company; the steamship El Sid, steamship El Rio and steamship El Siglo of the Southern Pacific. It may be of interest to note that in competition with other repair yards, the W. & A. Fletcher Company received on a competitive bid basis twenty-one out of the fifty-six vessels that were converted into United States Army transports, while eight was the largest number done by any other single yard or corporation.

The Fletcher Company was founded in the year 1853 and is now carried on under the leadership of Andrew Fletcher, president; H. N. Fletcher, vice-president, and Andrew Fletcher, Jr., secretary.

The Fletcher effort has safely carried the company through sixty-eight years of business and placed it in the front rank of shipbuilders and repairers, and no doubt its intimate knowledge of the business, coupled with sound judgment and initiative, will insure its preservation for generations to come.

One bay in the Machine Shop, W. & A. Fletcher Company

MARINE TURBINE OPERATION

By SEA FLAME

During the war emergency shipbuilding program under the United States Shipping Board turbine propulsion for cargo steamers was featured to such an extent that the majority of the ocean going tonnage built during that period was turbine driven. This situation brought about a great deal of criticism of the geared turbine drive, which arose from the fact that there were so few engineers who had had any practical experience with this method of propulsion. Sea Flame in this article directs the attention of operating engineers to many seemingly unimportant details which are often overlooked or neglected in practice, to the detriment of economical operation and often to the ultimate breakdown of the turbine or gears. This article will bear careful study by all operators of turbines and especially by the younger engineers who are just beginning their experience at sea.

THAT the successful operation of turbine engines in a great degree depends on the proper handling and care of the main boilers would at first glance seem to be anomalous. However, a due consideration will go far to show that this assertion is based on good reason. The following article has been written to explain, in plain language, something about turbine engines as applied to the propulsion of steamers.

Nothing will be set down here regarding the scientific design and arrangement of the several blades, rotors and stators — only an attempt to explain somewhat the practical handling and care of these now almost universal prime motors. In brief, there are but two types of turbines: the impulse and the reaction, although there are modifications and combinations of both. Their care and handling are practically the same. As there are few direct connected turbines in merchant vessels, this kind will be briefly mentioned. In fact, their ills are identical with the geared type.

Dry Steam Necessary

Going back to the first sentence of this article, this is meant to show that a boiler giving pure dry steam is necessary for the best operation of turbines. Obviously, a carelessly handled or neglected boiler will not give out the kind of steam a turbine engine demands for its best work. So primarily a well handled boiler is of the utmost importance. This will be shown as we go on. As all engineers know, a turbine is simply one or more disks fastened to a shaft, with blades fixed at the outer edges, on which the steam impinges, and this steam, by its weight and velocity, causes the disk and shaft to rotate, and as only a part of the energy of the steam is taken in the first disk, stators, or fixed disks, with deflecting or reversing blades, direct the steam onto another moving disk, and so on down the different stages until the volume of the steam has become so attenuated and deprived of its weight that it is of no further practical use. In many types of turbines the disks are increased in diameter to allow for the increased speed and lighter weight of the steam. The same effect is at times gained by wider spacing or different pitch of blades as well as different curves and surfaces. Each turbine builder has his own methods, all of which have certain claims to economy. A full description of the many different kinds would be far too long for a publication like Pacific Marine Review. There are many standard publications on the market which well explain the design and theoretical action of these machines. These publications, while of great good, do not appear to the writer to give any practical suggestions for operation. That is the intention of this article, and if it helps the engineer who does not fully understand the machine, the object it was written for will have been attained, and the labor not have been in vain.

These bladed disks and the several parts of the rotating unit are put into perfect balance, and should be dynamically and statically perfect so far as possible. Now comes the reason of such pure steam being called for. It is evident that if scale forming matter is in the steam from the boilers, it is very likely to coat the blades, and thus throw them out of balance to the detriment of good operation. Again, dirty boilers are liable to cause priming, and there is always danger to a turbine if heavy slugs of water come over, damage to blading in most cases being caused by this. And steam heavily saturated with water will never give as high vacuum as dry vapor, throwing also a strain on air pump and feed pumps, and in every way being a source of danger and waste. So it is easily seen why a well operated boiler is a prime essential.

Clearances

All turbine builders furnish with their machines full instructions regarding clearances, together with tolerances which may safely be risked. These clearances may, during the first few weeks of operation, change slightly, but the changes need cause no worry, as they are, as regards axial or longitudinal clearances, due mostly to thrust bearings getting to a proper surface. It has been found that a first run of a thousand miles increased the clearance some five thousandths of an inch, and after that a further run of twenty thousand miles did not increase the clearance perceptibly. Tip clearance on blading in some types is to be watched carefully, as it is small. However, in most of the American types, this tip clearance need not be considered, as it is full enough to allow for much latitude. Longitudinal clearance is easily adjusted by the Kingsbury or other turbine thrusts provided.

The shaft bearings of turbines require attention to a closer degree than reciprocating engines, as an undue wear of one will throw the unit out of line and balance. However, the writer has run an ordinary freighter turbine for many days with the forward horsepower bearing down twenty-nine thousandths. While this was done to save delay, it is not advisable, although in this instance no damage resulted, particular attention being given to the special bearing, and its working carefully watched. A copious and constant lubrication must be given to the several bearings. When it is remembered that the surface velocity of a six-inch shaft at 3600 r. p. m. is about one mile a minute, the necessity of proper lubrication becomes apparent.

Air Leaks

Particular attention should also be given to little air leaks around the job. A very slight air leak will impair vacuum to a considerable degree, and as the highest efficiency of a turbine is dependent on the final pressure, a high vacuum should be kept. This also means saving in fuel, as it takes fuel to drive air pumps in an effort to overcome lack of good vacuum due to a lot of little leaks. So be careful in handling the several drain and other valves directly connected to the condenser and turbines. A few little leaks here and there soon mount up to considerable of a total. These things are to be well looked after if economy is to be maintained.

The steam seals should also be intelligently manipulated. This seems to be a sort of gift to some engineers. Others, again, do not seem to grasp the fact that these steam seals need constant watching to ensure good operation. Should the main steam pressure change, even slightly, or the vacuum for some reason fall, it will be found that the steam seals require readjusting. However, with normal operation, steam and vacuum kept steady, steam dry and all in good balance, these seals will be of no trouble whatever. An overseal is also to be avoided, as this means waste of steam, which in turn is loss of feed water, which again brings around the inevitable cycle of waste: more steam, more water, more feed, more fuel. That is the absolute result. Nature's law refuses to be mocked, and any waste of whatsoever character must be made up. So be careful of the leaks and steam seals around a turbine. This also might well apply to any engine or plant.

Co-operation

One source of loss of efficiency is caused by failure of the deck department to notify the engine room of any change in operation. Many masters give this subject due consideration. Others, again, appear to have the idea that when the engineer asks for notice that it is only a fad. The writer had the pleasure of sailing with one master who was exceedingly particular as regards notice to the engine room as to changes in speeds or stops. It was fine with him, for when we did get a bell without notice we knew that "something was doing," and prompt action necessary. To show owners what a difference in fuel will result from this co-operation, will say that about 100 barrels of fuel oil was saved in a forty-day round trip while the master in question was in command, and a change of masters increased consumption to an extent remarked upon by the superintendent, but "old custom" prevented action being taken. However, these days of needed and necessary saving will probably change this. No interference with the master need be made as regards safe navigation, but the throwing to "stop" of a bridge telegraph for every little incident while out in an unobstructed ocean looks unnecessary, and it is wasteful. This evil is more noticeable with coal fuel than with oil. Owners should instruct masters to help save.

Making Ready

Now we get down to making ready a turbine. In making ready for a run, get the main circulator and independent air pump going. Of course it is understood that jacking gear is out and all clear to move engines. See that all drains are open, and that steam seals show some vapor. Have lubricating oil system in action. Then crack throttle slightly, letting enough steam through to warm up the whole turbine slowly. It is better not to pull too high a vacuum at this time, as it prevents equal warming up, and is a waste. When the rotor casings become well warmed, the throttle may be opened a little more and the engine slowly moved. The propeller shaft need not make over five or six turns a minute. The writer finds that a cracking of the astern valves, when possible, will facilitate warming up, as a little steam through them does no harm, even with ahead valves open. As the engines warm up, the vacuum may be raised and all valves to drains, etc., closed as required. No particular time to cover this operation can be given, as this entirely depends on circumstances and should be governed by them. Good judgment is paramount. The condition of the turbines can be "felt" after experience in this work, and is one of the best guides to good results. When all is in order, the deck folks to be notified. If they do not move the engines soon, it is a good idea to keep enough steam flowing through the main engines to ensure them being kept warm. In some types this can be done by opening both the ahead and backing throttles slightly. In other styles, an alternate opening and closing can be done without moving the propeller, which in many cases is not desirable in unmooring, etc.

All being in shape, a start is made, and the several valves around the system properly adjusted to give the results required. Attention to lubricating system given, and things will begin to get to a proper balance. The same care must be exercised as regards the other units of the plant as would be observed in a reciprocating job. Should you get an astern bell, do not be afraid to give her the backing throttle promptly. It can do no harm. In fact, in stopping it is good practice to bring the rotor to rest by admission of steam to the backing turbines. After a good warming up do not be afraid to open up quickly. Of course in working to bells due attention must be given to gland steam, otherwise a rapidly falling vacuum will ensue, or, if oversealed, a cloud of vapor from vents will take place.

Continuous Operation

In steady and continuous operation particular attention should be given to absolute tightness of the astern throttle valve. A leak at this point will cause a great loss, as the backing blades should revolve in as perfect a vacuum as possible when under way. In addition to the loss by reason of a leak, the efficiency of the engine is greatly reduced by the leaking steam retarding the backing rotor. This is obvious if given thought, and shows the great necessity for tight throttles. The same rule applies to the ahead throttle when going astern, as any slight leak will decrease the backing power, which at its best is one of the weak points of a turbine installation.

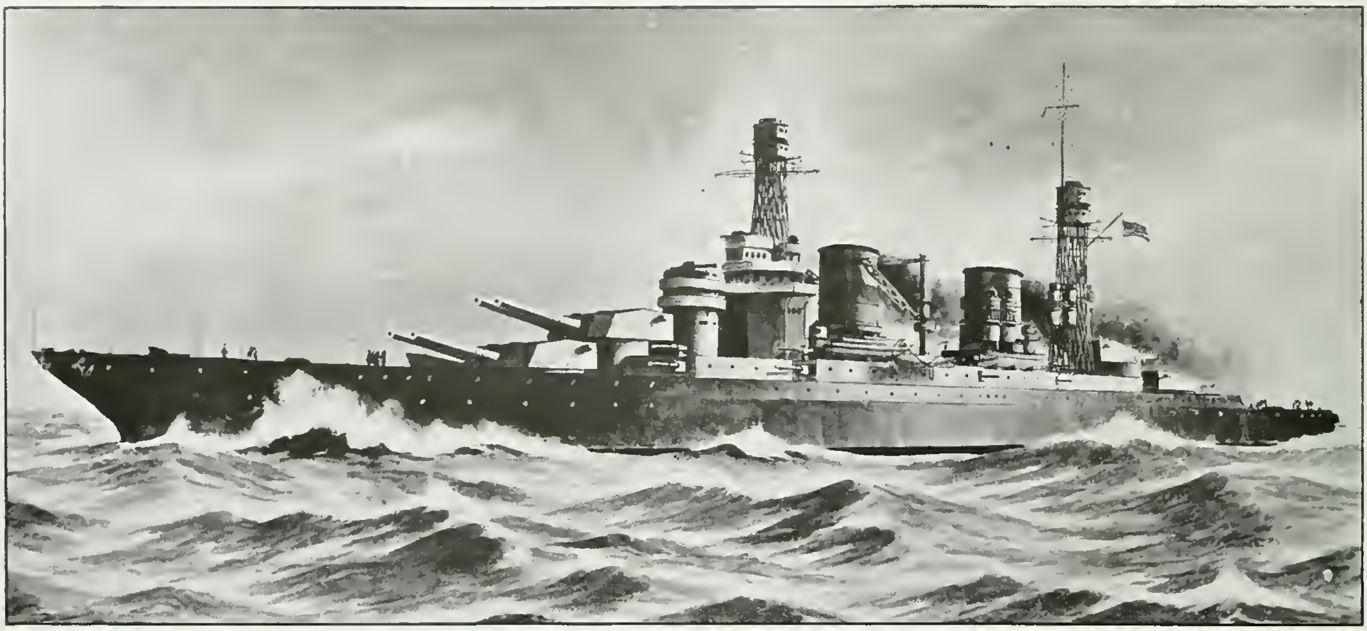
No absolute reliance can be placed on the ordinary type vacuum gauge. These instruments will vary at times most erratically, and for turbine work are not to be depended on at all. The writer finds that a good thermometer is more reliable, and it can be checked up easily. If the thermometer is placed in the exhaust trunk, and shows not more than 80 degrees Fahrenheit, you may be sure you have a vacuum of 28.5 inches. If everything is in good condition and the machine has been designed rightly, with enough condenser capacity, the temperature of exhaust should never be above 100 degrees Fahrenheit. A mercury column is all right if the ship does not roll, but is of no use in general sea practice.

Lubricating Oil

Another very vital matter to be attended to is keeping water out of the lubricating oil. In some types of turbines this is almost impossible, and a careful watch should be kept to ensure safety from this danger. A previous article has explained the best methods of effecting this object of clearing oil from water. It may not be out of order to repeat that either some good purifier or a system of settling tanks is of the utmost importance. To keep salt water out is easy. Always have the lubricating oil pressure somewhat higher than the salt cooling water pressure. But the water that creeps into the oil from glands, etc., is the worst and most difficult to deal with. Care, however, will do much, and the ever good advice of absolute cleanliness is to be followed in the operation of steam turbines. That and horse sense will accomplish much.

The engineer unfamiliar with turbines need have no worry as regards racing of engines. Unless most abnormal no trouble will be caused by this. Of course the gears will change their note, as will the turbines, but there is a big margin of safety in the fluctuation of speeds with that type—much more than in a reciprocating job. Ordinary judgment will go far in determining to what extent it is advisable to let her run open full in a sea way. This cannot be set down as a hard and fast rule, as conditions vary with ships as with men. A good mechanic can feel the plant.

Finally, do not become careless over the continued good operation of a turbine. When an engine of this kind "blows up" she does it quickly, and with no notice. Eternal vigilance is the price of safety. Keep boilers clean; plenty of clean lubricating oil on bearings; tight joints and a good vacuum, and turbine trouble will be reduced to a minimum. And above all, do not open 'em up to see what makes 'em tick. Occasional surveys are of course necessary, but continually lifting bearing caps or opening casings is not advisable, as there is always a liability of dirt getting in.



Artist's drawing showing one of the new United States battle cruisers. These ships are to be of 43,500 tons displacement, 874 feet in length, and are to be driven by steam turbine electric propulsion at a speed of 33 knots, the turbines developing 180,000 S. H. P. Eight 16-inch guns will compose the main battery.

JAPAN ADOPTS ELECTRIC DRIVE

New York Shipbuilding Company Gets Contract For Nippon Navy Collier

JAPAN is to be the second nation to use the electric drive in its navy, a contract having just been closed with the New York Shipbuilding Company of Camden, New Jersey, for a 20,000-ton fuel ship similar in size to the U. S. collier Jupiter, recently renamed the Langley.

Interested in the success of the electric drive, proven by the ten years' service of the Jupiter and the two years or more of practical service of the U. S. S. New Mexico, the world's first electrically propelled battleship, Japan has decided to follow America's steps in first electrifying a smaller navy ship. There is no doubt that if this vessel operates successfully, future large ships of the Japanese navy will be electrically propelled.

It was through the untiring efforts of Captain M. Yokura that the Japanese government decided to introduce the electric drive in its navy. Economy in fuel is of paramount importance and Captain Yokura therefore decided to install electrically-driven auxiliaries throughout, as well as to equip the boilers with superheaters so as to obtain about 200 degrees Fahrenheit of superheat. This last mentioned improvement alone will mean a saving of at least 10 per cent in fuel.

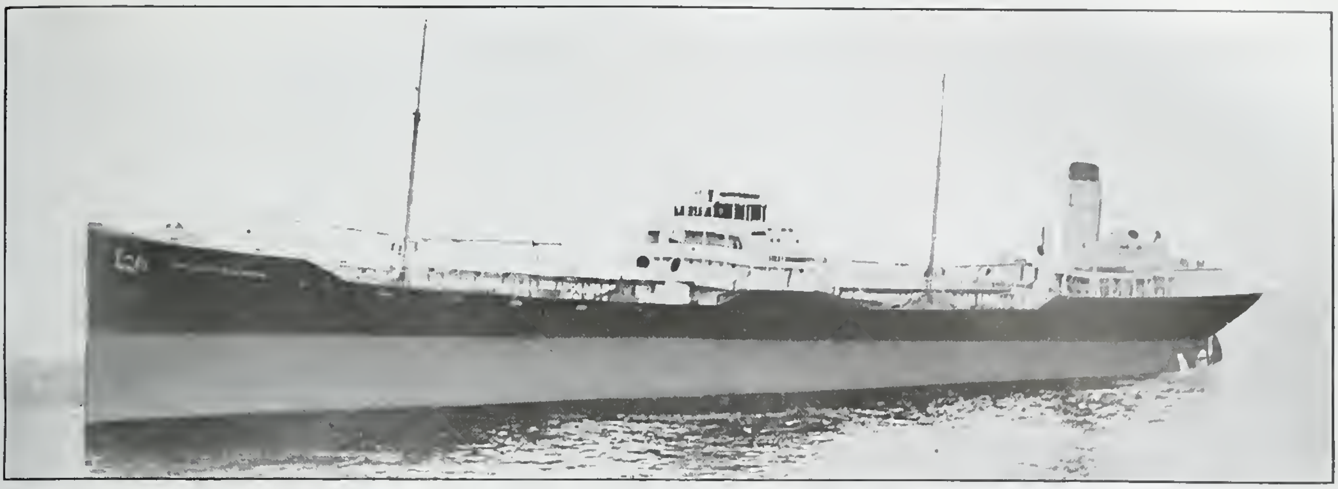
The G-E equipment, purchased from the International General Electric Company, will consist of an 8000 horsepower turbine generator supplying power to two 4000 horsepower, 120 revolutions per minute, synchronous motors; also two 500 kilowatt direct current turbine sets, one of which is to be sufficiently large to furnish the exciting current for the main generating units, as well as power to drive all the auxiliaries, such as the blower motor, steering gear, the gypsy, radio apparatus, refrigerating plant, laundry and lighting equipment.

There is also furnished a 650 kilowatt alternator which can be connected by means of a coupling to either of the 500 kilowatt, direct current auxiliary turbines, so that, in case of failure of the main driving unit, or any of its auxiliaries, this small generator will give sufficient power to propel the vessel at about 7½ knots.

This Japanese fuel ship will be completed in twelve months' time, and no doubt will on her trials make a record in fuel economy because of her water tube boilers of 270 pounds pressure with 200 degrees Fahrenheit of superheat, the fact that synchronous motors are to be used for the main drive, and that all auxiliaries are to be electrically operated.

BETHLEHEM DELIVERS TANKERS

Sparrows Point Plant Completes Two Fine Vessels For British Oil Company



Tank steamer Henry Deutsch De La Meurthe, 8350 d. w. t., built at the Sparrows Point plant of the Bethlehem Shipbuilding Corporation for the Lux Navigation Company of London, England

FOLLOWING a very successful deep-sea trial run on May 20, the second of two steel tankers built at the Sparrows Point plant (Baltimore, Maryland) of the Bethlehem Shipbuilding Corporation, Ltd., for the Lux Navigation Company, London, England, has been delivered to her owners. The first one of these tankers to be built was delivered on May 10, 1921. These vessels, the steamship Henry Deutsch De La Meurthe and the steamship Emile Deutsch De La Meurthe, are similar in design to the well-known "Shell" tankers, and are built on the longitudinal system of framing. They are classed at Lloyd's highest rating. The total carrying capacity of each of these tankers is 8350 tons deadweight on a mean draft of 24 feet 9 inches, with an oil cargo capacity of about 7600 tons. The principal particulars of the vessels are as follows:

Length over-all	428′ 0″
Length bet. perpendiculars	412′ 0″
Extreme breadth	53′ 3½″
Molded breadth	53′ 1″
Molded depth to upper deck	31′ 0″
Molded depth to main deck	24′ 0″
Speed, knots per hour	11
Type of engine	reciprocating
Size of engine, stroke	27x45x75x48″
Boilers	Scotch
Number of boilers	3
Steam pressure, pounds	180
Kind of fuel	oil and coal

The Bethlehem (Dahl) mechanical oil-burning system is installed on each vessel, and the boilers are fitted with Howden force draft furnace fronts suitable for conversion to coal burning if desired. Engines and boilers are placed aft with the fuel oil tanks forward of the boilers. Bethlehem-Weir horizontal fuel oil pressure pumps, 6 inches by 4 inches by 8 inches, are installed in duplicate for supplying oil to the burners. The pump room is located near midship, and is approximately 8 feet long and of the same width as the vessel.

Two Bethlehem-Weir vertical simplex cargo pumps, 18-inch by 16-inch by 24-inch stroke, are utilized for handling the oil cargo on each ship. Feed, drain, fuel oil transfer, ballast and deck and donkey and fire pumps are the same type. The main circulating pump is a 14-inch double suction centrifugal type, direct connected to an 8-inch by 8-inch vertical single steam engine. The deck machinery for each vessel consists of two 8¼-inch by 8-inch gypsies located on the upper deck, a hand-operated capstan on the forecastle deck, two 8¼-inch by 10-inch compound geared winches on the upper deck, a 10-inch by 10-inch triple spur geared windlass, and a 9-inch by 9-inch horizontal spring-quadrant steering gear controlled by hydraulic telemotor. The auxiliary machinery was built at the Moore plant of the Bethlehem Shipbuilding Corporation, Ltd.

Bow view of the Hawkeye State at a San Francisco wharf. This splendid passenger liner was built at Sparrows Point.

The results of the deep-sea trials of these two vessels were unusually satisfactory. On the trial of the steamship Henry Deutsch De La Meurthe, which was run April 21, an average speed of 12.90 knots per hour was maintained at a mean draft of 24 feet 9 inches. An average of 2833 indicated horsepower was developed at an average engine speed of 79.34 r. p. m.

On the trial of the steamship Emile Deutsch De La Meurthe, which was run on May 20, the average speed per hour maintained was 12.36 knots at a mean draft of 24 feet 10 inches. An average indicated horsepower of 2985 was developed at an average engine speed of 79.25 r. p. m. During the trials of both vessels the fuel burned was oil with a gravity of 28 degrees Baume.

OFFICES MOVED

The International Pulverized Fuel Corporation announces that on and after April 20 its general offices will be located in the National City building, 17 East Forty-second street, New York City.

ELECTRIC FURNACE IN SPAIN

The Electric Furnace Construction Company, Philadelphia, announces that the ten-ton Greaves-Etchells electric furnace installed by the English office at the works of the Sociedad Espanola de Construccion Naval, Spain, has been successfully started. This is the first large electric furnace to be operated in Spain.

EUROPEAN MARINE NOTES

Exclusive Correspondence Pacific Marine Review

THE shipping position on this side of the Atlantic is still one of depression, although here and there, owing to special circumstances, freights have moved higher. At the same time shipowners have been putting their house in order. They have set to work to reduce running costs. Tremendous savings have already been effected in connection with stores and equipment. With regard to wages a friendly settlement has been arrived at with every section of shipboard workers except one and that one is the Cooks' and Stewards' Union. From the firemen and deck hands up to the commanding officers, reductions have been agreed to by all except the cooks and stewards. The smallest cut, of course, is in wages of the sailors and firemen—ten dollars a month. This, however, with the 48 per cent drop in the cost of living, still leaves them better off than they were before the war. The cooks and stewards are trying the effect of withdrawing their labor. In other words, they have struck. Just what is happening on the cargo boats is not clear, but certainly, in so far as regards big passenger liners, the strike is a failure. Volunteer and non-union cooks and stewards have been obtained in abundance, and in fact more offers of help were received than could be accepted.

Importers and Exporters

A report, including a summary of the proceedings at a council meeting of the Manchester Association of Importers and Exporters, shows that this body closely follows all matters affecting the corporate concerns of merchants, and is kept well informed of current developments. Among the matters discussed at the last meeting were clauses in bills of lading, the recent report of the Imperial Shipping Committee, and the problem of pilferage. Dealing with the recommendations of the Imperial Shipping Committee that uniform legislation should be adopted throughout the Empire on the lines of the existing acts in the United States, Canada, Australia and New Zealand, the following summary is given of the effect of the existing legislation:

The governing terms are to the effect that the owners must not be relieved from liability for loss or damage arising from negligence, fault or failure in the proper loading, stowage, custody, care or delivery of goods received by them to be carried in or by the ships, nor must the obligations of the shipowner or his servants to handle and stow the goods carefully, and to care for, preserve and properly deliver them, be lessened, weakened or avoided.

It is recalled that the Council and Joint Indian Bill of Lading Committee of the Manchester Association sent recommendations to the government that legislation on the lines of the report of the Imperial Shipping Committee should be introduced without delay. In another part of its report the Manchester Association, referring to an interim statement on pilferage issued by the Chamber of Shipping, writes that "it would appear from this that many claims for pilferage have been settled by shipowners, notwithstanding the restrictive clauses in bills of lading." This of course expresses the facts and it bears out the point that clauses in bills of lading give shipping managers certain powers which, in fact, are rarely, if ever, exercised. Some of them, such as the provisions relating to deviation, are inserted for the purpose of meeting certain contingencies which, it is hoped, in the interests of all, will not arise.

The New Cunarder

It is nearly ten years since Swan, Hunter & Wigham Richardson, Ltd., launched a Laconia, sister ship to the Franconia, for the Cunard Steamship Company, Ltd. Unfortunately, both these fine ships were lost during the war. The new Laconia, now being built, is of much the same length as her predecessor, but has a greater breadth and is to be driven by steam turbines in the place of reciprocating engines. The leading dimensions of the Laconia are: 623 feet 9 inches extreme length, 73½ feet molded breadth, and 45 feet in depth to the shelter deck. The gross tonnage will be about 21,000 and her sea speed 16 knots. The ship is being built to Lloyd's highest class. She has a straight stem and elliptical stern, and will be provided with two pole masts and one funnel. Very comfortable accommodation will be provided for about 340 first-class and 340 second-class passengers. The public rooms for the first-passengers will consist of a spacious lounge, smoke room and drawing room, a dining room, garden lounges and a gymnasium. In the second-class accommodation there will be a dining room, smoke room, verandah cafe and a drawing room. Accommodation will also be provided for 1500 third-class passengers, and they too will have a dining room, a general social room and smoke room. The captain will be provided with a most comfortable suite of apartments communicating with the navigating bridge. There will be separate smoke rooms for the officers and engineers. For all the passengers there will be ample provision of baths, lavatories, etc., as well as hospitals, a dispensary and an operating room. The galley, pantries, baker's shop and refrigerated store rooms for perishable provisions will all be most complete. The outfit of boats and life-saving apparatus will all be in accordance with the British and American authorities and to the requirements of the International Convention for a passenger steamship.

The Laconia's twin-screws will be driven by two sets of turbines of the impulse type and working with double-reduction gearing, the steam being superheated. The total shaft horsepower will be close on 13,000, with the propellers running at 90 revolutions per minute. On each of two lines of shafting there are three turbines working in series. When going ahead the whole of the three turbines work in series, while for going astern there are two turbines working in series and incorporated respectively with the intermediate and low-pressure turbines, which arrangement has the great advantage of economizing steam and minimizing the risk of total breakdown. In case of any accident to one or other of the turbines, emergency connections are provided which can readily be brought into use to enable the remaining turbines to be worked. The whole of the auxiliary machinery in the engine room is of approved modern types and the installation is most complete. There will be put into the ship three double-ended and three single-ended multitubular boilers to be fired with oil fuel on the Wallsend-Howden system and working at 220 pounds per square inch under forced draft.

Australia's Fleet of Liners

Another stage in the progress of the shipping plans of the Australian government is marked by the launch of the Moreton Bay at the naval construction works of Messrs. Vickers. The vessel is one of five that are under construction in this country for the Commonwealth government line of steamers, two sister vessels, the Jarvis Bay and the Hobson's Bay, being on the stocks here, while two, the Largs Bay and the Esperance

Bay, are being built by Beardmore & Company at Dalmuir. The Moreton Bay has overall length of 548 feet 9 inches, and with a load displacement of 22,500 tons designed to carry 12,000 tons deadweight. Her engines will consist of two sets of double reduction geared Parsons turbines. A large proportion of the cargo space will be isolated for cold storage.

There will be accommodation for about 700 third-class passengers in two-, four- and six-berth cabins and there will be special suites for twelve first-class passengers. Special consideration has been given to the crew, who are housed in well-ventilated cabins under the forecastle deck. The lifeboats are of sufficient capacity to take the whole complement of the ship, and include two 30-foot motor launches. These are equipped with wireless telegraph installations, and in case of emergency are capable of towing all the ordinary life-boats. Mr. H. B. G. Larkin, the general manager of the Commonwealth line, said that he hoped by the end of this year to inaugurate with these five ships a regular four-weekly service between this country and Australia.

Lloyd's Shipbuilding Returns

There are some very striking lessons to be learned from the newest shipbuilding figures published. The shipbuilding returns of Lloyd's Register of Shipbuilding for the quarter ending with March show that, taking into account only vessels of 100 tons gross and upwards, the construction of which has actually been commenced, there were 884 merchant vessels of 3,798,593 tons building in the United Kingdom on March 31, as compared with 921 vessels of 3,708,916 tons three months earlier and 865 vessels of 3,394,425 tons twelve month earlier. The total was therefore about 90,000 tons more than that on hand at the close of September of last year and about 404,000 tons more than that at the close of March of last year. Of the total 790 vessels of 3,528,190 tons were steel steamers and four vessels of 2174 tons wood and composite steamers; 60 steel vessels of 260,731 tons, four ferro-concrete vessels of 2094 tons, and two wood and composite vessels of 355 tons were motor vessels; 23 of 4749 tons were steel sailing vessels, and one vessel of 300 tons was a wood sailing vessel. The total includes 84 steamers and motor vessels of 1000 tons and over, aggregating 557,027 tons, intended to carry oil in bulk.

Work Suspended

It is pointed out, however, that the figures do not represent the work actually in progress. In normal times the total would indicate great activity and prosperity in the shipbuilding industry, but the times are not normal, and the total as it stands is misleading, because it does not represent the work actually in progress, and therefore does not afford a true index to the relative position of the shipbuilding industry as compared with, say, twelve months ago. It includes a considerable amount of tonnage on which work has been suspended owing to the very heavy reduction in shipping values, corresponding to the rapid and serious fall in freights and consequent decline in the demand for tonnage. It also includes a large quantity of tonnage the completion of which has been postponed, owing, principally, to the joiners' strike. The tonnage on which work has been suspended amounts to 497,000 tons, and the tonnage the completion of which has been delayed amounts to 350,000 tons. These two totals, amounting to 847,000 tons, must therefore be deducted from the tonnage under construction in order to enable a comparison to be made with the figures for normal times, and there is thus reached a reduced total of 2,951,593 tons under construction in the United Kingdom.

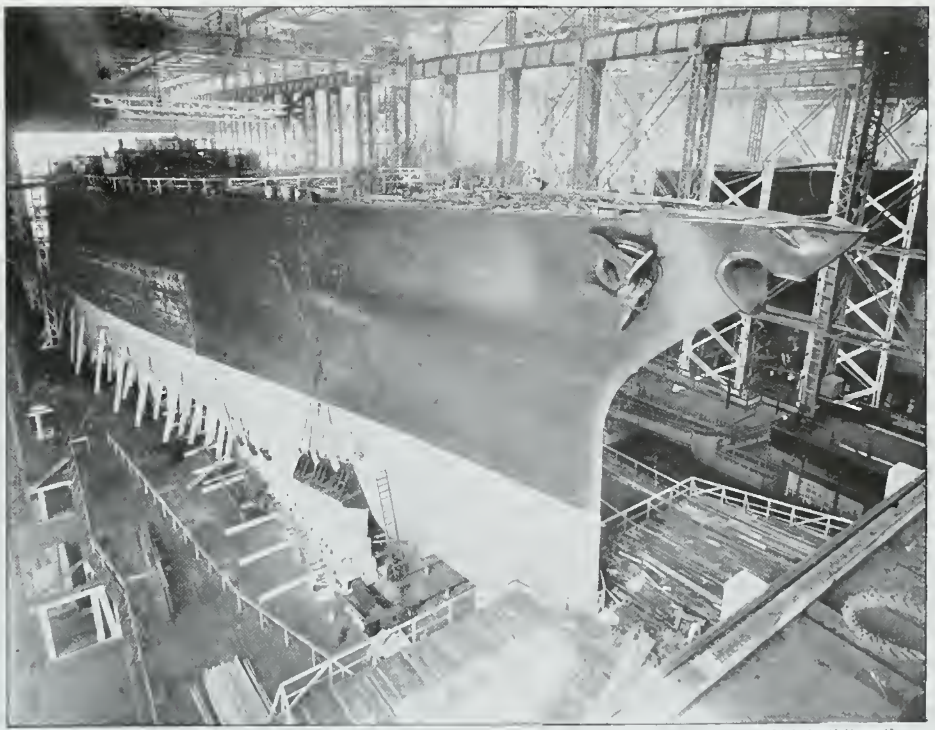
Types and Destinations

Of the vessels one was between 25,000 tons and 30,000 tons in size, 5 were between 20,000 and 25,000 tons, 25 were between 15,000 and 20,000 tons, 28 were between 12,000 and 15,000 tons, 4 were between 10,000 and 12,000 tons, 63 were between 8000 and 10,000 tons, 126 were between 6000 and 8000 tons, 94 were between 5000 and 6000 tons, 53 were between 4000 and 5000 tons, 72 were between 3000 and 4000 tons, 77 were between 2000 and 3000 tons, 92 were between 1000 and 2000 tons, 107 were btween 500 and 1000 tons, and 137 were between 100 and 500 tons. All the sailing vessels were under 500 tons.

Of the total under construction in the United Kingdom, 58 vessels of 295,298 tons were for France, 71 of 241,381 tons for Norway, 26 of 210,708 tons for Holland, 18 of 97,720 tons for British dominions, 5 of 64,300 tons for Italy, 15 of 46,600 tons for Spain, 5 of 28,411 tons for the United States, 11 of 27,545 tons for South America, 7 of 25,775 tons for Denmark, 4 of 25,200 tons for Japan, 7 of 23,230 tons for Greece, 5 of 17,060 tons for Belgium, 2 of 10,340 tons for Sweden, and 2 of 4750 tons for other countries.

Cunard's Smaller Profits

Far smaller figures are contained in the Cunard report for 1920 than those for 1919, which is only natural in view of the severe shipping depression which set in last year. After provision has been made for income tax, corporation profits tax, debenture interest and depreciation of ships, other properties and plant, and including £144,100 brought forward, there remains at the credit of profit and loss £638,200.



Copyright by New York Shipbuilding Corp.

United States battleship Colorado taken at the New York Shipbuilding Company's plant, Camden, New Jersey, just before launching

GOVERNMENT SHIPBUILDING IN AUSTRALIA

By TRADE COMMISSIONER A. W. FERRIN, Melbourne

(Reprinted from Commerce Reports)

THE recent announcement by the minister in charge of shipbuilding that lack of funds (the current year's appropriation having been exhausted in eight months) would prevent the building of any further Commonwealth government ships at the dockyard of New South Wales State government on Walsh Island, and the Labor party agitations which have followed the dismissal of large numbers of men from that plant and also from the Commonwealth government dockyard at Cockatoo Island, have renewed public interest in the question whether the Commonwealth government shall or shall not continue to build and operate its own vessels.

Opposition to continued government construction of ships comes from the organizers of the so-called "economy movement," a non-partisan agitation which seeks the reduction of all government expenditures on the ground that the combined Commonwealth and state debts of over £800,000,000 ($3,893,000,000) is too heavy a burden to allow of any increase, even for productive enterprises such as ships.

The Commonwealth Government Fleet

The Commonwealth government fleet was begun in 1916 by the purchase by the prime minister of fifteen steel cargo vessels of an average deadweight capacity of about 7000 tons and two wooden vessels, one of which was subsequently wrecked and the other sold. Lack of normal private shipping facilities and abnormal freight rates due to war conditions were the reasons for acquiring this fleet.

It was subsequently decided to increase the fleet by building in Australia twenty-one steel and twenty-four wooden steamers, in England five steel steamers, and in America fourteen wooden ships. Fourteen wooden ships were built in the United States, but were not satisfactory and were sold to American interests. Payment on five of them was defaulted by the buyers, and the Commonwealth had to take them. They are now running on the Australian coast. Contracts for twenty-two of the twenty-four wooden ships to have been built in Australia were canceled.

The steel cargo ship program was divided into two parts, the first consisting of six sister ships of a deadweight capacity of about 6000 tons, each 331 feet long by 48 feet beam, with single-screw engines and Babcock & Wilcox boilers, giving an indicated horsepower of 2200 and a loaded speed of 10½ knots. The last of these vessels was completed in 1920 and all are now in commission.

Progress of Second Series

The second part of the program consists of fifteen vessels, of which three were to be built at Williamstown, three at Walsh Island, one at Cockatoo Island, four at a private yard in Queensland, and four at a private yard in South Australia. Two of the Walsh Island boats have been launched. It is now intended to drop the other boat to have been built at Walsh Island, making the total number of Australian-built steamers twenty instead of twenty-one. One of the second set of vessels has been launched at Williamstown and one at Cockatoo Island, and work is progressing on eight more. The vessels of the second series already launched and nearing completion, and the others under construction are of the Isherwood shelter-deck type, 331 feet long by 48 feet beam, carrying 6000 tons deadweight on a 23.7-foot draft. Their engines, etc., will be the same type as those of the first series vessels.

The minister in charge of shipbuilding stated on March 19 that it was hoped that arrangements would soon be consummated by which the construction of two 12,000-ton steel steamers would be resumed at Cockatoo Island. These will be equipped for oil fuel and will have a loaded speed of 13 knots; they will be 530 feet long by 63 feet beam and with a loaded draft of 29.75 feet. In addition to the Commonwealth-built ships three 12,000-ton ships are building for the government at Vickers' in England, and two at Beardsmore's in England.

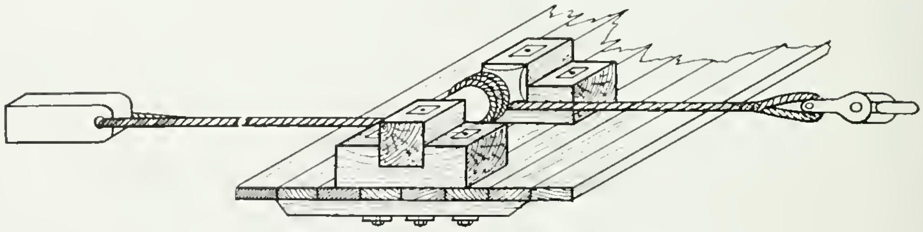


Diagram showing new snubbing device in use at the launching ways of the Union Construction Company, Oakland, California

New Snubbing Device

A NEW feature recently used at the launching of a ship is a snubbing device or brake, developed by J. G. Sjoberg, hull superintendent of the Union Construction Company, Oakland, and successfully applied at the company's last launching. The device, of which two are required, and which is clearly shown in the accompanying sketch, consists of a heavy line, one end of which is attached to the drag chains. The line is given three or four turns around a cylindrical wooden block or drum fastened to the building slip, and then stretched along the slip for 80 or 100 feet. The end of the line farthest from the drum is then attached to a drag heavy enough to obtain the necessary tension on the line and create the friction or braking effect on the drum.

When the ship leaves the launching ways, the drag chain moves with the ship and pulls on the line, which is wrapped around the drum and held to its work by the drag. The drag is attached by a small line which breaks when the drag has traveled the distance allowed and has come in contact with the stops attached to the drum, thus releasing the heavy line, which goes out with the ship.

To persons familiar with the handling of ships, it can readily be seen how great a braking power can be obtained by this method, because the friction brought into action by winding a line around a post or drum is limited only by the strength of the materials used and the tightness of the coils.

The ship to which the device was applied was heavier than similar ships at the time of launching, but she stopped in a shorter space, which demonstrated the success of the device herein described.

This device, in connection with the Sjoberg launching trigger, has enabled the Union Construction Company to be particularly successful with their launchings, and illustrates the policy of the company to make use of all new ideas suggested by men in the yard and proved to be practical in the saving of time, labor or material.

SHIPBUILDING AT BALBOA

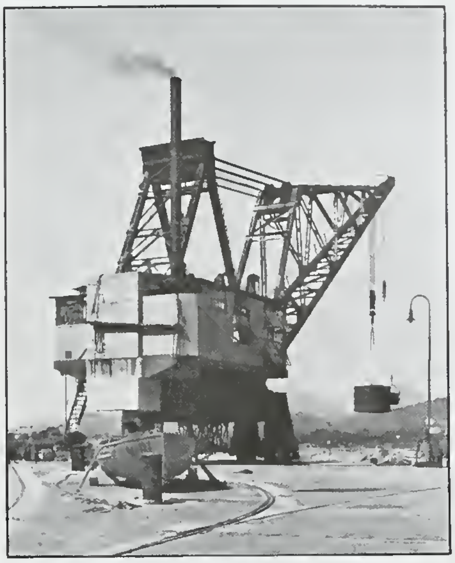
A Description of the Drydock and Shops of the Panama Canal

THE shops and drydock at Balboa at the Pacific entrance to the Panama Canal were designed as permanent adjuncts to take care of all repairs to the Canal plant, including floating equipment and the rolling stock of the Panama Railroad, to serve the United States Navy as a repair base for the fleet, and to handle current and emergency repairs for the thousands of merchant ships that pass through the Canal each year.

The Drydock

The drydock has the same dimensions as the Canal locks, and is of the same reinforced concrete construction. It is 1000 feet long, 110 feet wide, and the depth of water over the keel blocks is 45 feet. It can accommodate the largest ships afloat; and has been used for docking such vessels as the ex-German liner Von Steuben, the battleship New Mexico, and the Chilean dreadnought Almirante Latorre.

The pumping plant consists of four electrically driven main pumps (Worthington Volute) of 1000 horsepower with a capacity of 15,000 cubic feet per minute each, and two drainage pumps of 200 horsepower each. With three pumps, which is the normal method of operation, the dock can be pumped dry in 2 hours 15 minutes. To flood it requires approximately 30 minutes. The dock is closed with miter gates, which are electrically operated, instead of a caisson as used in most graving docks of similar type; and it is estimated that this feature cuts 40 minutes from the time required to dock a ship. There are 11 electric capstans, distributed along the sides and approach walls, that are used to work vessels into and out of the dock. A traveling crane moving on tracks encircling the dock has a capacity of 50 tons at a radius of 87 feet.


Traveling locomotive crane at Drydock No. 1, Balboa. Capacity 50 tons.

Shop Reservation

The shops cover an area of approximately 60 acres, adjoining the drydock on one side and on the other a steel and concrete repair wharf 60 feet wide and 2663 feet long, with a depth of water alongside of from 38 to 44 feet at mean sea level. At the end of the shop reservation there are 290 feet of additional wharfage. On the shore side the shops are connected by tracks with the main system of the Panama Railroad. There are forty-four permanent buildings of steel and concrete construction in the shop reservation. These include a general office building, a machine erecting and tool shop, forge shop, boiler and shipfitters' shop, steel storage shed, general storehouse, paint shop, car shop, planing mill, electrical and instrument repair shop, lumber and equipment shed, pattern storage building, foundry, coke shed, boiler house, roundhouse, gas house, paint house, sand house, compressor plant and pump wells, oil houses, restaurant and lavatories.

View of Balboa, Canal Zone, from the top of Ancon Hill, showing administration buildings, shops and docks

Shop Equipment

The plant is equipped with the most modern tools and appliances. These include a lathe with a 14-foot swing and 65 feet between centers, an extension open-side planer (96 inches by 132 inches by 24 feet), a 16-foot vertical boring mill, a 500-ton forging press, a 30-foot plate roll, and a 30-foot plate planer. The foundry can produce iron castings up to 20 tons, steel castings up to 5 tons, and bronze castings up to 2½ tons. The planing mill can provide material for any marine job involving the use of wood. In this department a great deal of native timber has been handled with excellent results. For many purposes it has been found cheaper than imported lumber and more durable. All of the shops are equipped with overhead traveling cranes of from 10 to 60 tons capacity. A sufficient stock of plates, angle irons and structural shapes commonly used in shipbuilding is carried to take care of any ordinary repair job without delays for material.

Electric power is used throughout, furnished by the hydro-electric plant at the Gatun spillway.

Working Force

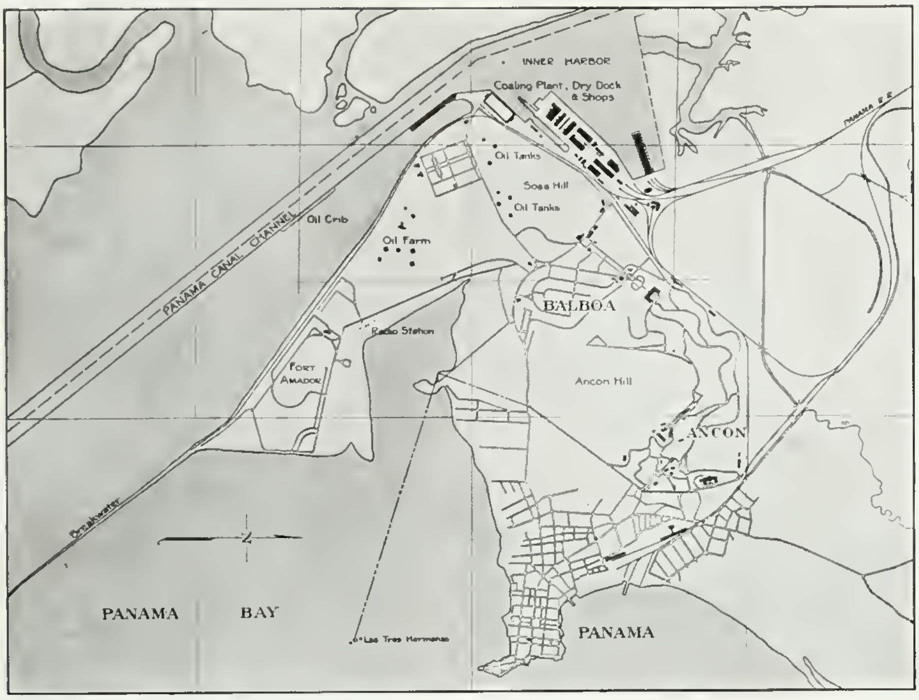
The force employed is normally about 2300 men, of whom 800 are skilled American mechanics and 1500 West Indians and other alien helpers and laborers with local training

Character of Business

During the fiscal year 1920, the last annual period for which complete figures are readily available, the value of work performed at the Balboa shops and at the smaller shops at Cristobal was $6,454,219, of which 59.87 per cent was marine work, 19.73 per cent railroad work, 12.17 per cent miscellaneous, and 8.23 manufacturing. Of the total work performed 35.09 per cent was for the Canal, 43.38 per cent for invividuals and companies, 17.16 per cent for the Panama Railroad, and 4.37 per cent for government departments. At the Balboa drydock 16 vessels were docked for the United States Army and Navy, 33 for the Panama Canal, and 34 for outside commercial interests. The total number of vessels other than tugs, barges and dredges on which work was done at Balboa was 422.

Rebuilding of S. S. Marne

The largest job recently handled



Sketch map of the Pacific Terminal of the Panama Canal showing the location of the coaling plant, drydock and shops at Balboa

at Balboa, and one which illustrates the capacity of the shops, was the rebuilding of the American steamship Marne, a freighter of 6869 gross and 4885 net tons belonging to the United States Shipping Board. On January 24, 1920, the Marne, while lying at a dock at Cristobal, took fire after an explosion in the hold. Her cargo included 160,000 cases of gasoline and benzine. The ship was towed away from the dock and sunk in shallow water by gun fire from a submarine. Fifty-four shots were fired from three-inch guns. Tne fire continued to burn, and was not finally extinguished until ten days later. The ship was subsequently raised, but before the cargo could be taken out a second explosion and fire occurred on March 6, 1920, and it was necessary to sink her again in 40 feet of water. The Marne was then raised a second time, and towed through the Canal to the Balboa shops, arriving there early in July. As a result of the two explosions, fire in the cargo and the damage by gunfire, the ship was a thorough wreck. As a preliminary to repairs it was completely stripped until only the bare hull remained. Later the deck and shell plates were removed over large sections, so far as could be done without danger of springing the ship. The main turbine and all auxiliary machinery were removed. Fortunately no holes were shot through the boilers, so that it was not necessary to take them out of the ship. Approximately 35 per cent of the shell plates were removed during the course of repairs, and about 10 per cent of those removed were renewed. The remainder were rolled out and replaced. The shelter deck, while badly warped, required the renewal of only four or five plates, the balance being successfully rolled. In some instances where plates were perforated by shell holes, and the plate itself, except for this damage, in good condition, the acetylene process of welding was used, blanks being welded through the holes after they had been trimmed off to an approximate circle. No especial difficulties were encountered that could not be easily handled by the facilities of the Balboa shops. The repairs were completed in seven months, and when the ship was returned to the Shipping Board, she was as strong and seaworthy as when first launched.

Other Notable Jobs

The Marne is the seventh large vessel to be rebuilt at the Balboa shops, the others having been the American steamship Cristobal of 9000 tons gross and five former German liners interned in Peru at the outbreak of the war.

Heavy repairs have also been made during the current fiscal year to the American steamship General H. F. Hodges, the Japanese steamship Koyo Maru, which grounded June 20, 1920, on Serrana Bank, 300 miles northwest of Colon; the British steamship Sussex, which ran on the breakwater at the Atlantic entrance to the Canal January 3, 1921, and the British steamship Tregantle, which was aground March 25, 1921, on Macabe Island off the coast of Peru.

Charges

The Panama Canal is not prepared to do repair work on a contract basis; but preliminary estimates can be furnished; and at the present time repairs are made at cost without any charge for the use of the permanent plant. The wages paid American skilled mechanics on the Isthmus are higher by 25 per cent than current wages in the same trades in the United States, but the wages of West Indians and other alien helpers and laborers are much lower. These differences tend to offset one another. Constant effort is made to reduce costs to a minimum and to maintain an organization capable of prompt, efficient and reasonable service to all vessels using the Canal or its terminal ports.

The charges for the use of the Balboa drydock by merchant ships are: for docking and undocking and the use of the dock for 24 hours, 25 cents, and for each subsequent lay day, 15 cents per gross ton, Panama Canal measurement. The docking rules are published in detail in the pamphlet entitled "Schedule of Rates for Supplies and Services Furnished to Shipping," which will be supplied gratis on application to the Panama Canal, Washington, D. C.

In addition to the facilities at Balboa, the Panama Canal maintains at the Atlantic entrance to the Canal a smaller drydock, 49.95 feet wide at the entrance, 300 feet long, and with a depth over the blocks at mean sea level of 13.39 feet, and shops less elaborately equipped than those at Balboa, but capable of handling all ordinary marine repair work, and doing a large annual business.

An interesting night view of the interior of the boiler shop at Balboa

MARINE INSURANCE

(CHARLES F. HOWELL, Eastern Contributing Editor)

A Campaign Needed

A shipping man discloses a somewhat unexpected condition. Considerable misunderstanding (and profanity) is being produced by general average in the intercoastal trade, says he, because of shippers' ignorance of customs of the sea. Evidently, many men, accustomed to transportation by rail and the practically complete liability of the carrier, ship by steamship, without stopping to inquire as to the degree of protection offered their goods in transit. Consequently, shipments often go forward uninsured. In the event of general average, the shipper finds himself facing an unexpected charge, and if reports are true, some Pacific Coast traffic managers have got into hot water quite recently when their principals inquired why such charges had to be paid.

Individuals and companies doing purely a domestic business may be pardoned, of course, for their ignorance of marine insurance. Up to the resumption of intercoastal trade last year, practically all business between the Atlantic and Pacific was overland. Unless a company had been engaged in coastwise or foreign trade, therefore, marine insurance had not been necessary. But steamship and marine insurance companies do bear a large responsibility for the continuance of such misunderstandings. Intercoastal freight solicitors would be helping themselves in the long run if they took pains to make clear the precise degree of the carrier's responsibility, because a man who pays an unexpected general average (which he might have protected by insurance) is scarcely a promising prospect for additional business. Underwriters, too, might make a studied effort to inform the public, beginning with fundamentals. Persons who are engaged in such highly specialized business as shipping and marine insurance do not appreciate how ignorant the public is of the simplest and most commonplace details. This ignorance, as was pointed out, is quite to be expected of men who have shipped altogether by rail and therefore have not faced the necessity of familiarizing themselves with ocean transportation. In the absence of the inclusion of marine insurance in quoted intercoastal rates, which, although it would offer a close parallel to railroad rates, nevertheless would be attended with considerable confusion, the only solution appears to be a comprehensive campaign for the dissemination of information. It would pay well in the end.

The Pacific Market

Marine insurance on the Pacific Coast is not at all in a satisfactory condition. The depression of shipping and the consequent tying-up of vessels and the falling-off in receipts of operators have reacted immediately upon underwriters, whose net premiums in many cases are very small compared to those of a year or two ago. One underwriter said that the company that was able to show a profit on the year's writing would have good cause to consider itself fortunate.

The situation is made more grave by some heavy losses. The sinking of the Governor was a hard blow, although most of the hull had been placed in New York and London. On top of that loss came the burning of the Japanese steamship Tokuyo Maru of the T. K. K. Her hull was placed in Japan, of course, but the cargo alone cost American underwriters close to $700,000, the one item of nitrate being a quarter of a million. Besides these larger losses, the intercoastal trade, in which most of today's cargo is moving, has been subject to a number of mishaps.

But underwriters can pay losses if they receive sufficient premiums. If they do not receive premiums their situation is likely to be bad. And premiums are not being paid as they should be, although a surprising number of vessels are being covered against total loss only and the valuations of many have been reduced considerably, a number of schooners having dropped from $175,000 and $200,000 to $100,000 and $110,000. When an operator is hard pressed for cash he is inclined to proffer a note for premiums. These notes have been accepted by underwriters, but they now are experiencing great difficulty in making collections. In fact, practically all policies being issued on the Pacific contain clauses providing for cancellation in the event of non-payment of premiums.

These reduced valuations, mentioned above, may be no more than the replacement cost of a vessel would be today and they probably exceed market prices; but it can be seen readily that any considerable loss of vessels thus reduced would be disastrous to the operating companies that have had no opportunity to write off any large portion of the capital charges. Total loss only also is playing with fire. But when the operator cannot get freight, even at ruinous rates, he must reduce expenses even though the reduction be dangerous.

The views presented above are substantially those of one underwriter. It should be said, however, that not all see the situation so unfavorably. Another expressed surprise at the number of reported failures of operators to meet their notes, and as for cancellations, he said that his company had had a sixty-day clause for years. It is a fact, however, that the San Francisco market recently has added the following: "In event of non-payment of premium sixty days after attachment, this policy may be cancelled by the assurers upon five days' written notice being given the assured." This clause is identical with that of the syndicate policies except for the substitution of "sixty" days for "thirty," the time allowed by the syndicate. The latter has been endeavoring to enforce the thirty-day provision rigidly, but even it has failed in some instances.

Some underwriters believe that they detect a slight improvement in the cargo market. Japan is improving, but the improvement is not nearly so marked as was hoped a year ago. Moreover, there is too much direct trade between the Atlantic and Far East for the Pacific Coast to benefit greatly from Oriental business.

Low Ebb in Japan

Much the same story of a low ebb comes from Japan. Says the Japan Advertiser of Tokyo:

"In spite of the fact that risks for ships built during the war are greater than those built before the war, the premiums for the former are lower. Formerly 4 per cent was quoted for European or American service, and 3 per cent for near-service, but at present the respective rates are only about 2 per cent and 1.5 per cent. During the war the cargo rate was 50 sen per yen 100 for the European or the American run, and 35 sen for the near-sea run, but the present quotations are

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

35 sen and 25 sen respectively. Thus the incomes of marine insurance companies are doubly decreasing, owing to the shrinkage in the volume of business and the fall in premiums."

The underwriter, who, unlike the steamship operator, is primarily interested in values, will find a birdseye view of the last year in the following table of exports of the United States to grand divisions:

	Month of April		Ten months ending April	
	1921	1920	1921	1920
Europe	174,645,581	364,094,160	3,053,315,328	4,184,087,642
North America	94,307,233	152,652,752	1,464,326,037	1,274,581,215
South America	20,717,814	47,026,874	487,919,783	386,418,623
Asia	29,858,079	87,193,509	479,338,755	651,405,964
Oceania	14,610,311	19,640,515	239,066,179	145,011,197
Africa	5,775,969	13,711,582	125,353,954	92,584,042
Total	339,914,987	684,319,392	5,849,320,036	6,734,088,683

Coverage of Rejected Shipments

In these days of falling markets and enforced foreign economy, it is as well for the shipper to know where he stands as regards the insurance on rejected consignments. To this end he could not do better than attend the observations of so approved an expert on the subject as William D. Winter, third vice-president of the Atlantic Mutual Insurance Company, who had some interesting things to say about it when he addressed the National Foreign Trade Convention at Cleveland recently.

Repudiation of contract has introduced a new moral hazard into the insurance of cargoes. The underwriter may accept or reject the application of a merchant for insurance, but having accepted he must rely upon the merchant to control the secondary moral hazard by exercising reasonable care in the selection of those to whom he ships goods. An insurable interest is necessary to the validity of an insurance contract. When goods are shipped on c. i. f. terms the shippers have an insurable interest, Mr. Winter points out, in that they are responsible by the terms of the contract for the procurement of insurance; but they have no such interest when the terms are cost and freight, as they have divested themselves of title and are in no way responsible for the insurance. Furthermore, the consignees, intending to repudiate the contract, may not have insured the shipment; the goods may still be in transit at the time the contract is repudiated without any insurance, or without insurance that is available to the shippers because they have no insurable interest in the shipment. Says Mr. Winter:

"When shipments are rejected an interruption of transit usually ensues, but this being caused by the act of the consignee will probably result in the abrogation of the insurance contract before the goods are safely warehoused. Underwriters on c. i. f. shipments hesitate to extend the insurance owing to the fact that with rejection the invoice value of the shipment disappears and the value becomes the market value of the goods at destination. If damaged, there is a tendency on the part of the shipper to endeavor to abandon the goods to the underwriter; or if this tendency does not materialize, a sale at auction to determine damage naturally results to the disadvantage of the underwriter in a depreciated and glutted market."

However, for an additional premium, the insurance may be extended by special agreement, with merchants of high standing, on c. i. f. shipments where they have had the original risk, until disposition of the goods can be made. But on cost and freight shipments the situation is very different. "Merchants should definitely understand," says Mr. Winter, "that they cannot protect themselves against the consequence of rejection of shipment in a marine insurance policy. The risk is purely a commercial risk incidental to the selling of goods. The problem is one to be solved jointly by the merchant and the banker. More caution in the selling of goods and greater care in credit investigation would do much to lessen this evil."

Livestock Coverage

Just at present there is an active movement of livestock to Europe, entailing new problems to both shipper and underwriter. Rates are higher than before the war, because many of the vessels are new in the trade and their crews are inexperienced. Under old conditions, half a dozen years ago, the underwriters could show a satisfactory result in this line of trade. At the port of loading the United States Bureau of Animal Industry makes an inspection, and unless there is an absence of disease or exposure to contagion live stock will be prohibited from export. Practically all export cattle are insured against mortality from any cause, because underwriters insuring them subject to average are liable for death occasioned by an insured peril—as when an animal is killed from being tossed about in heavy weather, or burned to death—

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING

F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

but there is no liability for mortality from seasickness, exposure or other natural causes. The two chief clauses covering mortality of animals are the so-called "walking ashore" clause and the "landed alive" clause. The former holds the underwriter for all animals unable to walk ashore at destination; the latter makes him liable if the animals are landed alive, no matter whether they can walk or not. Under the changes made a few years ago in the health laws of Great Britain, it is forbidden to land the carcass of an animal which died or was killed on the voyage; and this materially alters the outlook for the underwriter, as formerly he could sell the carcass for practically the full value of the animal. Consequently the underwriter is compelled nowadays to study the hardiness of the animal, granting a lower rate for steers and mules, for example, than for horses, and charging top prices for lambs and calves.

Simpler Marine Contract Wanted

Considerable discussion has followed the plea made at a recent dinner of the Insurance Society of New York for less haggling over marine claims and for a more modern and simpler contract. The speaker, who is a prominent broker, insisted that "underwriters are raising technical pleas to avoid or reduce payments as never before." This the underwriters vehemently deny, except as such a charge may be, in instances, applied to the newer and less experienced offices. The old-timers are going their reputable ways as they have always done. But more can be said for the suggestion that the present marine policy is archaic in language and the stipulations based upon the experience of other nations through many centuries. I believe, with the speaker, that the time is near when an American initiative would be acceptable toward a simpler form with a statement of conditions as direct as that of the standard fire policy, to be adopted in agreement with all trading nations. The objection would, of course, be instantly forthcoming from the older nations that no new contract could hope to possess the certainty now enjoyed by the time-honored policy because of the innumerable court interpretations given the latter. But the banks and the shippers have a perfect right to ask for something less antediluvian in expression, and consequently more intelligible, than the amazing collection of antiquities that at present composes the marine policy. At the very least, there should be standard clauses with uniform interpretation — not a particularly difficult goal to achieve, but one far removed from what now prevails.

Recent Syndicate Appointments

J. A. Wilson, attached to the staff of Syndicate A as surveyor since its organization last fall, has been made a deputy surveyor, and in this capacity will be executive assistant to the chief surveyor in the general direction and supervision of the now extensive surveying business of the syndicate. Mr. Wilson was formerly chief engineer in the North Atlantic passenger trade, and thereafter was, for a number of years, traveling engineer in the service of Babcock & Wilcox. Just prior to joining the syndicate he was general superintendent of installation of machinery and boilers at the Hog Island plant, where his success was demonstrated in the splendid performance records of the machinery installation of the vessels built there. His expert knowledge of turbines and boilers, combined with Chief Surveyor Foley's long and recognized experience in the field of ships' repairs, gives an unusually strong executive combination to handle the exacting and difficult work of supervising damage repairs throughout the country.

The syndicate has followed out its policy of placing its representation abroad in the hands of Americans, where it is consistently possible so to do, by appointing as its agent in the Argentine the firm of F. B. O'Grady & Company, at Buenos Aires, with jurisdiction over all ports of the Argentine with the exception of Punta Arenas. The firm is favorably known in the shipping trade of the Plate. The senior partner was for several years vice-consul at Buenos Aires, and is in consequence in close touch with the American as well as with the European and Argentine commercial community. Thus, in connection with the services of the American Bureau's exclusive surveyor, David Currier, Jr., American ships in distress or in need of repairs on the River Plate will be afforded the protection of a purely American service, which must redound to the benefit of the American shipping trade.

Syndicate A also announces the appointment of William R. Porter as its sub-agent at Key West, that important turning point in the Gulf, so vital in hurricane seasons.

Greek Losses

London underwriters have been urging the Greek government to investigate the circumstances surrounding the extraordinary number of marine losses in connection with the foundering or sinking of commercial vessels of that nation since the termination of the war. Negligible foreign trade is suspected to have inspired the destruction of Greek shipping for the insurance money, and criminal proceedings are said to have been instituted in several instances. Within the brief period of five or six weeks more than £3,000,000 in claims was presented to Lloyd's. In order properly to protect American goods shipped to Greece, it is urged that each bill of lading sent to that country be accompanied by full instructions and authority with respect to steps to be taken in case the merchandise is not withdrawn by the consignees within the forty-five-day period allowed by the Greek customs. Of late many shipments are said to have been left unguarded and unclaimed on the wharves, and are subject to being sold at auction without prior notice to the consignees unless the merchandise is removed within the above-mentioned time.

New British Hull Clause

Under the dual valuation system employed by British hull underwriters, the total loss value and premiums are considerably less than the average loss value and premiums, and therefore the following clause has been prepared by the Institute of London Underwriters to govern procedure in constructive total loss claims:

"Insured value for average purposes, £.................

"Insured value for total loss purposes, £.................

"In ascertaining whether the vessel is a constructive total loss, £................ shall be taken as the repaired value and nothing in respect of the damaged or break up value of the vessel or wreck shall be taken into account.

"In case of claim for total or constructive total loss, £................ shall be taken to be the insured value and payment by the underwriters of their proportions of that amount shall be for all purposes payment of a total loss.

"Should the steamer by reason of insured perils become a constructive total loss within the meaning of the above clause and should she not be repaired or should she be sold unrepaired, then the owners shall be deemed to have tendered and the underwriters to have accepted abandonment.

"Insurances allowed under the 15 per cent disbursements clause to be calculated on the amount recoverable for total loss."

Still the Theft Problem

Our readers, from time to time, come across accounts in this department of attempts to solve the serious problem of constant heavy losses from theft and pilferage, and in our last issue we announced what gave every promise of a successful termination of the determined struggle. But once more there is only failure to record. Competition in the American marine insurance market appears to be too keen to admit of underwriters getting together. Recently London devised and unanimously adopted new clauses that have every prospect of meeting the situation. These were cabled to New York with the hope that something similar might be taken up on this side. The American Institute unanimously adopted them, but when they were sent out to the individual companies for ratification it was soon learned that two or three of the leading offices declined to fall in line; with the result that the clauses have fallen to the ground, as unanimous adoption is imperative. The sole remaining hope lies with the committee of New York Underwriters that has been carrying on a co-operative effort with various allied commercial bodies. These latter have endorsed the initial plan of procedure, but there still remains the always-present fear that selfish competitive interests will once more defeat the efforts of the committee. It is an ugly fact, no matter how unpleasant to contemplate, that we cannot do, in this particular matter, what our British competitors find comparatively easy.

Shippers on Pilferage

At last, in this continuous performance of advice to shippers by underwriters on the subject of theft and pilferage, the merchant has taken his day in court and comes forward with a few timely suggestions of his own. The representative committee of the Council of the Chamber of Shipping of London has issued a report as to the best methods to employ in preventing losses from these sources while goods are in transit. The two points most particularly stressed are the need for careful checking of cargo at the various stages through which it passes and the adequate guarding of port precincts so as to reduce the chances of stolen property being removed. The report shows, further, that certain steamship companies have a consistently lower pilferage rate than others because of more efficient tallying and watching arrangements. It also urges the importance of carefully checking goods when they are being discharged into lighters, on to open quays, and on to the quays of dock and warehouse authorities. It recommends efficient control and supervision by ship's officers in all cases where holds are open; stricter scrutiny of persons and conveyances entering and leaving dock areas; and a more exacting system of "goods passes" for merchandise that is being removed from the docks.

Oil Tank Hazards

Last month we gave an account of the movement that is getting under way to combat the grave hazards to life and property involved in inadequate methods employed to detect and dissipate the perilous gases and vapors remaining in recently emptied fuel oil tanks. It is interesting to see that the agitation is gaining ground and that authoritative sources are behind an effort to introduce and enforce adequate regulations and rules. The marine fire hazards committee of the National Fire Protection Association has, through a sub-committee, gone thoroughly into the subject, and will submit a report that will embody the latest scientific conclusions. The methods employed by the United States Navy have been investigated, for instance. The Navy uses both steam and air, boiling out the tanks by a high-pressure pumping process for a period of twelve hours, followed by two more hours of pumping in event of vapors being discovered still adhering to intricate parts. This is followed by a chemical analysis of the air. Something of this nature will be recommended by the sub-committee, with the preference given to steam as the medium.

In the United Kingdom

The Atlantic Coast Shipbuilders' Association bulletin thus summarizes marine insurance in England:

The prosperous conditions of the marine insurance market naturally have not continued, the business offering being insufficient to go round and assure profits. Various companies' reports clearly indicate the big change that has come about and they show how seriously conditions have deteriorated from the underwriting point of view. Two good examples are those of the London Assurance and the International Marine Insurance Company. In the case of the first-mentioned concern, marine premiums for 1919 were given as £860,500, and the sum of £331,500 was carried to profit and loss. Last year the premiums were £359,300 higher, but the amount carried to profit and loss dwindled down to £47,800. The report for the first financial year of the International Marine Insurance Company (issued a year ago) stated that "in view of the impossibility of estimating the profits which have accrued at the close of the first year's underwriting" no dividend would be declared. The present report says that there was a loss on the first year, but it is not possible to say what the total loss is until the end of the current financial year. According to the first account, net premiums for 1919 were £267,500, but further premiums relating to 1919 and received last year increased this sum by £80,000 and at the end of last year the underwriting account showed a loss of £8600. In 1920 premiums amounted to £642,900, of which the first year's settlements represented 36.05 per cent.

Marine Insurance Bill

Following conferences in New York between representatives of the Shipping Board, steamship owners and underwriters, a new form of model marine insurance bill has been drafted and introduced in the House by Representative Edmonds of Pennsylvania. It bears the number H. R. 6775. Sections 20 and 21 of the old bill, which permitted companies to combine in making rates and the adoption of uniform policies, have been eliminated. The tax of 2½ per cent on the gross premium of insurance placed with foreign nonadmitted companies has been stricken from Section 26.

In discussing the first draft before the Senate Committee on Commerce, Mr. Edmonds said that the object of the bill was to show the position of Congress on the subject in the hope that the legislatures of the various states will adopt similar legislation. Meanwhile it would be the law on marine insurance for the District of Columbia.

When the combination feature of the bill was under discussion, Senator Edge of New Jersey announced that he is unalterably opposed to any legislation which would tend to restrict competition. Chairman Jones said that in ordinary circumstances he was opposed to such legislation, but it was possible Congress might be confronted with such a situation as would make it advisable to enact such a measure.

In speaking of the marine insurance syndicates, Congressman Edmonds said that before these syndicates were formed foreign marine insurance companies cut rates to a low figure and after the American companies had been forced to retire from the business put the rates at a very high figure. Something must be done, he said, to overcome these conditions, and for this reason the insurance syndicates should not be handicapped. Senator Jones said that even if the proposed measure were enacted into law the companies could not combine in any of the states where anti-trust laws exist. He believed that a test case should be instituted at once.

During Mr. Edmonds' remarks Ira Campbell, representing the American Steamship Owners' Association, asked whether he was in favor of the elimination of competition in the marine insurance business. "I think," replied Mr. Edmonds, "the insurance companies have just as much right to co-operate as the steamship companies have through conferences. And further than that, the insurance companies could give to the steamship companies cheaper insurance because of such co-operation."

Mr. Edmonds said he believed the formation of such combinations or syndicates would be of greater advantage to American shipping than can be realized at this time. There is no chance, he said, of insurance companies combining for the transaction of a cargo insurance business.

Mr. Edmonds was asked if he had any objection to striking from the bill the provision regarding the fixing of uniform rates. He replied that he had no objection to striking that out, but that other features of the combination section should remain, such as the fixing of a uniform policy by the companies.

Japanese Load Line Law

The following is the text of the Japanese load line law for ships, which was passed on March 8, and will be applicable to Japanese ships and ships of other nations at a date to be fixed by order later:

Art. 1. Al Japanese vessels shall have their load line assigned and marked under this law, except the following:

1. Vessels mentioned in all the paragraphs of article 1 of the ship inspection law.
2. Vessels employed solely within the small coasting limit or the smooth-water limit.
3. Sailing vessels under 100 tons gross and employed solely within the large coasting limit.
4. Vessels employed solely in fishing, towing, salvage, dredging, or hydrographic purposes, and those especially exempted by the competent minister of state.

Art. 2. Except in cases specially provided for by the competent minister of state, a vessel shall have her load line assigned and marked when she is proceeding to sea for the first time as a vessel required to have the load line under this law. A vessel, which is to be built in the place where this law is in force, may have her load line assigned during construction.

Art. 3. Except in cases specially provided for by the competent minister of state, the load line shall be assigned by the local marine authorities having jurisdiction over the place where she is.

Art. 4. When a vessel has had her load line assigned and marked a load-line certificate shall be issued to that effect.

Art. 5. Except in cases specially provided for by the competent minister of state, a vessel for which the load line has been marked under this law shall not proceed to sea with a draft submerging that load line.

Art. 6. The load-line mark shall not be concealed, altered, or obliterated except for the purposes of escaping capture by an enemy or other reasonable causes.

Art. 7. An official inspector is empowered to enter a vessel at any time for inspection or to detain her from proceeding to sea if he has reason to believe that she is violating this law.

Art. 8. The necessary rules for assigning and marking the load line, and the fees to be charged, shall be regulated by the competent minister of state.

Art. 9. A load-line certificate issued in accordance with this law and with rules under this law by a corporation or association for the survey and registry of shipping approved by the competent minister of state, together with the corresponding load-line mark, shall be recognized as equivalent to that issued and marked respectively under this law.

Art. 10. This law shall be applicable to vessels other than Japanese vessels, being in the port within the jurisdiction of this law.

Art. 11. When the load-line law and rules of a country to which the vessel in question in the preceding article belongs are considered appropriate by the competent minister of state, the load-line certificate issued under that law and rules, and the corresponding load-line mark, shall be recognized as equivalent to that issued and marked respectively under this law.

The provisions of the preceding paragraph shall not apply to vessels belonging to a foreign country which does not recognize the validity of the load-line certificate issued under this law and the corresponding load-line mark.

Art. 12. Except in cases specially provided for by the competent minister of state, if a vessel is employed at sea without a load-line certificate, or proceeds or attempts to proceed to sea with the load-line mark submerged, the master of the vessel or a person acting for him shall be liable to a fine of not less than 100 yen but not exceeding 2000 yen.

Any person who contrary to the provision of article 6 conceals, alters, or obliterates the load-line mark shall be liable to the fine prescribed in the preceding paragraph.

Art. 13. Any person who has obtained a load-line certificate by fraudulent or improper means shall be liable to imprisonment for a period not exceeding one year or to a fine not exceeding 1000 yen.

The provisions of the preceding paragraph shall also apply to a person who has violated the provisions contained therein outside the bounds of the empire.

Art. 14. Any person who resists or impedes the inspection of the official inspector or violates the order detaining the vessel shall be liable to a fine not exceeding 1000 yen.

Suplementary Rules

Art. 15. The date of enforcement of this law shall be fixed by the Imperial ordinance.

Art. 16. Japanese vessels holding, at the time of the enforcement of this law, a load-line certificate issed by a corporation or association for the survey and registry of shipping approved by the competent minister of state and having the corresponding load-line mark shall be recognized as having the load-line certificate under this law and the mark corresponding thereto.

The provision of the preceding paragraph shall be applicable to any vessel other than a Japanese vessel which may be in a port within the jurisdiction of this law at the time of enforcement of this law, so long as she remains in that port.

Art. 17. For Japanese vessels not coming within the provisions of the first paragraph of the preceding article this law shall not be applied until the load line is assigned in accordance with the regulations provided for by the competent minister of state.

Japanese Classifications

The Imperial Japanese Marine Corporation up to the end of April had classed five vessels of 12,293 tons gross, four of which belonged to the Yamashita Kisen Kaisha and one to the N. Y. K. At the same time the society or the British Corporation, with which it works, expected to class five new vessels; and five others, formerly classed by Lloyd's, had been transferred. These last were: Kleist, ex-German, N. Y. K.; Chosen Maru, O. S. K.; Myogisan Maru, Mitsui; Kunishiri Maru, Department of Communications; and Taiyo Maru, ex-German, T. K. K.

Kakichi Uchida, chairman of the Japanese committee of Lloyd's Register, said: "We hope to carry on operations in peaceful relations with the British Corporation. That Lloyd's has entrusted its powers in this country to the Japanese is a great event auguring well for further promotion of friendship and commerce between Japan and Great Britain. Lloyd's Register has classified and surveyed 58 per cent of the vessels built in this country and the British Corporation cannot be compared with it."

The Motorship Kennecott

The Alaska Steamship Company's motorship Kennecott, now operated by the Williams Line in its intercoastal service, has come and gone and left a decidedly good impression with underwriters. When her hull insurance was placed recently she received an unusually good rate, which "was practically equivalent," it was stated, "to that of the best steamer." This was the first motorship hull insured on the Pacific Coast, inasmuch as the Standard Oil Company's Charlie Watson had been placed with the rest of the fleet.

Good steamer rates also are being extended to Kennecott cargo. Time was when motorships took an appreciably higher rate than steamships, as was the case with the Siam, the first motorship to appear on the West Coast. Her relatively unknown machinery was looked at askance as making her liable to average claims, and a higher rate was asked. But conditions have changed radically. The Kennecott especially is regarded as being an excellent vessel, on which the Todd yard at Tacoma did its best work, and it is well known, of course, that McIntosh & Seymour extended themselves on her engines.

S. A. Livingston has been appointed underwriter of the Aetna Insurance Company's marine office, San Francisco, under J. A. Mathews, Pacific marine general agent. In 1907 Mr. Livingston entered the office of his father, John Livingston, marine underwriter of San Francisco. In 1913 he went to the Phoenix of London, and in 1918 to the marine department of Balfour, Guthrie & Company. He is a brother of the late E. S. Livingston, former marine general agent of the Aetna in San Francisco.

Edm. L. Woods, secretary of the Board of Marine Underwriters, San Francisco, will sail for England in July for a stay of two months or more. This will be Mr. Woods' first visit to his native country in thirty-seven years.

Captain H. H. Marden, Puget Sound pilot who was in charge of the steamship Governor when she was rammed by the West Hartland and sunk April 1, has been punished by suspension of his license for one year. He was charged with inattention to duty.

West Hartland Libel

The Pacific Steamship Company, through its attorneys, Grosscup & Morrow, has filed a libel against the steamship West Hartland, which sank the steamship Governor April 1, and against the Shipping Board, owner of the West Hartland. Damages are asked of $2,250,000, value of the Governor; $100,000, value of baggage and personal effects of passengers; and $150,000, value of the Governor's cargo. The West Hartland is charged with full blame for the disaster and her officers are charged with negligence.

At present prices the West Hartland would satisfy only a small portion of these claims.

Westinghouse Report

The gross earnings of the Westinghouse Electric and Manufacturing Company from sales billed for the year ending March 31, 1921, were, as shown by the company's annual report, $150,980,000, which is an increase of $15,000,000 over the gross earnings of the previous year. The manufacturing and selling cost was $138,774,000; and the net income available for dividends was $12,618,000, or 16.8 per cent on the company's capital stock. Dividends at the rate of 8 per cent were paid during the year on both the preferred and common shares of stock.

During the year the position of the company in the radio electrical field was greatly strengthened by the acquisition of exclusive rights under the patents owned by the International Radio Telegraph Company. These rights, together with others already owned, place the Westinghouse Company in a favorable position to develop and manufacture apparatus in a field that presents great future possibilities.

FULL SPEED AHEAD

Steamship Operations

Three Conferences Formed

Developments of June widened the break between the California and Washington lines of the Pacific Westbound Conference. The Seattle meeting, held early in the month, accomplished nothing whatever toward bringing the two districts together, for the California companies stood pat, and the Washington lines, to put it mildly, were rather belligerent. Neither attitude, of course, conduced to a restoration of the Pacific Westbound. Under the name of the California Pacific Westbound Conference the southern operators now make their own local rates, of which they advise the North, and both districts remain subject to the New York committee, so far as transcontinental rates are concerned. Portland also organized a separate conference, which survived despite vigorous opposition of Seattle and despite the withdrawal of the Admiral Line. Apparently, however, the conference succeeded in enlisting the Admiral again, and this having been accomplished, announced its intention of maintaining an organization, although at one time the T. K. K. and Columbia-Pacific, the other members, had been inclined to turn a favorable ear to proposals for amalgamation with Seattle.

New York a Sore Spot

This present settlement may not endure long. Trouble may brew at any time in New York. One of the immediate occasions of the split on the Pacific Coast was the dominating position of Seattle, which had more trans-Pacific lines and consequently more votes than San Francisco. The same condition still obtains in New York. If the California lines objected to dictation by Seattle in the making of Pacific Coast rates, they naturally would find fault with the same dictation in overland trade. In fact, they have adopted the policy of insisting upon some equalization of strength on the Atlantic; failing this, they may jump over the traces altogether, leaving the trans-Pacific situation "split wide open."

Pending the formal organization of a conference in Seattle, the old committee of the Pacific Westbound Conference agreed to advise the new California organization of rate changes, San Francisco to do likewise for Seattle. This understanding, combined with the adherence of both groups to the New York committee, practically gave the California lines what they had demanded of the Northern; and the situation would not be at all bad, were not the same and other elements of trouble present. Among the latter may be cited the organization of the conference at Portland and the threat of Vancouver to break off from the Seattle committee. In such conditions are to be found the seeds of rate-wars, even though the event would find city aligned against city instead of a few outside lines against a conference.

Bonds to Be Posted

In order to strengthen its control over individual members, the new Seattle committee decided to provide a sixty-day withdrawal clause and the posting of a bond of $5000, to be forfeited in case of rate-cutting. Such a proposal had been made to the California lines before, and they had rejected it because the Java-Pacific positively refused to listen. Seattle apparently places much reliance in the plan and has received the sanction of the Shipping Board for posting bonds and for a sixty-day notice of withdrawal.

At the meeting held in Seattle June 2, M. J. Mayfield, agent of the old Pacific Westbound Conference, represented the San Francisco operators. Mr. Chapin of the T. K. K. office, San Francisco, also was present. Mr. Mayfield explained to the northern lines that California had organized a separate body composed of the Pacific Mail, Java-Pacific, T. K. K. and Struthers & Dixon, but that it was quite willing to work with Seattle to exchange local rates and to consider suggestions. Announcement also was made of the organization of a conference in Portland, the members being T. K. K., Columbia-Pacific and Admiral. The last withdrew immediately, however.

Possible Sources of Trouble

What would happen in the event that a northern line, the O. S. K., for example, should enter San Francisco for cargo, or a southern line, such as the Java-Pacific, should enter Seattle, was discussed at length, and the fact was developed that trouble might occur over the rate to be charged. Portland representatives also explained their situation, saying that their position between the North and the South required independence of action so long as there were two conferences. Some cargo peculiar to Portland, such as phosphate rock and Utah coal, was cited as being a proper subject for the control of that city alone. In this discussion it was brought out that Portland also feared the majority power of Seattle, the old lumber rate of $10 being cited as unnecessary and as needlessly sacrificing $2.50.

After more discussion of different phases of the problem, the northern lines bluntly threatened to ignore San Francisco conference rates and to send vessels into that port to get business, regardless of the established tariffs. Despite this threat, however, and the manifest ill-feeling being generated between the two sections, the North finally agreed to advise the South of rate changes, provided that the South would reciprocate.

The T. K. K. and Columbia-Pacific expressed their willingness to join the Seattle conference, if certain difficulties were removed, and, pending negotiations, to abide by Seattle rates unless pressing competition forced a violation. As was stated above, however, Portland now appears to be determined to go its own way.

Seattle Membership

Members of the Seattle Conference will be: Nippon Yusen Kaisha, Osaka Shosen Kaisha, Canadian Pacific Ocean Services, Frank Waterhouse & Company, James Griffiths & Sons, Canadian Government Merchant Marine, Blue Funnel, Struthers & Dixon and the Admiral Line.

Some lines, it will be noted, are members of two conferences, Struthers & Dixon, for example, being in both the Seattle and San Francisco organizations.

A Free-for-All

Difficulties are arising to vex the intercoastal and trans-Pacific steamship lines in the application of their agreements for the transportation of freight between the Atlantic Coast and the Far East at all-water rates. A few months ago, it will be recalled, the companies made arrangements for transshipping cargo at ports of the Pacific Coast, transfer charges to be absorbed and the net proceeds to be divided equally between the intercoastal and trans-Pacific lines. So long as through rates remained sufficiently high the plan promised a fair volume of business, especially of imports, which had the choice of two markets instead of only one.

A Wallop from Singapore

But both foreign and American direct lines polished up their clubs and hit whatever heads they saw. The first resounding whack came from the direction of Singapore. The Straits-Atlantic companies, discovering that the intercoastal lines had fixed a minimum rate of $16 a ton, immediately reduced their general merchandise quotation to $15. Perhaps that result was not unexpected. To the trans-Pacific operator it was the logical sequence of the publication of a minimum; but the intercoastal operator retorts that he could not give the Oriental agencies a free hand to meet any rate that might be quoted by direct steamships, that he was compelled, in brief, to call a halt somewhere. Whether the direct rates from other Oriental ports to the Atlantic likewise were reduced is not definite, but so little cargo is moving that no one worries much. Quite a good bit of business did develop during the first few weeks of the agreement, although this now appears to have been largely wool that was being rushed to the United States to anticipate emergency tariff legislation, and naturally discharge at a Pacific Coast port was preferred, inasmuch as slower delivery at the Atlantic might defeat the scheme.

Not a Private Brawl

The Barber Line, guessing rightly that the brawl was not private, decided to take a hand. This company operates the only direct North Atlantic - Panama - Oriental service with Shipping Board vessels. It protested to the board against the absorption of transfer charges at Pacific Coast ports, and the board, through the traffic division, requested the North Atlantic-Pacific Coast Westbound Conference to do away with the absorption. The conference obliged.

Step Lively, Please!

But the Pacific Coast-North Atlantic Eastbound Conference was composed of different spirits. They would as soon fight the Shipping Board as anyone else. Stripped of diplomatic persiflage, their reply was exceedingly short, not to say curt. Thereupon the traffic department intimated that it might solve the question by permitting the Barber Line to engage in the intercoastal trade, incidental to its Atlantic-Orient service. This gave the conference something to think about, because the Barber Line might find the intercoastal trade to its liking and decide to remain. After quite a bit of discussion, the members of the conference abrogated their individual agreements; but inasmuch as some lines that used common piers might transfer freight without any added expense, the system probably has not been completely destroyed.

In its communication to the conferences, the Shipping Board held that the absorption of dock transfer and incidental charges at Pacific Coast ports operated to the detriment of the direct Oriental-Atlantic lines. In this view the Pacific Coast-North Atlantic conference did not acquiesce. It said, on the other hand, that the intercoastal lines were making no concessions, but were merely meeting the direct rates. Even so, the joint service could not be so desirable as the direct; therefore, meeting the direct tariff did not place the two services on a parity. And besides, the arrangement was not designed to attract shipments but was to meet existing competition of the transcontinental railroads and of intercoastal-trans-Pacific lines using the same docks, as, for example, the different lines of the Pacific Mail, which ply to the Atlantic and Far East, Williams and Struthers & Dixon; Pacific Steamship and Nawsco. Freight could be discharged from a Nawsco steamship and picked up by an Admiral vessel, for example, without the incurring of any transfer cost beyond that of discharging and loading, one of which is bound to be incurred in any event. A final argument, neatly formulated and presented, was that the predominating service between the Orient and North Atlantic was foreign, and therefore, that any arrangement meeting rail and trans-Pacific competition, the direct rate not being cut, was to the ultimate advantage of the American merchant marine.

Regarding the Barber Line being permitted to engage in the intercoastal trade, the conference replied that the berth had too much tonnage and that practically all vessels were operating with less than capacity cargoes. Furthermore, the board had stated in a formal resolution that it would not allot more government tonnage to the intercoastal trade. This was done when it refused, at the instance of private operators, to withdraw vessels from the Nawsco Line. Relying upon these promises, said the conference, private operators had been building up their lines.

In this interchange of notes, the operators appear to have had the advantage of logic. But they realized that logic availed little against a big stick, and decided, as stated, to play with the board, trusting to some dark night for revenge. When the private operators of the United States finally march on Washington they will make that little burning by the British a hundred years ago resemble a Sunday school picnic.

Panama Canal Tonnage

The conference was quite correct in stating that the predominating service between the Orient and the Atlantic was foreign. During April, for example, 80,674 long tons of cargo moved through the Panama Canal from the East Coast to Asia; British vessels carried 32,414, American 26,758 and Japanese 21,502. Most of that good business would have been shipped overland to Pacific Coast ports if there were no canal. In the other direction, however, only 11,303 tons moved, of which Japanese vessels had 9103 and American 2200.

American vessels make a much poorer showing in the Atlantic-Australasian trade. The westbound cargo of April was 65,621 tons, British vessels carrying 53,200, American 6500 and Japanese 5921. In the contrary direction the single cargo was 5420 tons, which was carried by an American steamer.

In the total tonnage of all routes for the month of April, westbound traffic predominates, as usual. From the Atlantic to the Pacific 500,801 tons moved, as compared with only 406,812 from the Pacific to the Atlantic. The latter total is 40,000 tons less than that of March and 62,000 less than that of April, 1920. The former total, that of Atlantic-Pacific business, is relatively much smaller, being 136,000 tons less than that of March, 1921, although 102,000 more than that of April, 1920. The aggregate decline of April under March was no less than 177,000 tons.

South American Agreement

Close co-operation between steamship lines operating from the Pacific and Atlantic coasts of the United States to the east coast of South America will result from a new working agreement now being formulated. In view of the fact that the different lines, though plying from the two coasts of the United States, were competitive to some degree, it was decided to place some rates on a parity and to give others into the control of one conference or the other. Thus the Atlantic would have the initiative in fixing a machinery rate, inasmuch as the larger consignments of such freight are from the Atlantic; and the Pacific would have the initiative as to wheat, lumber, etc. Each conference of course would conform to the rate fixed by the other.

The same working agreement is being discussed for the west coast of South America. Nothing conclusive has been done, however.

New Australasian Conference

A conference to control rates on freight moving between the Pacific Coast of the United States and Canada and Australasia will be organized within a short time by most if not all of the operators engaged in that trade. That no conference has existed up to this time is rather singular, in view of the number of lines engaged and the almost universal organization of rate-making bodies in other trades; but quite a number of the companies are relatively new and the older-established lines got along informally without any actual organization.

The lines that are expected to join are the Union Steamship Company of New Zealand and Oceanic Steamship Company, operating from San Francisco only; the General Steamship Corporation and Yamashita Kisen Kaisha, operating from the Pacific Coast generally; the Canadian Government Merchant Marine, a new line, and the Canadian-Australasian Royal Mail Line (Union Steamship Company of New Zealand), which runs from Vancouver to Auckland and Sydney via Honolulu and Suva. The Yamashita service also is new, having been recently announced.

One interesting aspect of the situation is that the American lines may have an opportunity to enter the Canadian - Australasian paper trade. About 125,000 tons of paper and pulp moves annually. Heretofore the rates have been more or less secret; now they will be placed on the table.

Committees will be organized in San Francisco and Vancouver; the headquarters will be in San Francisco.

Although the conference is just being formed, it has gone ahead with rate reductions. Some of the more important are: canned salmon, from $25 to $18; general, $25 to $20; shooks, $15 to $10. Lumber remains at $20. The tariffs are effective from all Pacific Coast ports to Auckland, Wellington, Sydney and Melbourne.

The Strike on the Pacific

Private steamship operators of the Pacific, acting through the Pacific-American Steamship Association and the Shipowners' Association of the Pacific, steadfastly refuse to join with the Shipping Board in the new agreements recently arrived at and signed, through Secretary of Labor Davis, with the marine engineers and radio operators. The following joint resolution of the two organizations was issued in June:

"In view of the reported negotiations between the Marine Engineers' Association and the Shipping Board, the Pacific Steamship Association and the Shipowners' Association of the Pacific wish to announce that there will be no departure from the policy as covered in the resolution published in the press a short time ago, as follows: 'Resolved, That the undersigned associations will not confer or negotiate, now or at any time, with the Marine Engineers' Beneficial Association as at present constituted and organized.'"

Except for the action of the Shipping Board, which generally is condemned severely by private operators, the strike situation on the Pacific was satisfactory to owners. They were succeeding in obtaining more men at the reduced scale and they expected a break among the unions themselves, which would tend to make the position of the operators even stronger. As is well known, the locals of the marine engineers were by no means a unit in accepting the new scale to which President Brown agreed. This resentment promised to create a split in the Marine Engineers' Beneficial Association. Other unions, moreover, were inclined to regard the action of the engineers as a betrayal of the common cause, especially since the Shipping Board broke off all negotiations in June and left the seamen, firemen, stewards, etc., in no enviable situation. These different factors made for optimism among the owners.

An interesting little controversy appeared in San Francisco in late June. The marine engineers were assessing tugboat engineers, who had remained at work, as much as 50 and 75 per cent of their salaries. As a result, men began to quit their jobs rather than give up half of their earnings.

The Red Stack, Rolph and Peterson tug companies, San Francisco, announced wage reductions of 15 per cent June 20.

Passenger Services Improve

The allotment of ten Shipping Board 535's, five to the Pacific Mail and five to the Admiral Line, and three 522's, all to the Pacific Mail, apparently is putting other trans-Pacific lines on their mettle to meet the new competition. The charter of the former German steamship, Cap Finisterre, now Taiyo Maru, by the Toyo Kisen Kaisha, was announced several weeks ago. Now comes the Canadian Pacific with two German vessels, which have been purchased of the British government. The Prinz Friedrich Wilhelm, 17,099 tons gross, will be renamed Empress of China and will ply between Vancouver and the Orient. The other vessel, the Kaiserin Auguste Victoria, 24,581 tons gross, will be renamed Empress of Scotland and will be employed in the Atlantic.

Reports from Vancouver state that the Empress of Japan, the oldest of the Canadian Pacific fleet, is being offered for sale. Should no satisfactory bid be received, she probably will be placed in the Calcutta-Hongkong feeder service.

Taiyo Maru Arrives

On her first trans-pacific voyage under the T. K. K. flag, the Taiyo Maru arrived at San Francisco late in June. The Toyo Kisen Kaisha arranged for a public inspection of the vessel June 30. On the next day a limited number of invited guests were to be taken for a cruise about the Farallones. After luncheon was served on board the Taiyo Maru the guests would be entertained by a band, Japanese wrestlers and a bevy of swimming girls.

The T. K. K. also is improving its South American service. The first of three large combination vessels built by the Asano yard, the Rakuyo Maru, sailed from Hongkong June 10. Two others, Bokuyo Maru and Ginyo Maru, remain to be delivered. The Kiyo Maru, formerly used in the South American trade, now is being employed solely as a tanker.

The 535 Keystone State assigned to the Pacific Steamship Company, sailed in ballast from Philadelphia for Seattle June 2. She was rushed to the Pacific to replace the Wenatchee, which will be laid up for thirty days for alterations, principally to her ventilating system. The Wenatchee will resume trans-Pacific sailings July 30. The Silver State sailed from New York June 4 for Seattle via way ports with 7000 tons of cargo and a large passenger list. She will sail from Seattle in the

Pacific Steamship Company's Oriental service July 9.

Intercoastal Changes

The Luckenbach Line announces that the large 15-knot steamships, Andrea F. and Lewis Luckenbach have been added to the intercoastal service. All the vessels now engaged in the Atlantic-Pacific trade are of the largest and fastest Luckenbach class.

The Shipping Board 535 Empire State, the second of five to be operated by the Pacific Mail, departed from Baltimore for San Francisco in June and will sail from San Francisco for Honolulu and the Orient July 23. The Matson Company's Buckeye State was delayed in departing from Baltimore for San Francisco in June, fire having damaged her badly. The Hawkeye State, which was retired for one voyage to permit of alterations being made, sailed from Baltimore June 25.

On the Mexican Coast

Consul Yost at Guaymas reported on May 3 that within a few days four merchant vessels, which the Mexican government recently purchased in Canada and which are now in the Gulf of Mexico, were expected to be brought to the Pacific Coast of Mexico. Two of the vessels are to be used in the freight and passenger service between Manzanillo, Islas Maria, and Mazatlan; the other two are to have their headquarters at Guaymas, whence they will serve ports in the Gulf of California and the Pacific littoral of Lower California, including Ensenada.

The Stark Steamship Company announces that beginning with the sailing of the Georgina Rolph from San Francisco June 18 the company will operate to South American as well as Mexican ports. The steamship Centralia has engaged in the San Francisco-Mexico trade.

The Red Star Line has placed three third-class vessels in the New York - Danzig - Libau service. The company developed a good business last year with various sailings of the same vessels to Baltic ports, and now has placed them regularly in that trade.

W. R. Grace & Company, Johnson Line agents, announce the sailing of the combination motorship Balboa from Pacific Coast ports for Hamburg in August.

The Mexican Steamship Company is reported to have purchased the steamships Bolivar and Washington, which will be used with the steamship Mexico between San Francisco, Los Angeles and Mazatlan.

The Williams Line announced in June that it had established a feeder service to New York and would accept cargo at certain outside ports at New York rates. Due to objection by the Shipping Board, however, the application of New York rates and the absorption of lighterage, etc., at New York have been discontinued, although the Williams Line will continue to issue through bills of lading.

The first vessel of the new Orient-Pacific Coast-Australasian service of the Yamashita Kisen Kaisha probably will arrive on the Coast in September, said Frank K. Hitching, its agent. Mr. Hitching said that the company probably would not join the new Australasian conference formally, although it had no intention of breaking conference rates.

The Congress Line, for which Mr. Hitching was agent, has abandoned all effort to resume intercoastal operations. It scarcely had begun when the Shipping Board seized its vessels.

The Royal Mail Steam Packet, which will operate motorships in its joint service with the Holland-America between Europe and the Pacific Coast, announces that the first vessel, the Somersetshire, will arrive at Pacific Coast ports in July. All the vessels will have refrigerated space.

Golden State's Record

A new record in trans-Pacific service was established recently when the steamship Golden State, first of the 535-type passenger and freight carriers assigned to the Pacific Mail Steamship Company by the United States Shipping Board, entered the Bay of San Francisco thirteen days, seven hours and forty-eight minutes after leaving Yokohama, exclusive of the time spent at Honolulu, says the Pacific Mail house publication. The new liner maintained an average speed of 16.62 knots during the return trip over the "Sunshine Belt to the Orient."

The fastest run in proportion to the distance between ports was made from Yokohama to Honolulu, the total time being eight days, nine hours and thirtyq-seven minutes, with an average speed of 17.7 knots. The steaming time of the Golden State from Honolulu was four days and twenty-two hours.

Flying the Stars and Stripes and the house flag of the Pacific Mail Steamship Company, the Golden State is the first vessel of her type to make a round trip between San Francisco and ports of the Orient. One of the remarkable features of the run from Hawaii was the fact that she overtook four other well-known trans-Pacific vessels, showed them all her heels, and steamed in through the Golden Gate a day in advance of them all.

The four-masted schooner Irene, Captain Carlson, arrived at Aberdeen May 19 after a voyage of fifteen days from Honolulu. This appears to be a record for the northbound passage, although the schooner Kitsap used to make fourteen days from Grays Harbor or Puget Sound to Honolulu with remarkable regularity.

Forty days from Melbourne, the four-masted barkentine Aurora entered the Straits of Juan de Fuca May 26, having averaged more than 182 miles a day. Her best previous time was sixty days. The forty-day voyage is believed to be a record.

Panama Oil Storage

Three steel tanks of 55,000 barrels capacity each were added to the petroleum storage facilities at the Atlantic entrance to the Canal in the month of April; and a fourth tank of the same capacity has been completed but is not yet filled, says the Panama Canal Record. The United Fruit Company, the Arrow Oil Company, and the Pacific Mail Steamship Company each owns one of the three tanks already filled, and the Huasteca Petroleum Company owns that which is completed but not yet filled. The storage capacity of the different tanks at both ends of the Canal is now as follows: Panama Canal, 396,368 barrels; Panama Canal Storage Corporation, 221,456; West India Oil Company, 194,946; Union Oil Company of California, 149,078; Huasteca Petroleum Company, 166,721; Texas Company, 111,515; Arrow Oil Company, 55,000; Pacific Mail Steamship Company, 55,000; United Fruit Company, 55,000; Panama Agencies Company, 25,064; total, 1,430,148. Of the capacity of the Panama Canal, one tank of 55,954 barrels at Cristobal and one of 4038 at Balboa are for Diesel oil.

Hawaiian Sugar Low

A marked falling-off in sugar shipments from Hawaii to San Francisco and the Atlantic Coast, New Orleans-Philadelphia-New York, appears to be a certainty. Estimates of the decline from normal range between 150,000 and 200,000 tons, or between one-third and one-fourth of the output of approximately 600,000.

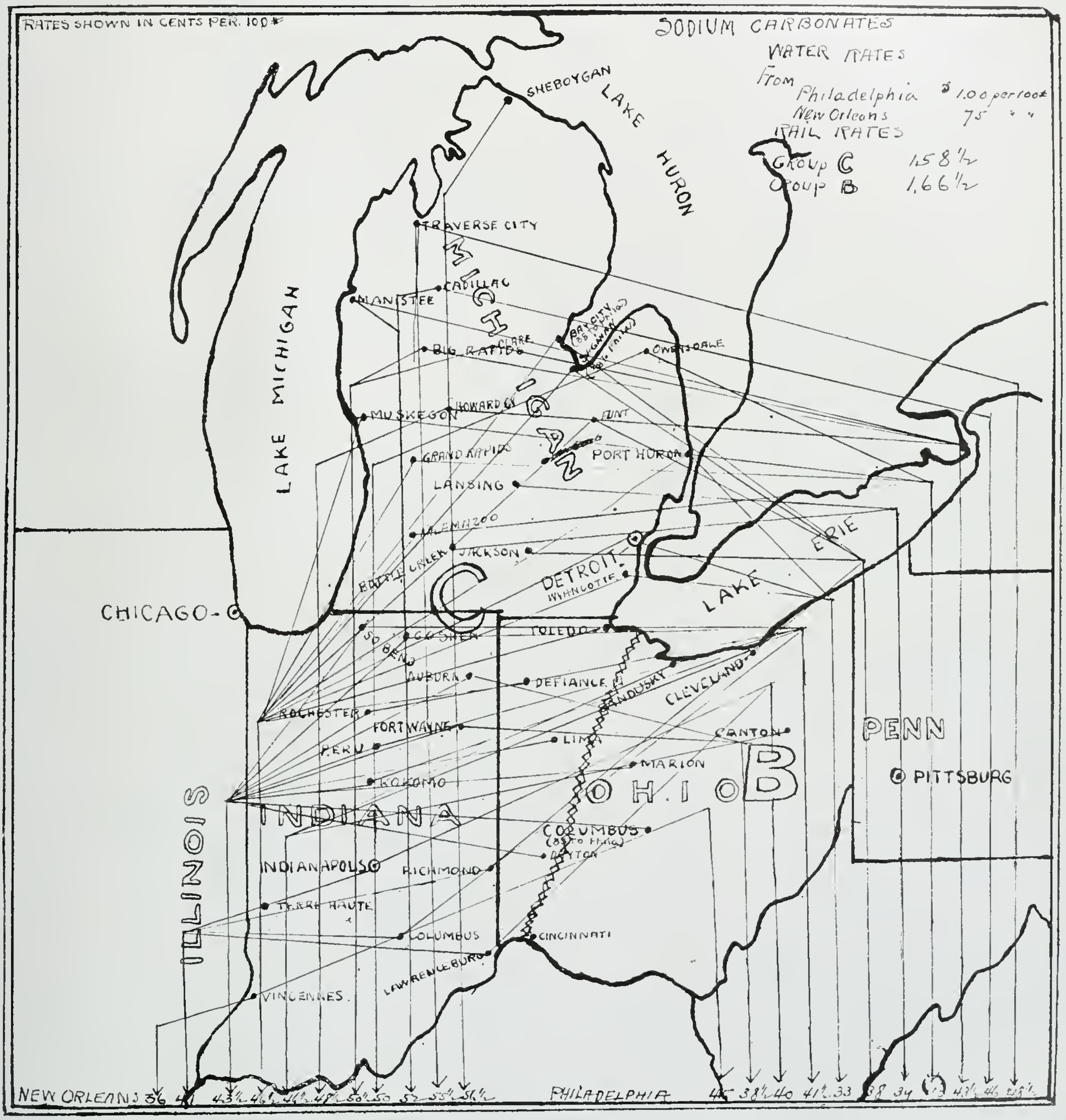
During the first half of 1920 the Japanese labor of Oahu was on strike. This adversely affected the 1921 crop, which did not have proper attention. On top of this came an exodus of Japanese to their native country and, worst of all, a go-slow attitude on the part of those that remained. As a result, some fields are in bad condition and apparently little can be done to save them. A delegation was dispatched from Honolulu to Washington to urge Congress to permit the importation of Chinese labor, and the planters also have been active in the West Indies; but whether these different efforts can be of much avail this season is very doubtful.

Should the worst be realized, and a decline of 200,000 tons be registered, the Hawaiian carrying trade, no less than the islands themselves, will suffer severely. Up to this time the Hawaiian business, both eastbound and westbound, had been probably the best in the world, and the Matson Line was in the enviable position of holding contracts for both the Atlantic and Pacific.

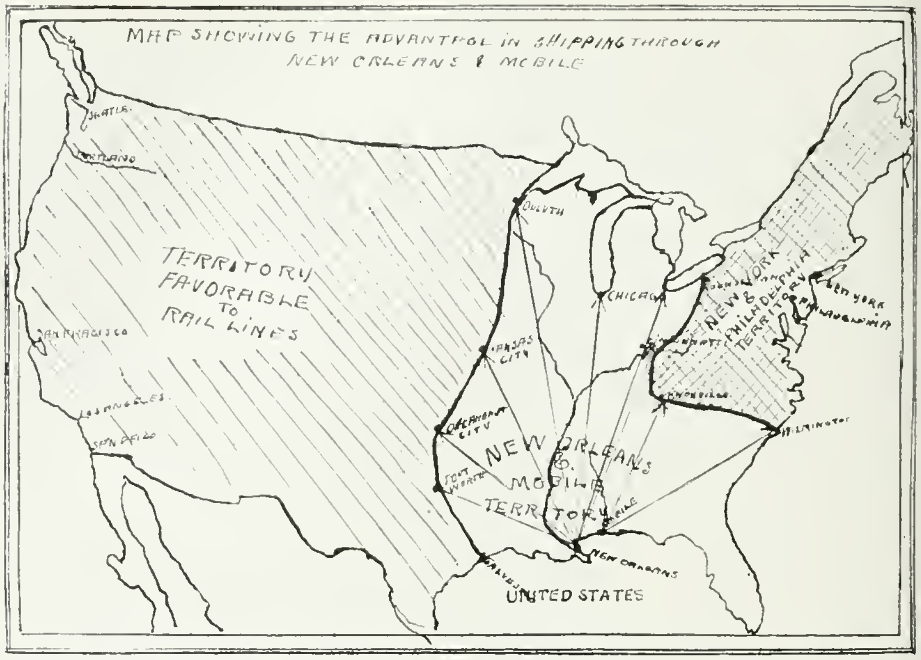
The Hawaii-San Francisco sugar rate has been reduced another 50 cents, from $5.50 to $5. The total reduction this year is $1.

Isthmian to Gulf

Following announcement by the Luckenbach Line of a Pacific-Gulf service, the Isthmian Line, through Norton, Lilly & Company, general agents, also has announced that it would maintain monthly sailings beginning with the departure of the steamship Anniston City from New Orleans June 15. Ports of call will be New Orleans, Mobile, Los Angeles (Wilmington), San Francisco, Portland and Seattle. Should cargo offerings justify, sailings will be increased. The Isthmian Line now has three distinct intercoastal services: Atlantic-Pacific, Gulf-Pacific and Atlantic-Pacific-Hawaii.



Sketch prepared by the San Francisco office of the Luckenbach Line showing the freight charges on sodium carbonate a hundred pounds from cities of C and B territory. From each shipping point run two lines, one to the lower left, where the rail rate to New Orleans will be found; the other to the Philadelphia rate on the lower right. In the upper right corner are Philadelphia-Pacific Coast and New Orleans-Pacific Coast water rates and the all-rail rates from groups C and B to the Pacific Coast. By using the data here given one may determine in a few seconds the relative costs of shipping by three routes. The serrated line crossing Ohio is the division between C and B territories.



Map prepared by the San Francisco office of the Luckenbach Line showing the advantage of shipping to the Pacific Coast through New Orleans and Mobile in preference to Atlantic ports. The present rail and steamship rates are such that, in competition with New York, Philadelphia, etc., the Gulf ports are able to command shipments from the entire Mississippi Valley and the Atlantic as far north as Wilmington This map is based on average rates and therefore does not hold good for every single commodity; nor does it take into account ports of the South Atlantic, such as Savannah. But it does indicate what business New Orleans and Mobile may expect to do with the Pacific Coast so long as those cities enjoy a water differential of approximately 25 cents a hundred pounds less than North Atlantic rates.

Gulf services heretofore had been maintained by Swayne & Hoyt (Pacific-Caribbean-Gulf Line) and by the Atlantic-Gulf & Pacific.

The accompanying charts, prepared by the San Francisco office of Luckenbach, have a story to tell of the Gulf trade.

Mexican Oil Imports

Petroleum imports into the United States in the fiscal year ending June 30 will be nearly twice that of any earlier year, notwithstanding the enormous production of our own oilfields. The total quantity of petroleum imported into this country, which itself produces two-thirds of the oil of the world, will be nearly 6,000,000,000 gallons against about 3,000,000,000 in 1920, approximately 2,000,000,000 in 1919, 1,500,000,000 in 1918, and 1,000,000,000 in 1917, says a statement of the National City Bank, New York.

Practically all of the oil imported from Mexico comes by tank steamer, the quantity imported by rail being extremely small. About one-third of the crude enters at the Gulf ports of Galveston, Sabine and New Orleans, while most of the remaining two-thirds passes through the Gulf northward to Baltimore, Philadelphia and New York. The latest available figures of the importation by ports are those of the calendar year 1919, and show 545,000,000 gallons entering at the port of New York, 202,000,000 at Baltimore, 196,000,000 at Philadelphia, 350,000,000 at New Orleans, and Galveston and Sabine about 200,000,000 gallons each.

Shipping Briefs

P. A. S. Franklin, president of the International Marine Company, at a meeting of the board of directors of the company in New York, announced the regular semi-annual dividend of 3 per cent on the preferred stock of the company, payable August 1 to stockholders of record at the close of business July 15. The officers of the company were re-elected by the board of directors for the ensuing year.

Suez Tolls

The Suez Canal Company during the war imposed tolls on shelterdeck spaces only when actually used for passengers or cargo, waiving on account of war necessities its former rules. Beginning with March 1, 1921, the former rule has been restored, and after that date shelterdeck spaces will be liable for tolls, whether or not actually used for passengers or cargo on the voyage through the canal, if such spaces have been so used before August 1, 1914, or after March 1, 1921.

Coal Bids

Bids received by the army depot quartermaster, San Francisco, for 43,000 tons of coal to be used during the next fiscal year were as follows: Standard Coal Co., Utah coal, $11.62 a ton; King Coal Co., Utah coal, $11.77; same, Comax, $11.22; same, Manchurian, $10.36; same, Australian, $11.48; Rolph Navigation & Coal Co., Utah coal, $13; same, Australian, $13. Standard was the lowest bidder on American coal.

Alaska and Section 27

A test suit has been filed in Juneau by the Alaskan territorial government and Juneau Commercial Association seeking to set aside Section 27, Merchant Marine Act, which would prohibit diversion of American cargo to Canadian ports for shipment to Alaska. A test cargo was shipped from a Canadian port to Juneau and the territory requested an injunction restraining the Federal government from interference. However the suit may be disguised, it is essentially a fight against the coastwise laws.

Seattle Wharfage

Seattle is having trouble in abrogating wharfage charges and assessing handling charges between ship's tackle and point of rest against the carrier. The steamship companies refuse to assume the charge unless they are permitted to do the work. They do not object to making Seattle free for the shipper, but they do object to paying for work done by another.

Other ports of the Pacific, San Francisco included, are considering the adoption of some such plan to meet Seattle and Portland.

Reciprocal Exemption

Senator Jones has introduced a bill (S. 1942) to secure for the American merchant marine exemption from foreign income and excess profits taxes in return for reciprocal treatment of foreign shipowners by the United States government. The bill is the result of conferences held for several months by the Inter-Departmental Committee consisting of representatives of the State and Treasury Departments and Shipping Board.

The American Ship & Commerce Corporation authorizes the following statement: The American Ship & Commerce Corporation has designated the American Ship & Commerce Navigation Corporation to execute the agreement that was negotiated last year by the Harriman shipping interests and the Hamburg-American Line for the joint maintenance of shipping routes. The American Ship & Commerce Navigation

Corporation's agreement is in the same form as the original compact which was made public last fall, and continues the terms then announced.

I. M. M. Report

The International Mercantile Marine estimates its 1920 earnings at $9,440,157, as compared with $17,062,912 for the year 1919. Inasmuch as the dividends of subsidiary British companies, however, have been converted into dollars at the standard rate of $4.85 to the pound sterling, in order to afford a just basis of comparison with preceding years, the actual earnings, expressed in dollars, were less than those given. The net earnings of the I. M. M., plus dividends from subsidiaries, less taxes and interest, were $8,307,283, the pound being converted into dollars at market exchange on the day received.

Shrinkage of freight traffic and the various handicaps to a large immigrant travel, among which is the recent law limiting immigration, has caused the net earnings for the first part of 1921 to be considerably less than for 1920. The report to the stockholders continues:

"It is impossible to predict a material improvement in the situation in the near future, as this can only be brought about as political, economical and labor conditions in Europe improve and the buying ability of the European nations is gradually restored. In the meantime our property is being well maintained and judiciously strengthened, our cash position is strong and we feel that the company is well equipped to maintain its position in its various trades, and is in excellent condition to weather the storm through which shipping is now passing."

The company paid 10 per cent during 1920 on unpaid back dividends, leaving 42 per cent still due preferred stock.

Rates and Freights

Rail Rates Cut

Transcontinental railroad rates are being forced down by the competition of intercoastal steamship lines. Repeated announcements of reductions were made in May and June, but at this writing the Interstate Commerce Commission has not given the sanction required in some cases, and the intermediate territory manifests a disposition to fight.

An important development is in iron and steel. Following upon a decision to reduce by 20 per cent, the railroads decided in June to request an additional 5 per cent.

On eastbound business the roads decided to cut beans and peas from $1.25½ to $1.05, canned goods from $1.20½ to $1.05, and rice from $1.25½, $1.16½ and 1.08½, the rate depending upon the group to which shipped, to a flat rate of $1 to A, B and C. Dried fruit in boxes was cut from $1.66½ to $1.25. These are radical reductions, of course, but let them be compared with the steamship rates: canned goods, 50 cents; beans, 55 cents; rice, 52½ cents (these rates were made for an emergency but have been extended); sacked and boxed fruit, 55 cents.

Export rates on goods moving via Gulf ports or via Mallory Line to New York have been cut. Boxed fruit is down from $1.66½ to 95; sacked from $2 to $1.15, the old 20-cent differential being preserved; canned goods from $1.20½ to 80; beans and peas from $1.25½ to 90; rice from 92 to 80, and barley from 74½ to 50. These reductions are forced by the competition of the direct steamship lines. Williams, Dimond & Company, operating the European-Pacific Line, have reduced dried fruit, sacked or boxed, to $1.25, beans to $1.20, canned goods to $1, rice to $1.05 and tallow to $1; no minima to apply. The railroad rates are for carloads.

While they are endeavoring to build up export business to Europe, the roads also are continuing their efforts for the restoration of the old Pacific reduction of Pacific Coast import and export rates. Rates heretofore effective to and from Chicago only now will be applied to points on the following railroads: Toledo, St. Louis & Western; Chicago, Terre Haute & Southeastern; Detroit & Toledo Shore Line, and Ann Arbor. The concurrence of the first and last already had been announced. But despite the beginning thus made, it is impossible to overlook the fact that none of the large groups, such as the New York Central and Pennsylvania, has acceded.

Refrigerator Ships

The subject of refrigerator steamships for the intercoastal trade continues to bob up, and indications are that one or more companies may decide to establish such a service. Nothing has been done yet, however, despite published statements that the American Shipbuilding Company had decided to employ ten 3800 deadweight ton steamers in the trade under an arrangement with the California Fruit Growers' Exchange. The company has been considering that use of the vessels, but the announcement that it had come to a decision was premature.

The American-Hawaiian Steamship Company has had a refrigerator fleet under consideration for several months. Intimations received on the Pacific Coast from New York were to the effect that favorable action probably would be taken.

All steamship men do not see the question in the same light; some hold that the transportation of perishable Pacific Coast products to the East is primarily a function of the railroads. They argue thus: Refrigerated freight is of its nature perishable and, accordingly, demands a quick market, the more so because it is increasingly liable to deterioration after being removed from cars or steamships. This necessity of immediate sale forces the diversion of many refrigerator cars, which may be consigned to Council Bluffs or Omaha and upon or prior to arrival reconsigned to the Middle Western or Eastern city, whether St. Louis, Chicago, Cleveland or New York, that offers the best immediate market. The fact is, said one steamship man in discussing the question, that relatively few cars are delivered in the East without having been reconsigned at least once.

A steamship carrying a large refrigerator cargo, on the other hand, would be compelled to discharge the whole at one or two Atlantic ports. New York first, and perhaps Boston next, offer the best markets; but the discharge of a large amount of refrigerated freight at these ports probably would tend to create a glut, with the result that the goods would go begging, even though some city a few hundred miles inland might offer a good demand. The very bulk of the refrigerator cargo also would militate against a satisfactory sale. Relatively small lots shipped by rail may be scattered from Kansas City to Boston; the same potential market scarcely would offer to a complete cargo delivered as a whole.

Nor are existing storage facilities in New York adequate to care for such a movement of perishable freight as a refrigerator line would handle; and even the creation of facilities would not enable a refrigerator line to compete with the railroads because of the expense of water shipment, of discharging and storage, or reloading and shipment by rail to the ultimate market.

The views presented here are held by a considerable number of shipping officials. Others, of course, think differently. The actual operation of a refrigerator line is the one proof of the pudding.

The Pacific Coast Producers' and Shippers' Association was organized at Seattle early in June with the object of obtaining better refrigerator facilities in the intercoastal trade. C. S. Whitcomb of Los Angeles, vice-president of the California Fruit Growers' Exchange, was elected president, and departed for New York on business for the new association. The organization says that its members are prepared to offer steamship lines a minimum of 9000 cars of fruit, but they are not willing to pay more than 90 cents a box. It is rather doubtful whether this rate would appeal to operators.

Freight Report

June 14, 1921.

Our last circular was dated May 11. Since that time a fair amount of business has been done in chartering, although the strike of engineers has been quite a factor in curtailing chartering vessels.

The Pacific Grain Company chartered steamer Benvenue for grain from Portland to U. K.-Continent at 58/6, option usual Mediterranean 2/6 additional, followed by the charter of the Benduran by Balfour, Guthrie & Company, at 60/- for one port U. K.-Continent, Bordeaux-Hamburg. Kerr-Gifford took the Port Said Maru at 58/- with the usual additional to Mediterranean. The Pacific Grain Company chartered steamer Natal at 58/9 for one port, 60/- two ports U. K.-Continent, Bordeaux-Hamburg, 62/6 usual Mediterranean. The Northern Grain & Warehouse Company chartered new tanker Swiftlight for two ports U. K.-Continent, Bordeaux-Hamburg, at 56/- and also Japanese steamer Ryfuku Maru at 57/6 for two ports U. K.-Continent, Bordeaux-Hamburg. Both the motorships Panama and Buenos Aires arranged space for wheat or flour from the North to Dantzig at 70/-. The Panama flour was by the Pacific Grain Company, and the Buenos Aires flour by the Sperry Flour Company. The Pacific Grain Company also chartered the British steamer Eastern Prince for U. K.-Continent, Bordeaux-Hamburg, usual Mediterranean, on private terms, and a Japanese steamer was reported as having been chartered at 55/- for one port, 56/3 two ports U. K.-Continent, option of 65/- one port; 67/6 two ports Baltic, or Norway and Sweden. The break in exchange has weakened the demand somewhat, but we quote the market steady for grain from the North at 55/- bid, 57/6 asked.

From San Francisco no entire vessels have been fixed as yet, but the different shippers have arranged space on the regular liners on the basis of 60/- for U. K. or Continental ports, and one steamer, the Ensley City, was forced to accept 57/6 for filling up space. The Buenos Aires also arranged space for about 4000 tons of cottonseed oil cake on the basis of $13 per ton, weight, from San Pedro to Copenhagen.

For August loading some business has also been done for space on liners on the basis of 60/-.

At the present moment, we are not in position to report what action the Shipping Board will take in the matter of making rates for new crop loading. Now that the strike of the marine engineers is reported as being off, it may be that they will be ready to make rates, although we understand that, unless they can get 62/6 as a minimum, the vessels would go out at a loss, to U. K.-Continent.

Quite a demand has sprung up for lumber to New York. The steamer West Catanace, which has just left this coast with lumber in that direction, has been chartered back to San Diego with coal by the Navy Department, and is again chartered for lumber to New York, this time at $17.50, and the Munson Line have chartered three of their steamers to the Willapa Lumber Company at $17. The Munaries and Mundelta so far have been named. There is still one more to be named.

Owing to the tieup of our steam schooners, the schooner Forest Friend was chartered by the Slade Lumber Company for lumber from the North to San Francisco at a reported rate of $8, and the Levi W. Ostrander was chartered from the North to Honolulu on private terms.

We forgot to say that from four to five steamers were chartered in May to carry wheat from Portland to Japan at $7 per ton.

The schooner Fort Laramie was taken by Grace & Company for nitrate to the Hawaiian Islands at $6.

Schooner Vancouver was chartered at $18 with lumber from Puget Sound or Grays Harbor to Callao by W. L. Comyn & Company, and the Mohns Commercial Company chartered schooner Resolute for lumber from Grays Harbor to Callao at $18.

Steamer Georgina Rolph was chartered on private terms on time, government form, in the Mexican trade, for from five to six months, the charterers having privilege of buying if they see fit.

At the close of this report, $18 per thousand is offered firm for vessels of a million feet or more for lumber from the North to direct ports in Chile or Peru, and this is about the rate that charterers would pay for sailers to Australia, if they were obtainable; $27.50 is about the rate which shippers would pay for Africa. The going rate for lumber to Japan and China by steamer is $12.50. Of course, none of our sailers care to try to compete with steamers, as with the poor prospects of getting cargo back, they would be at a heavy loss.

Now that the engineers' strike is broken, and with the incoming crop of barley, we hope to see quite a movement in chartering from this coast to the different parts of the world. PAGE BROTHERS,
Brokers.

In the Orient

Atlantic Tonnage Declines

An interesting feature of the April report of the Department of Communications of Japan is that Japanese vessels on the Orient-North Atlantic run decreased 48,074 gross tons during the month, the number at the end of April being 31 and their gross tonnage 188,925. Of all trade routes radiating from the United States, that to Japan was among the best, despite the severe panic that seized that country last year; but now, it appears, even the Atlantic-Orient business is following the Pacific into a decline. It is evident, too, that the Japan-India trade is decreasing or, as is more probable, is being lost to the United Kingdom, as the Japanese tonnage engaged on that route decreased 30,180 tons during the month.

On the other hand, North China increased by 32,678 tons. If Dairen also is included in North China, the increase is not so remarkable, because Dairen began to enjoy a boom a few months ago, with the inevitable result, however, that too much tonnage began to flock thither. Even Manchuria has not unlimited quantities of soya bean oil.

At the end of April tied-up vessels numbered 135, ships of less than 100 gross being excluded, and the tonnage was 242,770, or 7.7 per cent of the entire merchant fleet, which is 3,150,000 tons, vessels of less than 100 being excluded. As compared with March, idle shipping had increased by 3500 tons but had decreased by 27 vessels, the latter showing being due to the employment of small vessels and the retiring of larger craft. Of the idle vessels, 51 steel steamers of more than 1000 gross accounted for 192,491 tons. The principal owners and the number of idle vessels of each were: Kokusai, 4 of 21,677 tons; Kiroumi, 6 of 21,432; Kishimoto, 5 of 20,843; Katsuda, 4 of 20,029; O. S. K., 2 of 15,561; Harata, 2 of 7203; N. Y. K., 3 of 6917; Mitsui, 5 of 6102; Hashimoto, 2 of 5464; Kobe Kisen, 4 of 4212. Sixty-one vessels were at Osaka, 18 at Kobe, 12 at Yokohama, 13 at Hakodate and the remainder scattered. Charters of six or more vessels were to expire during May.

Japanese Wage Reductions

More trouble appears to be in store for American operators who are endeavoring to compete with the Japanese. A report from Tokyo says that the Nippon Yusen Kaisha has decided to reduce wages of new men (presumably not of old employes, however) by 20 per cent, effective June 1. Ordinary seamen were not to be affected. In this connection Japanese authorities give the following comparative wage scales in yen for vessels engaged in European services:

	Japanese	British	American
Chief sailor	120	130	190
First helm-man	91	120	174
First sailor	77	110	170
Chief fireman	120	120	......
Oilman	105	120	190
First fireman	77	120	180
Coal-man	63	110	150

It is estimated that the idle seamen of Japan number at least 15,000.

Earnings Decline

For the last business term the net earnings of the Nippon Yusen Kaisha fell off by yen 3,847,000 as compared with the preceding six months. The net profit, yen 5,541,878, was 19 per cent of the paid-up capital stock, which is yen 58,000,000. Although such a profit appears to be high, it should be remembered that the capitalization of the N. Y. K. does not begin to approximate the actual value of its property. A dividend of 25 per cent will be declared, it is anticipated, by the use of yen 2,350,000 of the profit and loss account. This will permit of yen 487,158 being carried forward, as against yen 2,828,280 for the preceding six months.

A reduction of 20 per cent in passenger fares and freight rates to the East Coast of South America has been decided upon by the N. Y. K. and O. S. K. in order to meet foreign competition. On the other hand, the Australian conference is reported to be about to increase its Australia-Japan rates by 25 per cent or more. This action is due to the decline of the pound sterling, rates being in shillings, and is merely following the precedent already set in the case of Japan-Australia rates, which were increased 20 per cent several months ago. The general cargo rate will be 70 shillings as against 55.

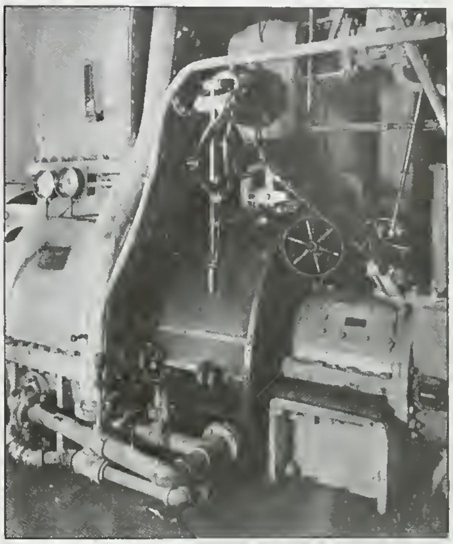
The Matsuda Kisen Kaisha has reduced its capital from yen 2,500,000 to yen 1,250,000, following a reduction from yen 5,000,000 to yen 2,500,000 last year.

With the Builders

Six steel merchant vessels were launched during April, one by Harima (Suzuki), two by Osaka Iron Works, two by Yokohama Dock and one by Kawasaki. The total gross tonnage was 30,780. Three vessels were for the N. Y. K., one for the O. S. K. and the others for builders' account.

Japanese shipbuilders anticipate an early abolition of duties on shipbuilding materials, an act providing for which was passed by the last Diet. Iron and steel, as well as machinery, etc., that cannot be manufactured in Japan, will be admitted duty-free. No immediate effect is anticipated, however, because building is so depressed that the abolition of tariffs cannot be of great avail. This year's tonnage output is estimated at about 200,000 gross, and next year's at not more than 100,000.

The Uchida shipyard, at Kanagawa, Yokohama, is represented as about to be sold to the Mitsuis, although the reports are denied about as rapidly as they appear. The Uchida yard formerly was the Yokohama Engine & Iron Works and was the first engine-builder in the empire. It is engaged on naval work now.



G-E turbine and generator of the Shipping Board's electric-drive Invincible

A Statement of Commercial Traffic Through the Panama Canal From its Opening to Date.

Herewith is given a comparative statement of the commercial traffic passing through the Panama Canal from its opening on August 15, 1914, to March 31, 1921. In the instances where tonnage figures have been omitted, it is due to the incomplete records kept during the early years of Canal traffic.

	No. of ships.	TONNAGE.				Tolls.	Tons of cargo.
		U.S. equiv.	P. C. net.	Reg gross.	Reg. net.		
July, 1920	225	705,643	856,798	1,109,079	702,591	$842,312 05	886,814
August, 1920	266	782,415	951,345	1,208,471	770;320	936,209 44	1,040,740
September, 1920	256	832,742	1,008,785	1,293,470	817,810	1,010,159 63	1,009,557
October, 1920	238	762,013	935,579	1,190,936	751,549	911,825.58	991,066
November, 1920	238	765,817	929,875	1,184,072	756,223	933,912 11	984,910
December, 1920	265	832,407	1,027.918	1,298,864	823,758	1,007,849 32	1,076,539
January, 1921	279	894,689	1,094,323	1,383,778	883,362	1,095,857 46	1,177,053
February, 1921	241	763,925	916,838	1,179,979	752,022	917,412 49	952,904
March, 1921	255	924,309	1,112,818	1,417,220	917,411	1,105,536.55	1,081,563
First 9 months of fiscal year 1921	2,263	7,263,960	8,834,279	11,265,869	7,178,427	8,761,065.63	9,204,146
Fiscal year 1920	2,478	7,089.230	8,516,044	11,059,819	7,037,875	8,513,933 15	9,374,499
Fiscal year 1919	2,028	5,193,812	6,145,094	7,876,603	....	6,172,828 59	6,946 540
Fiscal year 1918	2,068	5,440,114	6,584,073	9,371,339	....	6.438,855 55	7,533,031
Fiscal year 1917	1,806	....	5,817,607	8,530,821	....	5,631,781 66	7,083,045
Fiscal year 1916 [1]	760	....	2,385,281	3,596,529	....	2,399,830 42	3,063,371
Fiscal year 1915 [2]	1,072	....	3,772,167	5,416,787	....	4,313,383 69	4,926,145

[1] Canal was closed to traffic from September 18, 1915, to April 15, 1916.

[2] Canal was opened to commercial traffic August 15, 1914.

A statement of traffic from the Panama Canal Record. For April the statistics, as given in a later issue of the Record, are: Number of ships, 227; aggregate Panama Canal net tonnage, 955,503; tolls, $927,977.09; cargo carried, 907,613 long tons. The number of vessels and the tonnage carried were the smallest since July, 1920.

American Shipbuilding

On June 1 there were 28 steel merchant vessels of 310,790 deadweight tons under construction in shipyards of the Pacific Coast of the United States, according to returns compiled by Pacific Marine Review. These totals represent a decline of seven vessels of 79,080 tons from those of May 1, no new contracts having been let to offset deliveries of that month.

During May the first of nine tankers for foreign account were completed, Standifer delivering two of 11,940 tons each to Imperial Oil and Union Construction one of 8400 tons to Anglo-Saxon Petroleum. One vessel of 8800 tons, the West O'Rowa, was delivered to the Shipping Board by Los Angeles. Other deliveries were to private owners.

One 8400-ton freighter was delivered by Canadian yards.

The following table shows construction as of June 1:

American Yards:	No. Vessels	Agg'te D. W.
Freighters USSB	6	64,400
Tankers USSB	6	60,300
Tankers private	8	95,690
Freighters private	2	40,000
Tankers foreign	6	50,400
Totals	28	310,790
Canadian Yards:		
Freighters govt	4	33,480
Freighters private	1	600
Totals	5	34,080

Yards Finish Work

Mortality among shipyards has been great during the last few months. Several yards, in Canada and the United States, on the Pacific Coast, Great Lakes and Atlantic, have finished all the work that remained on hand.

With the delivery of two Imperial Oil tankers in June, the G. M. Standifer Construction Corporation, Vancouver, Washington, finished building. The Pacific Coast Shipbuilding Company, Bay Point, California, turned over the freighter Nashaba to the Shipping Board in June and prepared to close the yard. Northwest Bridge & Iron, Portland, Oregon, has delivered the tanker Swiftwind to Swiftsure Oil, leaving the Todd yard at Tacoma the one plant in the Northwest engaged on new steel work. The Swiftwind was the 228th vessel built on the Columbia and Willamette rivers since the beginning of war construction.

In Canada the Harbor Marine yard delivered its last vessel to the Canadian Government Merchant Marine in April. Port Arthur, on the Canadian Lakes, completed its last for the Canadian government in May; and no less than four American yards on the Lakes were nearing the end. The Anchor yard, Washburn, Wisconsin, expected to deliver a ferryboat in late June, no other work remaining on hand; Defoe, Bay City, Michigan, finished the last mineplanter for the United States Army in May; with the delivery of a yacht to the Horace Dodge estate the Great Lakes yard completed its last work; and Saginaw already had wound up construction by delivering the Lake Miraflores to the Shipping Board in April.

On the Gulf, Doullut & Williams, New Orleans, delivered the last two of their Shipping Board program in May. Submarine Boat, Port Newark, New Jersey, was engaged on one vessel, a motorship for its own account, and had announced that it would engage in general engineering work.

Some New Work

Although no new contracts are being placed for large steel vessels, a little new work is being done. Announcements of recent barge contracts have been made by Dravo, Pittsburgh. The bureau of lighthouses asked for bids for some new light vessels, and the United States engineers will build a drill boat to be used in improvement of the East River, New York. Some work may offer from the Navy soon, as twelve destroyers, one transport, and seven submarines remain to be built, authorization having been given but no contracts placed.

The Hawaiian Contract

Just when the Inter-Island Steam Navigation Company of Honolulu will take definite steps to place a contract for a new passenger vessel remains uncertain. James A. Kennedy, president of the company, returned to Honolulu after a short stay in San Francisco. With him went Captain Leb Curtis of Pillsbury & Curtis, who discussed a tentative plan with the directors. They were inclined to postpone building at this time because of the sugar situation in Hawaii, which is facing a decline of one-third to one-fourth of the normal output because of the indifferent attitude of Japanese labor. The directors did not formally postpone construction, however. Word now comes from Honolulu to the effect that officers of the company's fleet would be requested to consider the proposed plan and make suggestions for improvements and that reports of the officers would be reviewed by the company and perhaps incorporated in a revised plan. Indications are, therefore, that construction may be delayed longer than was expected, but it is accepted as certain that a vessel will be built.

One consideration that the Inter-Island directors must bear in mind is that there is no time like the present. Shipbuilding is at a low ebb and yards need work badly, so that they are prepared to submit unusually low bids. Within a year, however, various factors probably would make for greater costs: many yards may have closed or definitely diverted their activities to construction other than shipbuilding, and those that do remain open probably will have much more repair work, provided general business improves, and therefore would not be so keenly desirous of getting a relatively small construction job.

No less than six yards of the Pacific and four of the Atlantic were preparing to bid. Such competition may not be seen again within a lifetime. Moreover, the Inter-Island needs a new passenger vessel for the Honolulu-Hilo trade and must build within a short time.

The Year in Canada

Statistics issued by the Department of Marine and Fisheries of Canada, placing the total gross tonnage built in 1920 at 204,635 tons, representing 351 vesels of one kind or another, show that the Canadian shipbuilding industry turned out a great deal more tonnage than seemed probable before these complete returns were available. The vessels built and registered in Canada during 1920 numbered 329, classified as follows: wooden sailing vessels 121, wooden steam vessels 53, wooden gas vessels 119, metal vessels—steam 35, gas 1. In point of gross tonnage the steam metal vessels led with 120,127 tons, followed by wooden sailing vessels, 22,758 tons; steam wooden vessels, 12,829 tons; gas wooden vessels, 3495 tons, gas metal vessels, 116 tons—total 159,325 gross tons.

The vessels built but not registered in Canada during the year were 22 in number, 13 of them being wooden steam vessels, 9 steel steam vessels and one wooden sailing vessel. The gross tonnage was: steel steam vessels, 31,135 tons; wooden steam vessels, 13,829 tons; wooden sailing vessels, 348 tons.

British Columbia, with 138 to her credit, led the provinces in the number of vessels turned out.

U. S. S. B. Repair Costs

The cost of maintaining the merchant ships owned by the United States is ranging around $1,250,000 a month, says the Atlantic Coast Shipbuilders' Association. In the week ending May 7 201 ships of 1,404,841 deadweight tons were taken into repair yards. Thirty steamers were repaired abroad, the remainder in the United States. The record is as follows:

United States	171	1,175,715	$259,995
European	16	120,058	64,833
Other foreign	14	109,068	12,966
Total	201	1,404,841	$337,794

Merchant vessels built in the United States (including a small tonnage for foreign owners) and officially numbered by the Commerce Department, Bureau of Navigation, during the 11 months ended May 31, 1921, comprised 1500 vessels of 2,369,450 gross tons, compared with 2232 of 3,890,554 gross tons for the 11 months ended May 31, 1920. Steel construction during the first five months of the calendar year 1921 was as follows: January, 30 vessels of 196,482 gross tons, including two concrete vessels of 7582 gross tons; February, 18 of 108,179; March, 23 of 140,374; April, 15 of 111,162; May, 15 of 115,312.

News of Eastern Yards

Baltimore

An order for a 350-ton deadweight motor tank barge has been placed with the Baltimore Drydocks & Shipbuilding Company by the Standard Oil Company of New Jersey. Gasoline or kerosene engines of 350-400 b. h. p. aggregate will propel this vessel.

The Lio, a 10,300-deadweight ton tanker, was launched from the south plant on June 4. The vessel is 430 feet in length, 59 feet beam, 33 feet 3 inches in depth; will have 2650 shaft horsepower; single screw; geared turbines; a speed of 10 knots; equipped with three Scotch boilers; oil-burning; forced-draft; having a cargo capacity of 3,000,000 gallons. The Tulsagas, another 10,300-deadweight ton tanker, recently launched from the south plant, returned May 26 from her trial trip.

Bethlehem

The Sparrows Point plant, Bethlehem, delivered the 8350-ton tanker Emile Deutsch de la Muerthe to the Lux Navigation Company in May. The 535 Palmetto State was launched June 4. The tanker Agwibay was launched at Fore River May 24.

Canadian Vickers

Canadian Vickers delivered the Idefjord, a 6400-ton tanker for the Norwegian-American Line, June 6, and expects to deliver a sister, the Topdalsfjord, in July. The Topdalsfjord is the last vessel under construction.

Coastwise

As part of its general port development plan the city of Baltimore has purchased for $212,500 the property of the Coastwise Shipbuilding Company, consisting of about seven acres of land. The site has a waterfront of 429.6 feet and adjoins the reclaimed area of the McComas street bulkhead. The whole area now controlled by the city at this point amounts to 70 acres. The plant of the Coastwise Shipbuilding Company, which was established in July, 1916, has six launching ways and specialized in schooners and schooner barges.

Dravo

The Dravo Contracting Company, Pittsburgh, has launched an all-steel platinum and gold dredge of dimensions 120 feet by 60 feet by 10 feet 6 inches; having a digging capacity of 7500 cubic yards a day. The gross tonnage is 588 tons, exclusive of machinery and equipment. The dredge is being constructed for the General Development Company of New York City and is for the South American operations of that company. It will be delivered, assembled complete, afloat at the Neville Island plant of the Dravo Company. The dredge will then be towed down the Ohio and Mississippi rivers to New Orleans, at which point it will be placed in the tow of a sea-going vessel for delivery to South America.

The Dravo Company will build three steel lighters for the Shipping Board, New York delivery.

Federal

Federal delivered the 15,000-ton tanker E. T. Bedford to the Standard Oil of New Jersey June 7. Two sisters will be completed in July. The keel of the Steel Seafarer for United States Steel Products was laid May 25; that of the Steel Pathfinder June 1, and that of the Steel Pioneer will be laid early in July.

Foundation

The French High Commission is offering for sale the Foundation Company Shipyard No. 12, located at New Orleans, where several 6000-ton steel vessels of the LeParmentier type were built. The yard covers an area of 90 acres with a launching basin of 20 acres, the latter having a minimum depth of 25 feet. There are three launching ways.

Hog Island

The Buffalo Wrecking Company is dismantling the forty wooden ways of Hog Island. The work will require several months, as it involves the handling of about 5,690,000 feet of heavy lumber of the ways, towers and ramps. The government received about $30,000 for it. Ten permanent ways, built of concrete, will be retained and the yard probably will be leased to private interests when business improves.

Jahncke

The Jahncke Drydock & Ship Repair Company, New Orleans, has purchased the Crescent City Machine & Manufacturing Works. P. A. DuBus, manager of this concern, becomes general manager of the Jahncke Company. In addition to the above, the Stern Foundry & Machinery Company of New Orleans, name, good-will, tools and equipment, has been sold to the Jahncke Company. The personnel of the Stern organization, however, will not be transferred. Arrangements have been made for the transfer of all machinery, tools and equipment of both concerns to the Jahncke Drydock & Ship Repair plant.

Lord

The Lord Drydock Corporation, which operates a completely equipped plant for the repairing of ships, including a 3500-ton Crandall marine railway, at Providence, Rhode Island, has opened its new plant on River Road, West New York, New Jersey, which will be the headquarters of the company in the future.

The West New York plant when completed will have a 100-ton stiff-leg derrick and six floating drydocks of from 1000 to 10,000 tons capacity, four of the docks now being in operation.

The plant is located on the west shore of the Hudson River, opposite Eighty-third street, Manhattan, and covers eighty-eight acres. There is a water frontage of 2000 feet on the property, on which has already been erected two piers. The complete project calls for five 1000-foot piers. The tracks of the West Shore Railroad serve these piers as well as other parts of the yard.

Merchant

Merchant launched the 10,000-ton tanker Playa for the Union Oil Company June 4. Following upon its recent entry into general engineering work, the Merchant yard has been awarded a contract by the Fegles Construction Company, Minneapolis, to furnish certain fabricated steel for grain elevators being erected for the New York Barge Canal Company at Gowanus Bay, Brooklyn.

Newburgh

Shipping men of New York are showing great interest in the steamship Henry D. Whiton. This vessel, which has just been delivered to the Union Sulphur Company by her builders, the Newburgh Shipyards, is designed expressly for the transportation of sulphur in bulk, and in keeping with the nature of her cargo carries on her brimstone yellow smokestack the Union Sulphur Company's insignia of a "red devil" rampant.

The Henry D. Whiton is a twin-screw, single-deck vessel, 356 feet in length by 51 feet 6 inches breadth and 32 feet 5½ inches depth, and has a deadweight carrying capacity of 7346 tons on a draft of 25 feet 5½ inches. In her design and construction she presents many features that contribute to her efficiency in the loading, transportation and discharge of sulphur, while her unusually large water-ballast capacity will insure seaworthiness returning in ballast condition from European discharging ports. The triangular-shaped topside ballast tanks, running all fore and aft on each side of the vessel, make the cargo holds self-trimming and permit the holds to be entirely free from all obstructions, while contributing greatly to the longitudinal strength of the vessel.

The propelling machinery consists of a high and low pressure Parsons marine turbines, each driving a 14-foot propeller through a 36-to-1 reduction gear. These turbines are located one on port side and the other on starboard side, as far outboard as possible, by which the usual obstruction of shaft tunnels through cargo holds aft of machinery spaces is eliminated, and the two aft holds of the Henry D. Whiton can be unloaded by grab buckets with the same ease and facility as the two forward holds. Steam is supplied by three single-ended Scotch boilers, using fuel oil, and it is of interest to know that this vessel has sufficient fuel oil capacity to give her a steaming radius of 15,000 miles at 12 knots' speed.

Considerable attention has also been paid to the accommodations for both crew and officers. The crew are housed in commodious and well-ventilated quarters in the after deck house, while the officers' and engineers' quarters are on the bridge deck.

Newport News

The Newport News Shipbuilding & Drydock Company, with a low bid of $97,550, has been awarded the contract by the Shipping Board for alteration to be made to the new 535-foot passenger steamship Hawkeye State, operated by the Matson Line.

New York

Pennsylvania's namesake, the Keystone State, returned to the Camden yard of the New York Shipbuilding Corporation the afternoon of May 27 with brooms at its mastheads, symbolic of the liner's "clean sweep" in its two-day trial trip. The vessel covered 600 miles in its run. A speed of 19.75 knots was developed, with an average of 18.2. The contract maximum is 17.5. One hundred and thirty-seven guests were on the trial trip. The ship will be operated by the Admiral Line, Pacific Steamship Company, between Seattle and the Orient. She was the first vessel delivered by the South yard of the New York Ship.

The 12,550-ton tanker Empire Arrow, building for Standard Transportation, was launched May 24.

New York Navy Yard

The U. S. S. Tennessee, the latest electrically-propelled dreadnought, which was built at the New York Navy Yard, was given her final trials off Rockland during the latter part of May and passed them with complete success. Among the results obtained, the following are of special interest:

Her actual steam consumptions at various speeds were better than the Westinghouse Company's guarantees by 5 to 10 per cent.

The maximum speed developed was 21.378 knots.

She was brought to rest from top speed in less than three minutes. This is believed to be a record for so large a ship and is about the severest test that can be imposed upon her machinery, as the propellers were being operated astern while the ship was forging ahead.

The salvo test, the firing of all twelve 14-inch guns at once, caused no injury to her electrical equipment.

With astern operation of her propellers she developed 15 knots.

Her turning circle with all propellers operating forward and rudder hard-over is about 700 yards, which is hardly more than that of a destroyer.

It is stated that during the entire time of her trials that her Westinghouse electric propelling machinery functioned perfectly, and that the superior maneuvering power which is claimed for the electric drive has been amply demonstrated.

The propelling machinery of the Tennessee consists of two 15,000-KVA Westinghouse turbo-generators and four 8375-H.P. Westinghouse propeller motors. Her length is 625 feet, beam 91 feet, and displacement 33,000 tons.

Shortly after her trials, she left the Atlantic Coast to join the Pacific fleet.

Staten Island

Staten Island launched the sugar vessel Dixiano for the American Sugar Refining Company May 21 and expected to make delivery in June. Two barges for Standard Oil of New York were launched in May and June, and the keel of a ferryboat for New York City was laid in May.

Submarine Boat

Following the lead of the Merchant Shipbuilding Corporation, which has gone in for general engineering in order to overcome the lack of orders for ship construction and marine engineering, the Submarine Boat Corporation, Newark Bay, New Jersey, is turning its attention to steel fabrication for land work, its initial contract being one for 1200 tons.

Sun

The Norwegian-America Line's new 10,000-ton tanker Foldenfjord was launched May 12 at the Sun Shipbuilding Company's yard, Chester, Pennsylvania. The Foldenfjord is the third Norwegian-America tank steamer to leave the ways in the past six months. After her trial trip, on which she averaged 11.84 knots, she was delivered May 31.

The 10,600-ton tanker David McKelvy, built for the Tidewater Oil Company, was launched June 4.

The Sun yard is reconditioning the Red D steamer Zulia at a cost of about $100,000.

Texas

The Texas Steamship Company launched the tanker Illinois, 9600 deadweight tons, building for its own account, June 11.

Todd

The Todd Shipyards Corporation has added three floating docks to its extensive ship-repair facilities at New York. These additions give the five New York plants of the Todd Corporation a total of eighteen floating drydocks and two graving docks, the latter being the only graving docks, outside those in the Brooklyn Navy Yard, in New York harbor. With the three floating docks on the Pacific Coast at Seattle, the Todd

Corporation operates a total of twenty-three docks and is justly proud of being the largest and most complete ship repair organization in the world.

The three docks recently acquired have been divided between the plants of the Tebo Yacht Basin Company and Clinton Drydocks in Brooklyn, and the Tietjen and Lang Drydock Company in Hoboken.

It is not many years since the distinction of being the world's largest ship repair organization was claimed by an English company. By the building of new docks and the welding together of the principal repair yards in New York harbor into a compact and efficient organization, the Todd Shipyards Corporation has won an international reputation for speed and thoroughness in the building and repair of ships.

In Pacific Yards

Bethlehem

Bethlehem delivered the 10,100-ton tanker Hambro, the first of the sisters building for the Shipping Board, in June. The others, Hammac and Hamer, both of which were launched in May, are scheduled for late July delivery. The F. H. Hillman, the first of three 15,000-ton tankers for Standard Oil of California, will be launched in July.

Four destroyers, Farenholt, Sumner, Corry and Melvin, were delivered in May, the last on May 31. With that delivery the yard's program of sixty-six destroyers was closed. Thirty-six of the total were delivered in twelve months, which, in the absence of proof to the contrary, may well be accepted as an American record.

Kiangnan

The 10,000-ton freighter Celestial, the second of four building at the Kiangnan yard, Shanghai, for the Shipping Board, sailed in June for San Francisco, where delivery will be made by the Robert Dollar Company, representing the builder.

Los Angeles

Los Angeles Shipbuilding & Drydock Company delivered the West Lewark, an 11,000-ton freighter, to the Shipping Board in June. This vessel and her four sisters are the last cargo vessels building for the board on the Pacific Coast. The West Greylock was launched June 15.

Destroyer Farquhar, commanded by Lieutenant Commander R. G. Coman, undergoing a record painting in the Los Angeles drydock.

Lieutenant M. B. Pollock, naval constructor assigned to duty in the plant of the Los Angeles Shipbuilding & Dry Dock Company to supervise dry docking and repairs of destroyers and Pacific fleet auxiliaries at that plant, is credited with the development of a particularly efficient system of handling each destroyer, with the result that through the co-operation of officials and personnel of the plant and of the commander, officers and crew of the ships to be docked, he has created a record of raising a destroyer, thoroughly cleaning the hull, painting it with two coats, cutting in the new water-line and undocking the ship, sending her on her way back to her base within the remarkably short space of five hours.

The destroyer Farquhar, commanded by Lieutenant Commander R. G. Coman, entered the drydock of the Los Angeles yard June 4, and was officially raised at 10:35 a. m. The hull-washing crew, in ten pontoons around the ship as the dock was being raised, scraped, wire-brushed and cleaned her "to a gantling." As she dried, the first coat of paint was applied to the entire hull and a new water-line cut in, her draft marks repainted, the second coat of paint applied over the first and at 3:33 p. m., the Farquhar again was afloat with the company's tug Bedford towing her clear of the dock and heading her seaward.

The Los Angeles yard's equipment permits of a destroyer leaving San Diego in the early morning, being raised, cleaned and painted with two coats and returning to be moored at her base again the same evening.

Moore

The last vessels under construction for the Shipping Board at the Moore yard, Oakland, were launched June 15 and christened Tustem and Lubrico. Each is a 10,000-ton tanker and a sister to the Bohemian Club. The 4750-ton motorship H. T. Harper was launched June 16 for the Standard Oil of California, which placed the motorship Charlie Watson, built by Union Construction, in service a few months ago. The Bohemian Club was to be delivered to the Shipping Board in late June.

Northwest Bridge

Northwest Bridge & Iron, Portland, delivered the 12,000-ton tanker Swiftwind to Swiftsure Oil in June. This was the last of seven sisters and the last steel vessel of any description under construction on the Columbia and Willamette.

Pacific Coast

Another yard completed its work when the Pacific Coast Shipbuilding Company, Bay Point, California, delivered the 9400-ton freighter Nashaba to the Shipping Board in June. With the exception of a small tanker for Associated Oil, all the yard's work was for the Shipping Board.

Peninsula

Ending its marine construction recently after a successful program as to workmanship and the development of its own design, the Peninsula Shipbuilding Company has decided to dispose of its plant at Portland, Oregon. The five-masted schooner Undaunted, which is being fitted out under the direction of G. F. Matthews, is the last ship at the yard. She will be ready for service in July. The Undaunted is one of the Shipping Board wood hulls that were left on the ways at the Grant Smith-Porter yard, Portland, and were taken over to join the commercial sailing fleet.

The Peninsula interests designed the Peninsula type of wood hull, a 4000-ton carrier when fitted as a steamer. Ten of them were finished for the Emergency Fleet Corporation. They were the only wood carriers of the war fleet turned out with turbine gear in the United States. Two hulls left on the ways when the war ended were changed into six-masted schooners and named Oregon Fir and Oregon Pine. Today they are rated the largest of their rig in the lumber trade of the Pacific and have proven smart sailers as well as economical carriers, each having loaded 2,200,000 feet of lumber on the maiden voyage. Before the war the Peninsula yard turned out auxiliary schooners and that fleet was disposed of to Scandinavian and French owners.

Southwestern

Southwestern delivered the 8400-ton tanker Scopas to Dutch Shell in June. She was launched May 28. Her two sisters are scheduled for July and August delivery, and La Purisima, the other vessel under construction, for July launching and August delivery.

Union Construction

Union Construction laid the last keel of its present program, that of the Coast Guard tug Shawnee, June 1, following the laying of the cutters Mojave and Modoc in April.

Wallace

The Wallace yard, Vancouver, B. C., delivered the 8400-ton freighter Canadian Skirmisher to the Canadian Government Merchant Marine on May 16. The Canadian Thrasher, which is being completed at the Prince Rupert yard by Wallace, will be launched about August 15.

Eastern Yard Reports

Atlantic and Gulf

AMERICAN BRIDGE COMPANY, PITTSBURGH, PENN.

Purchasing Agent: W. G. A. Millar.

Twenty-five coal barges Carnegie Steel Co; 175 LBP; 26 beam; 8 loaded draft; 4 launch Mar/21; 5 launch Apr/21; 3 launch May/21.

Six coal barges US War Dept; 145 LBP; 24 beam; 9 loaded draft; keel Mar/21; 3 launch May/21.

Three car floats undisclosed interests; 285 LBP; 38 beam; 8 loaded draft; keel June/21, est; launch Aug /21, est; delivered Sept/21, est.

Two coal barges W. G. Coyle & Co, New Orleans; 175x26x8 loaded draft; launch and deliver July/21.

Two tow boat hulls Carnegie Steel Co; 149-2x34 4-5 loaded draft; launch and deliver Aug/21.

BATH IRON WORKS, BATH, MAINE

Purchasing Agent: J. L. P. Burke.

Thomas P. Beal, hull 86, freighter Crowell & Thurlow; 395-6 LBP; 55 beam; 27-1 loaded draft; 10 loaded speed; 9600 DWT; Parsons geared turbine, 2100 SHP; 3 Scotch boilers, 15-6x11-6; keel Nov/20; **launch June 16/21**; deliver Aug/21, est.

BETHLEHEM SHIPBUILDING CORP., FORE RIVER PLANT, QUINCY, MASS.

Lexington, hull 1300, battle-cruiser U S N.

Raleigh, hull 1382, scout cruiser U S N.

Detroit, hull 1383, scout cruiser U S N.

Massachusetts, hull 1400, battleship USN.

And the following nineteen submarines USN: AA-2, hull 1270; hulls 1309 to 1320 inc, submarines S-18 to S-29 inc; hulls 1389 to 1394 inc; submarines S-42 to S-47 inc.

Java Arrow, hull 1388, tanker Standard Trans Co; 468-6 LBP; 62-6 beam; 27 loaded draft; 11 loaded speed; 12,620 DWT; rec eng, 3200 IHP; 3 Scotch boilers, 15-3x11-6; keel May 17/20; launch Apr 30/21; **deliver May/21.**

Agwibay, hull 1395, tanker At-Gulf & W I S S Co; sister to above; keel Aug27/20; **launch May24/21.**

J. Fletcher Farrell, hull 1496, tanker Sinclair Nav Co; 430 LBP; 59 beam; 25-5 loaded draft; 11 loaded speed; 10,600 DWT; rec eng, 3200 IHP; 3 Scotch boilers, 15x11-9; **launch June10/21.**

William Boyce Thompson, tanker Sinclair Nav Co; sister to above; keel Nov11/20.

BETHLEHEM SHIPBLDG. CORP., SPARROWS POINT PLANT, SPARROWS POINT, MD.

Pine Tree State, hull 4195, combination USSB; 518 LBP; 72 beam; 30-7 loaded draft; 16 loaded speed; turb eng, 10,000 IHP; 8 Yarrows boilers; keel Feb15/19; launch Mar 19/21.

Palmetto State, hull 4196; combination USSB; sister to above; keel Feb19/19; **launch June4/21.**

Nutmeg State, hull 4197, combination USSB; sister to above; keel July29/20.

Emile Deutsch de la Meurthe, hull 4209, tanker Lux Nav Co; 412 LBP; 53-1 beam; 24-5 loaded draft; 11 loaded speed; 8400 DWT; rec eng, 2850 IHP; 3 Scotch boilers; keel Dec14/20; launch Apr16/21; **deliver May/21.**

International, hull 4210, ore and oil International Pet Co; 550 LBP; 72 beam; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; rec eng 4600 IHP; 3 Scotch boilers, 17-6x12; keel July22/20.

Bethore, hull 4211, ore and oil Ore SS Co; sister to above; keel Feb24/21.

Marore, hull 4212, ore and oil Ore SS Co; sister to above, except turb eng; keel May2/21.

Steelore, hull 4213, ore and oil Ore SS Co; sister to above; keel not laid.

CONSOLIDATED SHIPBUILDING CORPORATION, MORRIS HEIGHTS, N. Y.

Purchasing Agent: Wm. Rayner.

Oak, hull 251, US lighthouse tender; 160 LOA; 30 beam; 9-6 loaded draft; 875 DWT; TE eng, 700 IHP; 1 Scotch boiler, 14 diam; keel Nov 22/20; **launch June 18/21.**

Hawthorn, hull 252, US lighthouse tender; sister to above; keel Nov 22/20; launch June/21, est.

No name, hull 246, US lightship; 146-3 LOA; 30 beam; 12-7 loaded draft; 825 DWT; comp eng, 400 IH P; 2 Scotch boilers, 10-6 diam; keel Mar4/21; launch June/21, est.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO., PHILADELPHIA

Purchasing Agent: Ed. C. Geehr.

Hull 448, scout cruiser USN; keel Feb16/20.

Hull 449, scout cruiser USN; keel Mar29/20.

Hull 501, scout cruiser USN; keel Aug18/20.

Hull 502, scout cruiser USN; keel Aug4/20.

Hull 503, scout cruiser USN; keel Oct14/20.

Cuba, hull 505, passenger P&OSS Co; 325 LBP; 47 beam; 16 loaded draft; 16 loaded speed; 1100 DWT; 2-cyl TE eng, 1800 IHP each; 4 SE Scotch boilers, 12x14-6; keel May3/20; launch Dec11/20; **deliver May 1/21.**

OSCAR DANIELS COMPANY, TAMPA, FLORIDA

B. D. Benson, hull 11, Isherwood tanker Standard Oil; 466 LBP; 60 beam; 26-7 loaded draft; 10½ loaded speed; 11,900 DWT; QE eng, 2800 IHP; 3 Scotch boilers, 15x11-6; keel June29/20; launch Apr15/21; deliver June15/21 est.

T. J. Williams, hull 12, Isherwood tanker Standard Oil; sister to above; keel Aug11/20; launch May3/21; deliver Aug15/21 est.

DOULLUT & WILLIAMS SHIPBUILDING COMPANY, NEW ORLEANS

Ward, hull 1913, Isherwood SS for USSB; 395-6 LBP; 55 beam; 27 loaded draft; 11 loaded speed; 9600 DWT; turbine eng, 2800 IHP; 3 WT boilers, 9150 sq ft; keel Mar25/20; launch Jan22/21; **deliver May23/21.**

Oldham, hull 1914; sister to above; keel Apr17/20; launch Mar19/21; **deliver May31/21.**

FEDERAL SHIPBUILDING CO., KEARNY, N. J.

Purchasing Agent: J. L. Hastings.

E. T. Bedford, hull 48, tanker for Standard Oil of NJ; 500 LBP; 68 beam; 27-6 loaded draft; 11 loaded speed; 15,000 DWT; rec engs, 3500 IHP; 3 Scotch boilers, 16 diam; keel July23/20; launch May17/21; **deliver June 7/21.**

Victolite, hull 49, tanker Standard Oil of NJ; sister to above; keel July 22/20; **launch June 14 / 21**; deliver July2/21 est.

J. A. Moffett Jr, tanker Standard Oil of NJ; sister to above; keel July 23/20; launch July5/21, est; delivery July22/21, est.

Steel Seafarer, hull 43, freighter US Steel Products Co; 425 LBP; 56 beam; 25-10 loaded draft; 12 loaded speed; 9400 DWT; turb engs, 3100 IHP; 3 Scotch boilers, 15 diam; **keel May25/21**; launch Oct15/21, est; deliver Nov5/21, est.

Steel Pathfinder, hull 44, freighter US Steel Products Co; sister to the above; keel June1/21; launch Nov 12/21, est; deliver Dec3/21, est.

Steel Pioneer, hull 45, freighter US Steel Products Co; sister to the above; keel July5/21, est; launch Dec10/21, est; deliver Dec31/21, est.

GLOBE SHIPBUILDING & DRYDOCK CO. OF MARYLAND, BALTIMORE

Purchasing Agent: H. B. McCauley.

San Leopoldo, hull 101, oil carrier Eagle Oil Transport Co; 401 LBP; 54 beam; 25-1 loaded draft; 10½ loaded speed; 8600 DWT; TE engs, 2800 IHP; 3 Scotch boilers, 15-3x 11-6; keel Sept/20; launch June25/21, est; deliver Aug15/21, est.

San Leonardo, hull 102, oil carrier Eagle Oil Transport Co; sister to above; keel Sept/20; launch July26/21, est; deliver Aug30/21, est.

LAKE TORPEDO BOAT CO., BRIDGEPORT, CONN.

Purchasing Agent: H. C. Stevens.

S-48, hull 48, submarine USN.

S-49, hull 49, submarine USN.

S-50, hull 50, submarine USN.

S-51, hull 51, submarine USN.

MERCHANT SHIPBUILDING CORPORATION, CHESTER, PENN.

Purchasing Agent: G. Coit.

Puente, hull 381, tanker Union Oil Co; 424 LBP; 58 beam; 25-5 loaded draft; 10½ loaded speed; 10,000 DWT; TE engs; 3 Scotch boilers, 15-3 x11-7; keel July 3/20; launch Apr 28/21; **deliver June14/21.**

Playa, hull 382, tanker Union Oil Co; sister to above; keel July22/20; **launch June4/21.**

Robert E. Hopkins, hull 383, tanker Tidewater Oil Co; sister to above; keel Aug30/20.

Samuel Q. Brown, hull 384, tanker Tidewater Oil Co; sister to above; keel Oct1/20.

No name, hull 385, freighter American-Hawaiian SS Co; 445 LBP; 59-8 beam; 28-6 loaded draft; 11½ speed; 11,000 DWT; 2 6cyl, 4-cycle Diesel engs, 4500 metric; 1 vertical donkey, 400 sq ft HS; keel Feb5/21; launch June/21, est.

No name, hull 386, freighter American-Hawaiian SS Co; sister to above; keel Feb10/21; launch July/21, est.

NAVY YARD, BOSTON

Pecos, fuel ship No. 18, USN; 455 LBP; 56-2 beam; 26-8 loaded draft; 14 loaded speed; 14,800 disp; rec eng, 5200 IHP; 4 Ward WT boilers; keel June2/20; launch Apr23/21; deliver Oct/21, est.

Whitney, destroyer tender No. 4 USN; 460 LBP; 60-11 beam; 21 loaded draft; 16 loaded speed; 10,600 disp; geared Parsons turbs, 7000 IHP; 2 WT exp small tube boilers; keel Apr23/21; launch Apr/22, est; deliver Oct/22, est.

NAVY YARD, PHILADELPHIA

Dobbin, hull 7, destroyer tender USN; 460 LBP; 60-10 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp; Parsons geared turb single screw engs, 7000 SHP; 2 WT boilers; keel Dec23/19; launch May 5/21; deliver date not determined.

Constitution, hull 8, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive, 180,000SHP; 16 WT boilers; keel Sept 25 / 20; launch and deliver dates not determined.

United States, hull 9, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive, 180,000 SHP; 16 WT boilers; keel Sept25/20; launch and deliver dates not determined.

NEW YORK SHIPBUILDING CORPORATION, CAMDEN, N. J.

Purchasing Agent: L. G. Buckwalter.

Southern Cross, hull 241, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs, 12,000 SHP; 8 WT boilers; keel Aug/18; launch July20/19; deliver fall/21, est.

American Legion, hull 242, combination USSB; sister to above; keel Jan21/19; launch Oct11/20; deliver summer/21.

Blue Hen State, hull 250, combination USSB; sister to above; keel Mar 4/20; launch Feb23/21; deliver summer/21, est.

Bay State, hull 251, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs, 12,000 SHP; 8 WT boilers; keel Oct15/19; launch July17/20; deliver winter/21, est.

Peninsula State, hull 252, combination USSB; sister to above; keel July20/20; launch Apr/21; deliver spring/22, est.

Keystone State, hull 253, combination USSB; sister to above; keel May13/19; launch May15/20; **deliver May28/21.**

Empire State, hull 254, combination USSB; sister to above; keel May 13/19; launch Aug4/20; **deliver June !21.**

Lone Star State, hull 255, combination USSB; sister to above; keel May 13/19; launch Oct23/20; deliver summer/21, est.

Hoosier State, hull 256, combination USSB; sister to above; keel May20/19; launch Oct23/20; deliver fall/21, est.

Yankee Arrow, hull 260, bulk oil Standard Trans Co of NY; 468 LBP; 62-6 beam, 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs, 3200 SHP; 3 SE Scotch boilers, 15-2x11-6; keel Aug17/20; launch Apr10/21; deliver summer/21 est.

Empire Arrow, hull 261, bulk oil Standard Trans of NY; sister to above; keel Sept14/20; **launch May 24/21;** deliver summer/21.

Levant Arrow, hull 262, bulk oil Standard Trans Co of NY; sister to above; keel Nov4/20; launch fall/21, est; deliver winter/21, est.

No name, hull 263, combination Munson SS Co; 414 LBP; 57-6 beam; 23 loaded draft; 15½ loaded speed; 4950 DWT; geared turbs, 5800 SHP; 5 SE Scotch boilers, 16-4x12-3; keel Sept30/20; launch summer/21, est; deliver winter/21, est.

No name, hull 264, bulk oil stock; 419-3 LBP; 56-3 beam; 25-9¼ loaded draft; 10¾ loaded speed; 9870 DWT; 3 cyl TE engs, 3000 SHP; 3 SE Scotch boilers, 15-10x11-4; keel Jan17/21; launch fall/21, est; deliver winter/21.

No name, hull 265, bulk oil stock; sister to above; keel spring/21, est; launch fall/21, est; deliver winter/21, est.

Dixie Arrow, hull 266, bulk oil Standard Trans Co of NY; 468 LBP; 62-6 beam; 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs, 3200 SHP; 3 SE Scotch boilers, 15-3 x 11-6; keel Aug11/20; launch fall/21, est; deliver winter/21, est.

Saratoga, hull 199, battle cruiser USN; 874 LOA; 850 LBP; 105-5¼ extreme beam; 31 mean draft; 43,500 normal disp; 33¼ loaded speed; GE turbo-electric drive; 180,000 SHP; 16 WT boilers, 198,000 sq ft plus 18,000 superheat; keel Sept25/20.

Colorado, hull 200, battleship USN; 624 LOA; 600 LBP; 97-3½ beam waterline; 30-6 mean draft; 32,600 normal disp; 21 loaded speed; Westinghouse turbo-electric drive, 28,900 SHP; 8 B&W WT boilers, 41,678 sq ft plus 4169 superheat; keel Mar29/19; launch Mar22/21.

Washington, hull 201, battleship USN, sister to above; keel June30/19; launch Sept/21, est.

Hull 267, fuel ship Japanese Navy; 497-8 LOA; 67 beam; 28 designed draft; 15 loaded speed; 13,000 DWT; elec drive, 8000 SHP; 4 B&W boilers; keel fall/21, est.

STANDARD SHIPBLDG. CORP'N, SHOOTERS ISLAND, MARINERS HARBOR, N. Y.

Purchasing Agent: Jamie Cortada.

Hull 32, fireboat City of New York; 121 LBP; 27 beam; 14-9 deep; 12 loaded speed; comp eng, 900 IHP; 2 B & W WT boilers, oil burning; keel Mar31/21; deliver Sept1/21, est.

STATEN ISLAND SHIPBUILDING COMPANY, STATEN ISLAND, NEW YORK

Purchasing Agent: R. C. Miller.

Diviano, hull 726, sugar ship Arn, Sug Ref Co; 360 LBP; 50 beam; 23 loaded draft; 10 loaded speed; 6300 DWT; TE eng, 2000 IHP; 2 Scotch boilers, 15x11; keel Sept9/20; **launch May21 21;** deliver June18/21, est.

Hell Gate, hull 728, dredge C. R. Browning; 140 LBP; 48 beam; 15 loaded draft; keel Aug28/20; launch Feb23/21.

Socony 113, hull 733, barge Stand Oil of NY; 258 LBP; 40 beam; 13 loaded draft; 2200 DWT; keel Dec 30/20; **deliver June/21.**

Socony 114, hull 734, barge Stand Oil of NY; sister to above; keel Jan10/21; deliver July9/21, est.

Socony 115, hull 735, barge Stand Oil of NY; sister to above; keel Feb 26/21; deliver July30/21, est.

Hull 736, tugboat Staples Trans Co; 136½ LBP; 27 beam; 16½ loaded draft; 10 loaded speed; 1 TE eng 700 HP; 1 Scotch boiler, 16x11½; keel May16/21; launch July30/21, est; deliver Sept15/21, est.

Hull 737, ferryboat City of New York; 247 LBP; 66 beam; 19½ loaded draft; 15 loaded speed; 1 F&A comp eng, 3500 HP; 4 B&W WT boilers, 13,000 sq ft; keel May 23/21; launch Aug15/21, est; deliver Oct 17/21, est.

Northwestern, tanker Am Pet Co; 242 LBP; 42 beam; 23 loaded draft; 10 loaded speed; TE eng; 2 Scotch boilers; lengthening job, additional 56 ft, making 2 new cargo tanks, 1000 DWT additional capacity. Vessel considered total loss by fire; raised; and now undergoing general repairs and at the same time lengthening. Job started May31/21; estimated time 4 months.

SUBMARINE BOAT CORP., PORT NEWARK, N. J.

Purchasing Agent: W. C. Lawrence.

Suphenco, hull 150, motorship Submarine Boat Corp; 324 LBP; 46-2 beam; 23 loaded draft; 11 loaded speed; 5350 DWT; keel May29/20; launch Apr12/21.

SUN SHIPBUILDING COMPANY, CHESTER, PENN.

Purchasing Agent: H. W. Scott.

J. N. Pew, hull 39, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs, 4300 IHP; 3 SE Scotch boilers, 15-10x 11-11¼; keel Nov5/20; launch Apr 23/21.

Agwiharve, hull 40, tanker A. G. W. I. S. Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 12 loaded speed; 12,500 DWT; single screw QE engs, 4300 IHP; 4 SE Scotch boilers, 15-10 x11-11¼; keel Nov26/20; launch Apr 2/21.

Agwimex, hull 41, tanker A. G. W. I. S. Co; sister to above; keel Dec8/20; launch May21/21, est; deliver July/21, est.

Agwiscot, hull 42, tanker A. G. W. I. S. Co; sister to above; keel Dec23/20; launch July2/21, est; deliver July 30/21, est.

Agwistates, hull 43, tanker A. G. W. I. S. Co; sister to above; keel Jan3/21; launch July16/21, est; deliver Aug15/21, est.

Hull 44, tanker Benham & Boyesen, Inc; 430 LBP; 59 beam; 25-7 loaded draft; 11 loaded speed; 10,600 DWT; TE engs, 2600 IHP, est; 3 SE Scotch boilers, 15-10x11-11¼; keel Jan12/21; launch May 12/21; **deliver June 1/21.**

David McKelvy, hull 45, tanker Tidewater Oil Co; sister to above, except loaded speed is 10½; keel Feb23/21; **launch June4/21**; deliver June30/21, est.

No name, hull 46, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs, 4300 IHP; 3 SE Scotch boilers, 15x11-11¾; keel Apr/21; launch Aug30/21, est; deliver Sept30/21, est.

No name, hull 47, tanker Sun Oil Co; sister to above; keel Apr/21; launch Sept3/21, est; deliver Oct 3/21, est.

TERRY SHIPBUILDING CORP., SAVANNAH

Purchasing Agent: H. A. Bittner.

Hull 69, oil-barge builders' acct; 285 LBP; 44 beam; 21 loaded draft; 3500 DWT.

Hulls 70, 71, 72; sisters to above; work suspended.

TEXAS STEAMSHIP COMPANY, BATH, MAINE

Purchasing Agent: A. R. Weber.

Illinois, hull 31, tanker Texas S S Co; 415-10 LBP; 56 beam; 25-7¾ loaded draft; 11½ loaded speed; 9600 DWT; TE engs, 3000 IHP; 3 Scotch boilers, 15-3x11; keel Oct 19/20; **launch June11/21.**

No name, hull 32, tanker Texas SS Co; sister to above; keel Nov10/20.

American Lakes

ANCHOR SHIPBUILDING CO., WASHBURN, WIS.

Purchasing Agent: Geo. F. Morgan.

Double ended ferry, no name, Hudson & Athens Ferry Co; 113 LBP; 33 beam; 7 loaded draft; 8 loaded speed; Ingersoll-Rand Diesel engs, 300 IHP; keel Feb/21; **launch May/21**; deliver June28/21, est.

DEFOE SHIPBUILDING CO., BAY CITY, MICH.

Purchasing Agent: A. D. Defoe.

Major William P. Pence, hull 56, mine planter US Govt; 100 LBP; 22 beam; 11 loaded draft; 12 loaded speed; comp eng, 350 IHP; 1 WT boiler; **deliver May/21.**

Captain Clarence M. Condon, hull 57, mine planter US; sister to the above; **deliver May/21.**

Captain John W. McKie, hull 58, mine planter US; sister to above; **deliver May/21.**

Canadian

CANADIAN VICKERS, LTD., MONTREAL

Purchasing Agent: H. Graham.

Idefjord, hull 81, single-screw steel two-deck cargo Norwegian-America Line; 365 LBP; 49½ beam; 29 loaded draft; 11½ loaded speed; 6400 DWT; TE engs, 2600 IHP; 3 Scotch boilers, 14-9 with superheaters; keel May8/20; launch Apr9/21; **deliver June6/21.**

Topdalsfjord, hull 82, Norwegian America Line; sister to above; keel July29/20; launch May5/21; deliver July/21, est.

DAVIE SHIPBUILDING & REPAIRING COMPANY, LTD., LAUZON LEVIS, P. Q., CANADA

Purchasing Agent: N. W. Van Wyck.

Canadian Challenger, hull 476, single-screw cargo Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE surface cond engs, 3000 IHP; 3 Scotch marine boilers, 15-6x 11-6; keel May14/20; launch June/21, est.

PORT ARTHUR SHIPBUILDING COMPANY, PORT ARTHUR, ONTARIO

Purchasing Agent: N. S. Thrasher, Cleveland, Ohio.

Canadian Harvester, hull 45, double-deck ocean freighter Canadian government merchant marine; 251 LBP; 43-6 beam; 22-3 loaded draft; 10 loaded speed; 3950 DWT, est; 3 cyl TE 18-30-50x36 engs, 1250 IHP; 2 Scotch boilers, 16x10-9; keel Mar 30/20; launch Nov20/20; **deliver May17/21.**

Miscellaneous Construction

COLUMBIA STEEL COMPANY, PITTSBURG, CALIF.

Steel castings for many steel vessels now under construction in the Pacific Coast yards, including the dreadnought Montana and the sister ships 49, 50, 52; also for Coast Guard cutters under construction in the Union Const. Co. yard.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO., PHILADELPHIA

Twelve Parsons manganese bronze propellers for scout cruisers 4, 5 and 6 building by Todd Drydock & Const. Corp., Tacoma. Two right-hand and two left-hand propellers for each vessel. Weight of propellers 13,200 pounds each; diameter 11-3; pitch 11-10.

ALLAN CUNNINGHAM COMPANY, SEATTLE

On order and under construction: 6 steam and electric steering gears; 13 steam and electric anchor windlasses; 18 steam and electric and hydro-electric and hand capstans; 37 steam and electric winches.

DOW PUMP & DIESEL ENGINE COMPANY, ALAMEDA

H. T. Harper, motorship Standard Oil Co; one 200 IHP, two 267 IHP Diesel auxiliary electric drive engs.

JAMES C. H. FERGUSON, SALES AGENT, MONADNOCK BLDG., SAN FRANCISCO

American Engineering Co.: Four steering engines, ferries Newark and Piedmont; electric capstans drydock Moore; hydraulic telemotor, hull 2077, Moore; 3 towing machines, 4 steering engines, Shipowners & Merchants' Tugboat Co.

Pneumercator Co.: 116 pneumercators USS California, Mare Island; 40 for 4 Coast Guard cutters, Union Construction; 10 for West Lewark, West Faralon, West Greylock, West Prospect, West Chopaka, Los Angeles; 60 for 12 submarines U S N, Bethlehem; 2 for SS Mandarin.

Rostand Mfg. Co.: air ports and lenses complete 4 Coast Guard cutters and 4 Anglo-Saxon tankers, Union Construction Co.

FORD & GEIRRINE, AGENTS, SAN FRANCISCO

National stockless anchors, Upson Walton Co., for hull 165 at Moore's; Dean feed pumps, Dean Bros' Steam Pump Works, for 166 at Moore's; Reliance forced draft equipment, Jno Reid & Co., for hulls 165, 166 at Moore's; National stockless anchors Upson Walton Co., hull 166, Moore's; Dean feed pumps, Dean Bros' Steam Pump Works, hull 23, Southwestern; Willett Bruce whistle control, McNab Co., hulls 16, 17, 18, 19, Union Construction; McNab direction indicators, McNab Co., hulls 16, 17, 18, 19, Union Construction; Reliance forced draft equipment, John Reid & Co., hull 23, Southwestern; Anchor chain, Lebanon Chain Co., hull 23, Southwestern; windlass, gypsy and steering gear, Hyde Windlass Co., hull 20, Union Construction; Welin davits, American Balsa Co., hulls 5311-2-3, Bethlehem, hull 163, Moore; Reliance furnace fronts, John Reid & Co, hulls 2862-3-4, Moore; Willett-Bruce whistle control, McNab Co., hulls 5311-2-3, Bethlehem; McNab direction indicator, hulls 31-2-3-4-5, Los Angeles; Balsa wood for cold storage, American Balsa Co, hulls 5311-2-3, Bethlehem; Welin davits, American Balsa Co., hulls 2862-3-4 and hull 165, Moore; White fuel oil burners, Todd Dry Docks, hull 165, Moore; Mills releasing gear, hulls 24-5-6, Southwestern; Broady releasing gear, hull 165, Moore.

LIDGERWOOD MFG. COMPANY, NEW YORK, SAN FRANCISCO, LOS ANGELES

One 10x10 inch screw gear steering engine for USS Holland building at Puget Sound Navy Yard.

MARINE IRON WORKS, CHICAGO

Five hundred special ice machines.

SKANDIA PACIFIC OIL ENGINE COMPANY, OAKLAND

Purchasing Agent: A. Bolander.

Ten 850 BHP Werkspoor Diesel engs building for USSB; 6 cyl, 135 RPM; six delivered.

Ten 140 BHP 4-cylinder Skandia engs for self-propelling barges on Erie Canal; all delivered.

Fifteen 16 BHP 1-cylinder Skandia engs, auxiliaries for above; all delivered.

One 100 BHP 2-cylinder Skandia eng for river freighter for N. Fay & Son; delivered.

STEWARD DAVIT & EQUIPMENT CORP., NEW YORK, SAN FRANCISCO, SEATTLE

Steward davits are being installed in the following: At Union Const Co: Coast Guard cutters, hulls 16, 17, 18, 19; Canadian Pacific lines, Wallace yard, Vancouver; Matson SS Enterprise, Moore yard; hull 166, Vacuum Oil, Moore yard.

Returns of the West Coast

United States

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
Potrero Works

Purchasing Agent: O. W. Street.

Hammac, hull 5274, tanker USSB; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec engs, 2600 IHP; 3 Scotch marine boilers, 15x11-9; launch May25/21; deliver July20/21, est.

Alameda Works

Hambro, hull 5272, tanker USSB; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec engs, 2700 IHP; 3 Scotch marine boilers, 15x11-9; keel Sept8/20; launch Apr15/21; **deliver June/21.**

Hamer, hull 5273, tanker USSB; sister to Hambro; keel Nov1/20; **launch** May21/21; deliver July30/21, estimated.

Chilore, hull 5309, combination ore and coal carrier Ore Steamship Co; 571-6 LOA; 550-1 LBP; 72 molded beam; 44 molded depth; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; Curtis turbines with Falk reduction gears, 5000 SHP; 3 Scotch SE boilers, 17-6x12, each 4287 sq ft; oil burners; keel July/21, est; launch Oct/21, est; deliver Jan/22, est.

Lebore, hull 5310, combination ore and coal carrier Ore Steamship Co; sister to above; keel July/21, est; launch Nov/21, est; deliver Feb/22, estimated.

F. H. Hillman, hull 5311, tanker Stand Oil Co of Cal; 500 LBP; 68 beam; 25-11 loaded draft; 11 loaded speed; 15,000 DWT; rec engs, 4000 IHP; 3 Scotch marine boilers, 16x 12-9; keel Jan10/21; launch July/. 21, est; deliver Aug15/21, est.

H. M. Storey, hull 5312, tanker Stand Oil Co of Cal; sister to F. H. Hillman; keel Jan19/21; launch July 15/21, est; deliver Sept1/21, est.

W. S. Rheem, hull 5313, tanker Stand Oil Co of Cal; sister to F. H. Hillman; keel Mar1/21; launch July 31/21, est; deliver Sept1/21, est.

BETHLEHEM SHIPBUILDING CORPORATION, LTD.
Potrero Works
Naval Work

Destroyers USN; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1308 tons; turbine engs, 27,000 IHP; 4 Yarrows boilers. **Last four delivered as follows: Farenholt, May 10; Corry, May 25; Sumner, May 26; Melvin, May 31.**

Submarines USN: S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145; launch Jan5/21; S-41, hull 146.

HANLON DRYDOCK & SHIPBUILDING CO., OAKLAND

Purchasing Agent: R. Barker.

Dan F. Hanlon, hull 89, steam schr. D. J. Hanlon; 2500 DWT; 1400 IHP engines; 2 B&W boilers.

LOS ANGELES SHIPBUILDING & DRYDOCK CO., SAN PEDRO

West Lewark, hull 31, steel cargo USSB; 430 LBP; 54 beam; 28-2 loaded draft; 10½ loaded speed; 11,000 DWT; TE engs, 3500 IHP; 3 Scotch single end, 15-9; keel July30/20; launch Feb24/21; **deliver June/21.**

West Faralon, hull 32, steel cargo USSB; sister to above; keel Sept27/20; launch Apr19/21; deliver July 15/21, est.

West Greylock, hull 33, steel cargo USSB; sister to above; keel Nov10/20; **launch June/21;** deliver Aug9/21 est.

West Prospect, hull 34, steel cargo USSB; sister to above; keel Dec31/20; launch July13/21, est; deliver Sept14/21, est.

West Chopaka, hull 35, steel cargo USSB; sister to above; keel Feb24/21; launch Sept6/21, est; deliver Nov25/21, est.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: W. E. Hostetter.

Bohemian Club, hull 2862, tanker USSB; 425 LBP; 57 beam; 26 loaded draft; 10,000 DWT; rec eng; three Scotch boilers, 15-2x11; keel Oct23/20; launch May14/21; deliver June 25/21, est.

Tustem, hull 2863, tanker USSB; sister to the above; keel Nov24/20; **launch June15/21;** deliver Aug25/21, estimated.

Lubrico, hull 2864, tanker USSB; sister to above; keel Jan/21; **launch June15/21;** deliver Aug30/21, est.

H. T. Harper, hull 163, tanker Standard Oil Co of California; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engs; keel Oct/20; **launch June/21;** deliver July15/21, est.

Tamihua, hull 165, tanker S. P.-Atlantic S S Co; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; rec engs; 3 Scotch boilers, 15-9x12; keel Feb28/21; launch July2/21, est; deliver Aug6/21, est.

S. S. Birkenhead, hull 166, tanker Vacuum Oil Co; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec engs; 3 Scotch marine boilers, 15-2x 12; keel Dec9/20; launch July12/21, est; deliver Aug20/21, est.

NAVY YARD, PUGET SOUND

Medusa, repair ship for government; 460 LBP; 70 beam; about 19 loaded draft; 17-5 loaded speed; turbine eng, 7000 IHP; 2 WT express type boilers; 10,000 tons disp; keel Jan2/20; launch and deliver dates not set.

Holland, submarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K loaded speed; turbine eng, 7000 IHP; two WT express type boilers; 10,000 tons disp; keel Apr11/21.

NAVY YARD, MARE ISLAND

California, battleship USN; 600 L BP; 97-3½ beam; 30-3 loaded draft; 21 loaded speed; 32,300 disp; turbo-electric engs, 26,800 SHP; 8 Bu's express boilers, 50,984 sq ft; keel Oct 25/16; launch Nov20/19; deliver July or Aug/21.

Montana, battleship USN; 660 LB P; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 disp; turbo-electric engs, 60,000 SHP; 12 Bu's express boilers, 74,040 sq ft; keel Sept 1/20.

Wasmuth, destroyer USN; 310 LB P; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 disp; geared turbine eng, 26,000 SHP; 4 Normand boilers, 27,000 sq ft; keel Aug12/19; launch Sept15/20.

Trever, destroyer USN; sister to above; keel Aug12/19; launch Sept 15/20.

Perry, destroyer USN; sister to above; keel Sept15/20.

Decatur, destroyer USN; sister to above; keel Sept15/20.

NORTHWEST BRIDGE & IRON CO., PORTLAND

Purchasing Agent: W. C. Smith.

Swiftwind, tanker Swiftsure Oil Trans Co (France & Canada S S Co); 12,000 DWT; shelter deck; Isherwood system; 465-7 LBP; 60 beam; 26-3 loaded draft; 10½ loaded speed; TE eng, 3150 IHP; 3 Scotch boilers, 15-5½x11-9; launch May19/21; **deliver June/21.**

PACIFIC COAST SHIPBUILDING CO., BAY POINT

Purchasing Agent: J. A. Smiley.

Nashaba, hull 950, steel cargo US SB; 402-6 LBP; 53 beam; 26-6 loaded draft; 9400 DWT turb eng, 2800 IHP; 3 Scotch boilers, 11x15-6; keel Aug25/19; launch Mar24/21; **deliver June/21.**

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

La Purisima, hull 23, Isherwood tanker Union Oil Co; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engs, 2800 IHP; 3 Scotch boilers, 14x12; keel Dec22/20; launch July/21, est; deliver Aug/21, est.

Scopas, hull 24, Isherwood tanker Nederlandsch - Indische Tankstoomboot Maatschappij; 412 LBP; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engs, 2800 IHP; 3 Scotch boilers, 15-6 x 11-7; keel Oct20/20; **launch May28/21; deliver June/21.**

Silvanus, hull 25, Isherwood tanker Nederlandsch-Indische Tankstoomboot Maatschappij; same as above; keel Oct20/20; launch June/21, est; deliver July/21, est.

Semiramis, hull 26, Isherwood tanker Nederlandsch-Indische Tankstoomboot Maatschappij; same as above; keel Nov5/20; launch July/21, est; deliver Aug/21, est.

TODD DRYDOCK & CONSTRUCTION CORP., TACOMA

Purchasing Agent: C. L. Bankson.

Omaha, hull 100, scout cruiser US N; 555-6 LOA; 550 LBP; extreme beam 55-4; molded beam 54-9; depth molded 26; mean loaded draft 13-6; disp 7100 tons; Westinghouse Parsons turbines and reduction gear, 105,000 IHP; designated speed 34; 12 Yarrows WT boilers; keel Dec6/18; launch Dec14/20.

Milwaukee, hull 106, scout cruiser USN; sister to above; keel Dec13/18; launch Mar24/21.

Cincinnati, hull 107, scout cruiser USN; sister to above; keel May15/20; launch May23/21.

UNION CONSTRUCTION CO., OAKLAND

Tampa, hull 16, cutter USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engs, 2600 IHP; 2 WT boilers; keel Sept27/20; launch Apr16/21.

Haida, hull 17, cutter for USCG; same as the above; keel Sept27/20; launch Apr19/21.

Mojave, hull 18, cutter USCG; same as the above; keel Apr16/21; launch Sept10/21, est.

Modoc, hull 19, cutter USCG; same as above; keel Apr19/21; launch Sept10/21, est.

Shawnee, hull 20, cutter USCG; 150 LOA; 30 beam; 13-6 loaded draft; 12½ loaded speed; 1000 DWT; rec engs, 1000 IHP; 2 WT boilers; **keel June1/21.**

Achatina, hull 21, oil tanker Anglo-Saxon Pet Corp, Ltd; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec engs, 2600 IHP; 3 Scotch marine boilers, 15-6 x 11-7; keel Dec15/20; launch May21/21.

Ampullaria, hull 22, oil tanker Anglo-Saxon Pet Corp, Ltd; sister to Achatina; keel Feb 5/21; **launch June20/21.**

Amalthus, hull 23, oil tanker Anglo-Saxon Pet Corp, Ltd; sister to Achatina; keel Mar 12/21; launch July15/21, est.

All cutters on transverse system; others on Isherwood system.

Canadian

CHOLBERG SHIPYARD, VANCOUVER, B. C.

Purchasing Agent: W. Meed.

Sir Henry Drayton, hull 5, 4-masted barkentine Victoria Shipowners, Ltd; 250 LOA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel; shaft logs fitted for auxiliary but no machinery installed; keel May 15/20; launch Aug1/21, est.

No name, hull 6, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel June4/20; launch Oct 1/21, est.

No name, hull 7, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel Feb/21.

J. COUGHLAN & SONS, LTD., VANCOUVER, B. C.

Purchasing Agent: J. Joseph.

Canadian Transporter, hull 20, steel freighter Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE eng, 3000 IHP; 3 Scotch boilers, 15-6 x11-6; keel Jan6/21.

Canadian Freighter, hull 21, steel freighter Canadian government; sister to above; keel Jan6/21.

PRINCE RUPERT DRYDOCK & ENGINEERING COMPANY, PRINCE RUPERT

Canadian Scottish, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Sept 27/19; launch May17/21.

Canadian Thrasher, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Oct20/19; launch Aug 15/21, est.

These vessels are being completed by the Wallace Shipbuilding & Drydock Co, North Vancouver. The terms are time and material plus 8 per cent.

WALLACE SHIPBUILDING & DRYDOCK CO., VANCOUVER, B. C.

Canadian Skirmisher, cargo Canadian government; 8400 DWT; 413 long; 52 beam; 31 deep; 11½ loaded speed; keel Oct/20; launch Mar17/21; **deliver May16/21.**

Coastwise steamship Canadian Pacific; 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel Oct/20.

This company also will complete the Canadian government steamships Canadian Reaper and Canadian Thrasher, each of about 8400 tons deadweight, work on which was suspended when the Prince Rupert Drydock & Engineering Company went into the hands of a receiver.

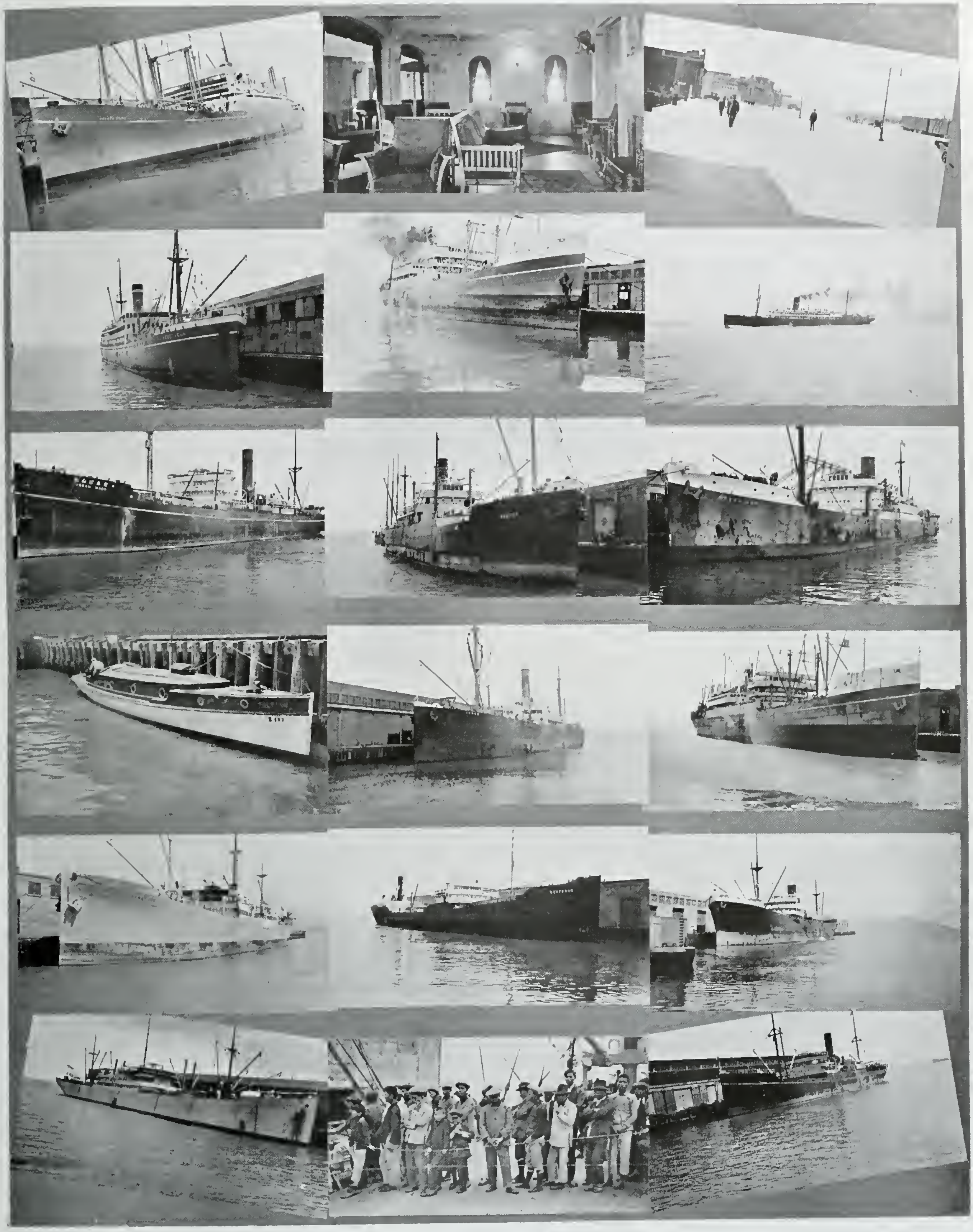
Drydocking and Repairs

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Miscellaneous repairs: Shabonee (also retubing main condenser), Steel Age, Golden State, Newport, La Brea (also repairs to fuel tank bulkhead, installation grease extractor), Banter, Buford, Santa Inez, San Jose, Barge No. 4, Eastern Importer. New crankshaft: Barge Olinda. Miscellaneous repairs, drydocking, painting: Coalinga (also making and installing 2 capstans), Arctic, Bangor, Bandon, Atlas, Colusa, Rosamond. Repairs to stern

Snaps Along the Waterfront



Left to right, top row: Pacific Mail passenger liner Golden State; interior reception hall Golden State; scene on San Francisco's Embarcadero. Second row: Pacific Mail liner Venezuela; Pacific Mail passenger and cargo liner Wolverine State; Admiral Line's coasting passenger steamer President. Third row: Japanese freighter Durban Maru; General Steamship freighter Meriden; Isthmian Line freighter Steel Age. Fourth row: Mystery speed boat Lillian; American-Hawaiian freighter Iowan; Pacific Mail freight and passenger liner Creole State. Fifth row: Swedish motorship Borgland; U. S. Shipping Board tanker Stockton; Dutch freight steamer Bali. Sixth row: Swedish motorship Buenos Aires; Oriental immigrants watchfully waiting; Toyo Kisen Kaisha steamer Mayo Maru.

Photographs by J. P. Crotty.

wheel: Potrero. New feed pump bodies: West Hixton, Las Vegas, West Holbrook. New tailshaft: F. S. Loop. Engine, boiler, hull repairs: Marama. Overhauling sea valves, drydocking, painting: Nashaba. Engine and hull repairs, drydocking, painting: Borgland, La Habra (also boiler repairs). Caulking decks: Wolverine State. New propeller blades: D. G. Scofield.

Alameda Works

Miscellaneous repairs: Katherine, Davenport, Liverton, Angel Island, Solano, Pacific, Daisy Freeman, Phyllis. Drydocking, miscellaneous repairs, new propeller: Idaho. Miscellaneous repairs, drydocking, painting: F. S. Loop, Stanwood, Quinault (new propeller), Johanna Smith, Daisy. New propeller: Oregon.

MOORE SHIPBUILDING COMPANY

Oakland

Drydocking, cleaning, painting, miscellaneous repairs: Eastern Importer (hull), Grays Harbor, West Henshaw, West Keene (engine), Fernwood (engine and hull), W. P. Barge No. 2, Amy Turner (hull), A. H. Payson, Tamalpais, Saginaw (no repairs), George U. Hind, Philippine, Northland (no cleaning, painting), Meanticut. Miscellaneous engine and hull repairs: Tuchee, Golden Gate. Engine repairs: Sonoma, Steel Age, Bali, Royal Arrow, Pomona, Willfaro, S. C. T. Dodd, West Notus, Eastern Mariner, Santa Alicia, Bakersfield, R. J. Hanna, Steel Mariner. Hull repairs: Ensley City, Julia Luckenbach, San Francisco. Miscellaneous repairs: West Kedron.

NAVY YARD, PUGET SOUND

Drydocking, cleaning, painting bottom, miscellaneous alterations and repairs: Destroyers Tingey, Morris, Meade, Bailey, Thornton; Tug Sotoyomo, fuel ship Neptune. Drydocking, cleaning bottom: Cargo lighters Nos. 46, 88, 89. Miscellaneous repairs and alterations: Destroyers Gillis, Welles, Delphy, Swasey. Miscellaneous repairs: Fuel ship Orion; radio repair ship Saturn, Gunboat Vicksburg, West Canon, Coast Guard Bothwell. Repairs necessary for operation as district craft: Eagle No. 57, Pawtucket, Tatnuck, Iroquois, Mahopac.

SOUTHWESTERN SHIPBUILDING COMPANY

East San Pedro

Repairs electric machinery: Annie Hanify. Repairs boilers and engine: Fairhaven, Eastern Guide. Repairs main feed pumps: Julia Luckenbach.

TODD DRY DOCKS, INC.

Seattle

Extensive hull repairs: West Hartland. General overhaul: Burnside. New stem, cleaning, painting, caulking: Gleaner. New stern frame, planking, caulking: H. B. Lovejoy. Survey, hull and miscellaneous engine repairs: Santa Alicia. Cleaning, painting: Jitney; Levi W. Ostrander (also new shoe and hull repairs); Barges 41, 10, 14; Samson; Potlatch; Milwaukee. Change propellers: Catherine D. Voyage repairs, drawing tailshaft: West Ivis. White fuel oil burning apparatus, spare parts: Apus, Texan, Sylvan Arrow. Miscellaneous repairs: Forest King, Westerly. Boiler repairs: Washington. Miscellaneous engine repairs: Admiral Watson. Miscellaneous machinery repairs: Colin H. Livingston.

THE WINSLOW MARINE RAILWAY & SHIPBUILDING CO., INC., SEATLE

Docking, painting, miscellaneous repairs: Henry Villard (also new mast). Docking, cleaning, painting, general repairs: Aurora (also overhauling iron work, renewing shoe); Spokane (also installing new mast); Watson A. West; Vancouver; Jim Butler (also engine repairs); Monitor. Caulking deck and topsides, renewing planking, work on engine thrusts and shafting, miscellaneous engine and general repairs: Santa Flavia.

YARROWS LIMITED

Victoria, B. C.

Cleaning, painting, repairs: Scow No. 17, Ruby, Madge, El Lobo, Princess Victoria. Cleaning, painting: Derrick scow Truant. Repairs: Restless. Survey: H. M. C. S. Patriot. Alterations to steering gear, engine room repairs: Prince George. Reconditioning work: Prince Rupert (completed and returned to owners).

Sperry in the Orient

T. A. Morgan, general sales manager of the Sperry Gyroscope Company, and Elmer A. Sperry, Jr., sailed in June for Japan and China. One of the primary objects of the voyage is to sign a contract for the installation of Sperry gyroscopic stabilizers on two ferryboats of the Imperial Japanese railways plying between Shimonoseki and Fusan across the straits. The vessels will be of about 4000 tons displacement.

While in San Francisco, prior to sailing for Japan, Messrs. Morgan and Sperry conferred with George E. Butler, Sperry agents, regarding the inauguration of service stations and service facilities for Pacific vessels equipped with the gyroscopic compass. When the navies of the world began to make the Sperry compass standard equipment, the company established a world-wide service organization, which is now being extended to cover the merchant marine. Important installations have been made on vessels of the Cunard Line, and recently the Canadian Pacific, after testing the device on the Atlantic, has decided to install it on other vessels. These companies state that the Sperry gyro compass renders a great service because of the fact that it is a true compass without variation and deviation and also has no lag; in other words, it has none of the faults of the magnetic compass.

The Sperry Company is doing considerable work now on the high intensity searchlight, which is being made in sizes and weights that will accommodate any ship from the smallest yacht to the largest battleship. The high intensity light is one of Mr. Sperry's important inventions. At the present time the Sperry Company, under the guidance of Elmer Sperry, is making several important developments, one of which is the compound Diesel engine. Two of them have been made and are now running in the factory, and one has been running for about two years. This engine is a radical step in Diesel development, inasmuch as its weight per horsepower is about one-seventh of the ordinary Diesel and its fuel consumption is considerably lower.

"I have been with Mr. Sperry for about ten years," said Mr. Morgan. "I first came in contact with him when he had his first gyro compass installed in the United States Navy. I was so fascinated by this marvelous invention that I immediately set about to make plans to associate myself with him. Since then I have seen the Sperry Gyroscope Company grow from an organization of about a half-dozen men to its present size and have also seen the Sperry apparatus distributed throughout the world. Elmer Sperry, Jr., who is accompanying me on this trip, is a mechanical and electrical engineer and has been working directly under his father for the past five years, acting more or less as Mr. Sperry's representative in his most important engineering developments."

Personals

H. W. Poett, of Williams, Dimond & Company, has been appointed chairman of the maritime and harbor committee of the San Francisco Chamber of Commerce. Other members are: George C. Boardman, Philip S. Teller, Leonard C. Hammond, E. A. Christenson, A. W. Follansbee. Jr., Captain J. H. Bennett, C. E. Hume, J. C. Rohlfs, Captain A. F. Anderson, Charles R. McCormick, Arthur L. Black, Thomas A. Graham.

Ross L. Fryer, Albee building,

Washington, D. C., has been appointed District of Columbia agent of the Hooven, Owens, Rentschler Company.

S. L. Kreider has been elected president of the World Traders of Los Angeles.

C. R. Sheridan has been appointed Portland agent of the Atlantic, Gulf & Pacific, succeeding O. W. Chilton.

D. C. King, orange sales agent of the California Fruit Growers' Exchange, sailed for Europe in June to study foreign markets and to determine the possibility of selling larger quantities of citrus fruits abroad. He will visit London, Liverpool, Rotterdam, Antwerp, Glasgow, Paris and other cities. The new refrigerator vessels of the Royal Mail Steam Packet and Holland-America, which will be in service before the next season, will offer much better facilities for the all-water transportation of citrus fruits.

Captain Robert Dollar was re-elected president of the Pacific American Steamship Association at the annual meeting in San Francisco June 6. The other officers also were reelected as follows: A. F. Haines, first vice-president; Daulton Mann, second vice-president; J. P. Williams, secretary-treasurer; Captain C. W. Saunders, J. C. Rohlfs and H. R. Struthers, directors.

Captain John T. Kinley has been appointed commander of the British steamship Nile of the China Mail. Captain E. L. Tindall has been made first officer.

William Fogarty, who has been in the employ of the Peterson Launch & Tugboat Company, San Francisco, for three years, has been made manager of the San Pedro Launch & Tugboat Company, which was recently organized by the Peterson interests.

Captain H. G. Morse has been appointed wharf superintendent of the San Francisco & Portland Steamship Company at Portland.

Captain Randall Rogers has been appointed commander of the Los Angeles Steamship Company's liner Harvard, which has been reconditioned for the Los Angeles-San Francisco passenger service.

David W. Niven has been made manager of the marine sales of the General Electric Company. In his new position, Mr. Niven will direct sales to the Federal government for naval and other purposes. Mr. Niven has been with the General Electric Company for twenty-one years and in the marine department since 1910. He is a native of Scotland and before coming to the United States was identified with Siemens Brothers in London.

Copyright Underwood & Underwood, Studios, N. Y.

David Sarnoff, the 30-year-old general manager of the Radio Corporation of America, whose appointment was announced recently.

Richard R. Florian, of Moore, Florian & Company, has been elected president of the newly-organized World Traders of San Diego. Other officers are: F. J. Lea, vice-president; Rufus Choate, vice-president of the Union National Bank, treasurer; W. L. Heathcote, agent for S. L. Kreider, who represents the T. K. K. and Williams Lines, secretary.

R. C. Morton, general agent of the Pacific Mail in the Philippines, will arrive in San Francisco on his vacation soon.

C. P. Converse, in charge of the foreign trade bureau of the Pacific Mail, represented the company at the Foreign Trade Convention in Cleveland.

Charles F. Stern, California state superintendent of banks, who resigned effective June 20, has been elected vice-president of the First National Bank of Los Angeles and of the Los Angeles Trust & Savings Bank.

Miss Mary Waterhouse, daughter of Frank Waterhouse, was married to James Charles Kerr of Seattle in June.

J. J. Tynan, manager of the Union Works, Bethlehem Shipbuilding Corporation, and his family were passengers on the 535 Silver State from New York to San Francisco.

Marshall Dill, of Dill-Crosett, Inc., has been appointed chairman of the foreign trade committee of the San Francisco Chamber of Commerce. Other members are: Charles Bransten, V. H. Pinckney, C. B. Lastreto, Daulton Mann, George C. Boardman, Jesse McCargar, F. F. G. Harper, T. S. Edwards, W. R. Edmondson, James McDonough, M. S. Roesti, J. H. Vinter, Frank E. Booth, A. C. Oppenheimer, C. E. Hume, A. A. Asher, W. J. Mitchell, Harry Glensor, Charles Saiz.

Captain Clyde Parker, former master of the steamships Rose City and Harvard, has been appointed San Francisco bar pilot, succeeding the late Captain George Korts.

Parker F. Wood has resigned as sales manager of the San Francisco branch of Fairbanks, Morse & Company to operate boats on the San Joaquin and Sacramento rivers.

A. C. Diericx, assistant general manager of the Matson Navigation Company and president of the Honolulu Consolidated Oil Company, represented the latter company at an oil-lands hearing before Secretary of the Interior Fall in Washington in June.

A. M. McDougall of the McDougall-Duluth Shipbuilding Company and Dr. Henry Moskowitz of the Submarine Boat Corporation are members of a committee in charge of a convention of the Great-Lakes-Hudson and Atlantic Waterways Association to be held at the Lafayette Hotel, Buffalo, June 29 and 30, when the first united effort to develop the Barge Canal as a connecting link between the Great Lakes and the Atlantic Ocean will be launched. Among the exhibits will be a combination lake and canal barge of 1750 tons and other boats.

John D. Hashhagen, former traffic manager of the American Glue Company for several years, has been appointed traffic manager of the North Atlantic & Western, succeeding the late J. Karcher.

H. S. Eaton has succeeded Laurence O'Connell as assistant to M. F. Cropley, Pacific Steamship Company manager at San Francisco. Mr. O'Connell has joined the San Francisco office of Johnson & Higgins.

Ramon C. Cevallos has been appointed general agent of the Pacific Mail Steamship Company on the West Coast of Mexico with headquarters at Mazatlan.

John C. Ogden, formerly general manager of Thorndyke-Trenholme Company of California, has purchased the outstanding stock of the corporation and will continue the business of chartering and acting as steamship agent under the name of the John C. Ogden Company. Offices will continue to be at 214 Front street, San Francisco.

G. C. Thayer, former general manager of the Harriman yard of the Merchant Shipbuilding Corporation, has been appointed asistant to the vice-president to handle special assignments, together with co-ordinating the sales activities of the same company's Chester yard. L. D. Keller, who for years was connected with the company's Philadelphia office as office manager, has been appointed executive assistant to the vice-president, his duties being that of an administrative assistant.

W. L. Bunker will be general manager of the West New York plant of the Lord Drydock Corporation, which was opened recently. Other officials stationed at the yard will be: John T. Watson, treasurer; T. F. Sullivan, general superintendent; J. E. Dorward, shop superintendent; Victor Watson, hull superintendent; D. L. Richardson, purchasing agent.

E. C. Genereaux, marine surveyor of San Francisco, has removed from 280 Battery street to 310 California.

Deaths

C. H. Clapp, former secretary of the Inter-Island Steam Navigation Company of Honolulu, in Fallmouth, Massachusetts, May 19.

Rear Admiral A. F. Fechteler, commandant of the Fifth Naval District, at Norfolk Navy Yard May 26.

Captain N. Rosich, master of the schooner H. D. Bendixsen, in Oakland, California, May 31.

Maurice Connell, a survivor of the Greeley Arctic expedition, in San Jose, California, June 3.

F. B. Oliver, ship broker of San Francisco, in Oakland June 10.

Captain A. Rasmussen, master of the U. S. A .T. Dix, at sea between Seattle and San Francisco, May 26.

Los Angeles Bond Issue

The people of Los Angeles have approved a bond issue of $4,500,000, the proceeds of which will be expended on various work in and about Los Angeles harbor. An important item in the purchases will be cargo-handling equipment for the port. No list of what will be required has been made up, however, and nothing can be bought until the bonds have been sold.

Steamer Stacks

The Cunard Line, in describing the new liner Scythia, which will be placed in the trans-Atlantic service this summer, comments upon the vessel's one funnel and reviews the increase in the number of stacks of Cunard liners as follows:

Heretofore distinction in steamers has been indicated by the number of funnels carried. When the paddle-wheeler Scotia entered the service in 1862 her two funnels won instant popularity for her. When the double-stacked Aurania carried the Cunard flag across the Atlantic in 1882 she dwarfed the value of the single-funneled Russia, which was, from 1867 until the Aurania's coming, one of the company's favorite ships.

Other steamers that won wide fame among travelers with their huge twin funnels were the Umbria, Etruria, Campania and Lucania, covering the years from 1884 well into the new century. The general public took a lively interest in the incoming and outgoing of these truly beautiful ships. They were considered triumphs of the science of ship building and were built on graceful lines. Consequently people flocked to the Battery or to points of vantage in Bay Ridge or Staten Island to see them pass.

In 1905 the Caronia and Carmania, each of 20,000 tons, sailed into the forefront of popularity with their huge size and great double funnels, the mark still indicative of supremacy, although a few three-stackers, such as the City of Rome, City of Paris and City of New York, slipped in and won a throng of admirers for their trio of smoke exits and their yacht-like appearance. The New York is still in service, but one funnel has been removed.

Ships with four funnels appeared in 1907. These were the renowned Lusitania and Mauretania, 31,000-ton steamers, and for the time world wonders. Later years brought many more four-stackers and some massive three-stackers, and thus we established the popularity of the ship with many funnels.

Not only did the better class of passengers take to the steamer with the most stacks, but the emigrant wanted to cross in such a ship, too. When he bought his ticket he saw pictures of the great ocean liners on the walls in the steamship ticket offices and nothing but four-stackers would do for him. Usually coming from inland parts, he saw security in bigness and extra funnels, and so dummy stacks were added to some ships. Incidentally the Cunard Line never built any ships on this design. And he had to have big ships, although all practice points to the complete comfort enjoyed on ships of from 12,000 to 20,000 tons.

C. V. Lane, who has joined Ford & Geirrine, Merchants Exchange, San Francisco. Mr. Lane was chief engineering draftsman of the Union Iron Works Company for several years and was with the Bethlehem Shipbuilding Corporation, Union Works, San Francisco, as assistant chief engineer. He will assist in the handling of engineering problems as well as the general sales of Ford & Geirrine.

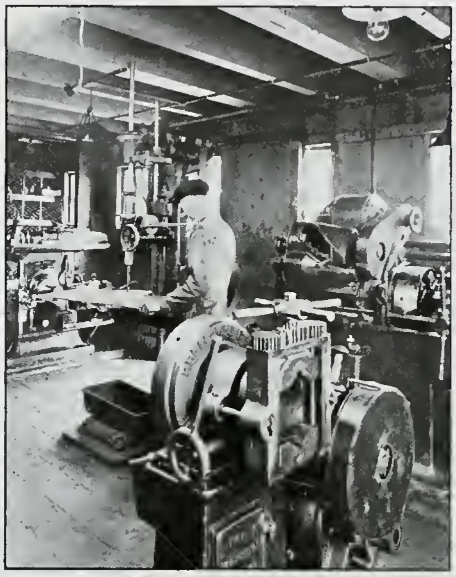
PACIFIC MACHINERY

A Floating Machine Shop

WITH the slowing down of construction in shipyards many of the established firms are turning their attention more particularly to repair and reconditioning work, and in this connection are extending and altering their plants in such a way as to enable them to more efficiently handle repair jobs.

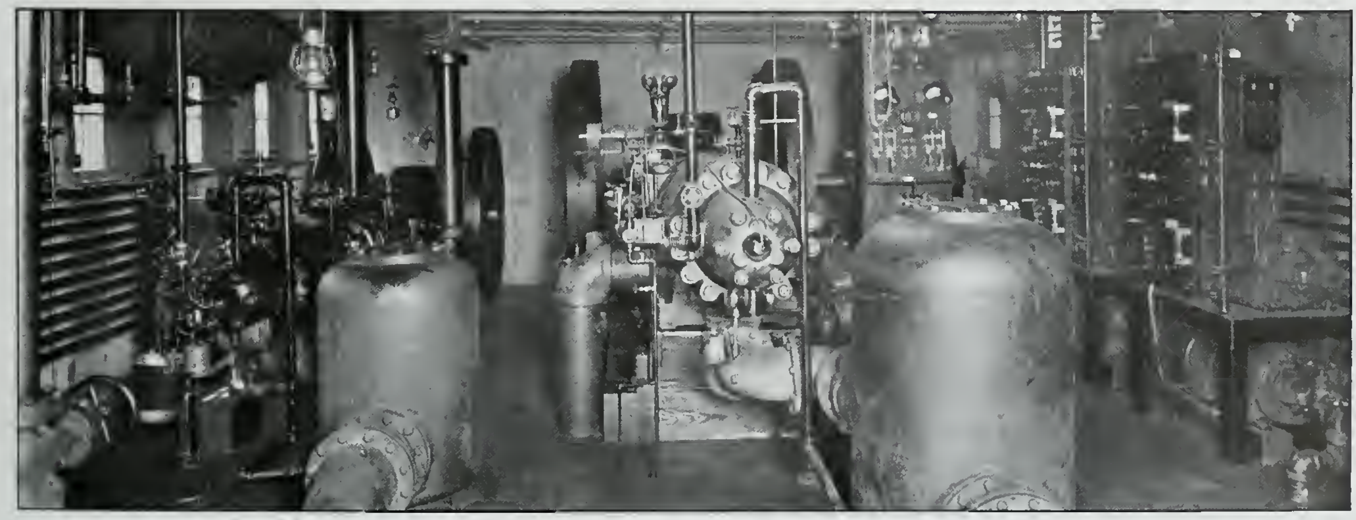
In several former issues of Pacific Marine Review we have briefly noted the building and equipping of floating repair shops by various yards, and we are glad in this article to be able to give a full account of a very compact and efficient barge machine shop recently built and equipped by the Federal Shipbuilding Company.

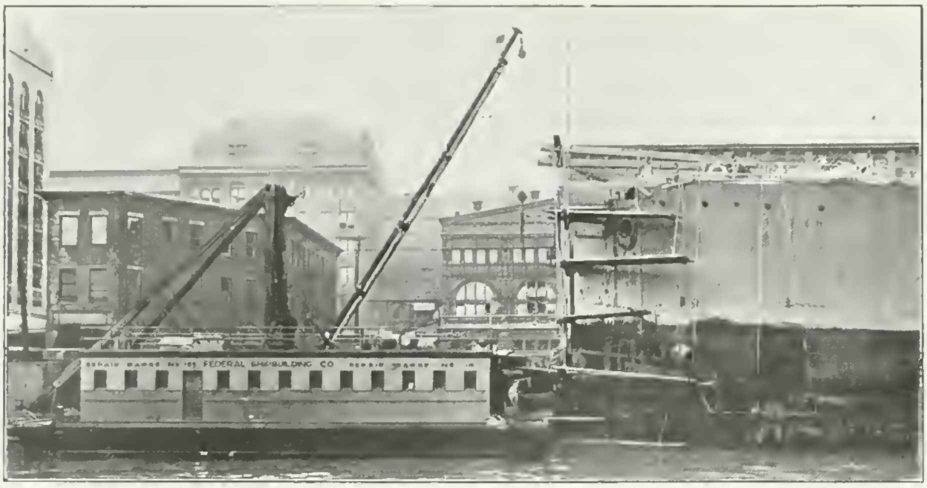
The principal dimensions of this barge are: length over all, 68 feet; beam, 26 feet; depth molded, 7 feet. The hull and superstructure are of wood construction. The barge is not intended to be self-propelled but to be moved about by a small tug, and the superstructure house, as will be noted in the photographs, covers the entire hull.


Interior view in the floating machine shop of the Federal Shipbuilding Company

It is in the equipping and powering of this shop that the greatest interest lies. The power plant consists of two semi-Diesel engines supplied by the Chicago Pneumatic Tool Company. One of these engines is directly connected, the Diesel piston and compressor piston being mounted on the same rod to an air compressor cylinder having a capacity of 300 cubic feet of air per minute. This compressor supplies power for operating air tools for working torches, etc. The other semi-Diesel engine, also of the horizontal type, is directly connected to an 80 kilowatt direct current generator which supplies electric power for working all of the tools in the machine shop and also for operating four 3 kilowatt motor generator electric welding sets and for lighting the barge and shop. A small air compressor is supplied as a standby for furnishing power for starting up the Diesel engines when cold.

The machine shop is fitted with a 14-inch by 8-foot engine lathe supplied by the Monarch Machine Tool Company of Sidney, Ohio; with a 21-inch drill press from the Cincinnati Bickford Tool Company; with one 16-in. Cincinnati shaper from the Smith and Mills Company, Cincinnati; one 6-inch pipe threader and cutter from the Merrell Manufacturing Company, Toledo, Ohio; one 2-inch Landis bolt cutter; one 6-inch cut-off saw from the Peerless Machine


The power plant of the floating machine shop of the Federal Shipbuilding Company showing the Chicago Pneumatic Tool Company "Little Giant" semi-Diesel engines, one direct connected to air compressor and the other to electric generator. At the right are the motor generating sets for supplying welding current.



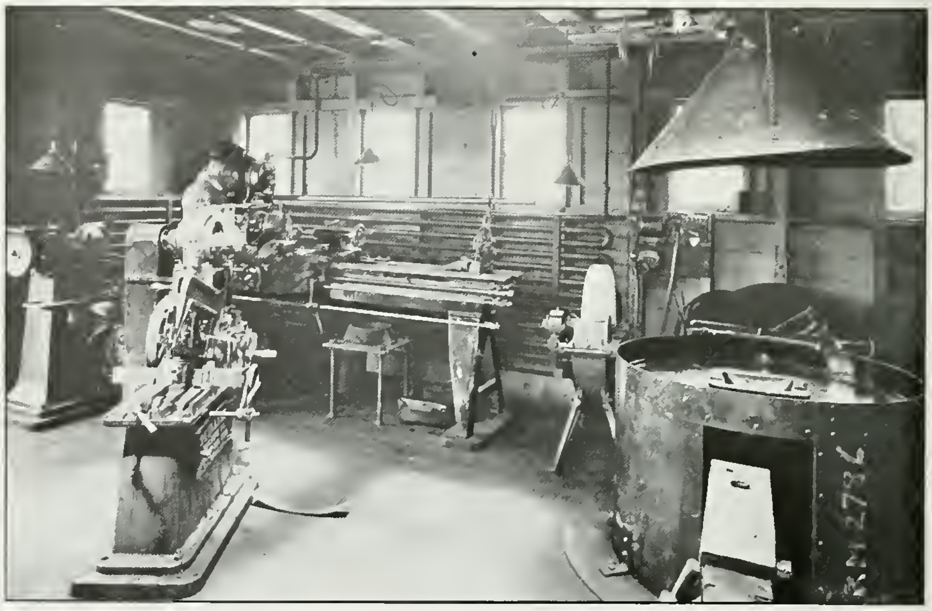
Exterior view of the Federal Shipbuilding Company's floating machine shop at work on the steamship Steel Exporter

Company of Racine, Wisconsin; one 30-inch by 4-inch wet grinder; one 12-inch double emery grinder from the U. S. Electric Tool Company of Cincinnati, Ohio; one forge from the Champion Blower and Forge Company of Lancaster, Pennsylvania.

The hold of the barge is used for steel storage tanks as follows: three fuel oil tanks of 1000-gallon capacity; one fresh water tank of 1000-gallon capacity; one lubricating oil tank for air compressor of 60-gallon capacity; two lubricating oil tanks for engine of 60-gallon capacity; one lubricating oil tank for machines, 60-gallon capacity; and one cutting oil tank, 60-gallon capacity. Suitable pumps are supplied for fuel oil service from the storage tanks to gravity tanks located over the engines and for fresh water service. There is also a bilge, fire and general service pump which has suction either from the bilges or from the sea and discharges either overboard or to fire and sanitary systems. Pacific Coast shipbuilders will note with interest in the photographs the large wall radiators. A complete hot water heating plant is installed on this barge supplied by an American Radiator Company boiler.

The machine tools and pumps are all electrically driven with individual motors. The wire is all in conduit and under complete control from the main switchboard.

With this barge towed into position alongside a ship, power and machining operations are available for all such ordinary repairs as could be effected without drydocking the vessel, and its use has proven a matter of great satisfaction and economy to the repair department of the Federal Shipbuilding Company and has assisted that firm to offer its clients very much better dispatch in the handling of repair work.



Corner in the machine shop. Note radiator pipes and effective lighting from windows

A New Bolting-Up Machine

FOR a considerable period the Pneumatic Plate Tightener, Inc., of Seattle, has been perfecting the Hallett Invincible bolting-up machine, and at length has attained a machine that is producing remarkable results.

The new type of machine has several new features; one being that it is controlled entirely through an automatic valve placed in the handle; another being an air pressure chuck for gripping the bolts. This chuck deserves special mention, as it is operated by the same control as controls the air intake into the cylinders of the machine. The head of the bolt entering this chuck is immediately gripped, on the slightest turn of the air-controlled handle, by the jaws with a 400-pound pressure, and upon the air being released from the machine, the handle also releases the air from the chuck, so that the machine is ready to leave the bolt automatically without any further control or effort on the part of the operator. This new feature is not only a material aid in the speeding up of the operation, but also enables the operator more efficiently to control and operate the machine.

Pull of Eleven Tons

This pneumatic plate tightener as now placed on the market has a two-cylinder air-pressure device with a draw-bar operating by combined toggles through pressure exerted by the cylinders. The pull on the draw-bar against the bolt is duplicated by the pressure of the stand against the plate so that when the air is supplied to the machine and it starts to pull on the bolt, it not only pulls the bolt but presses on the plate and relieves the operator from the entire weight of the machine.

At university tests against the standard draw-bar pull, it has been found that the small machine, weighing 34 pounds with 90 pounds of air pressure, will exert a pull of 11 tons on the bolts, thus making it the strongest pulling machine for its weight that has ever been invented.

This machine is practically foolproof and any ordinary workman or bolter-up can readily learn to operate it, and it cannot break in any way so as to injure the operator, making it efficient from a safety standpoint.

THE PNEUMERCATOR SYSTEM ON THE U. S. S. CALIFORNIA

By GARDNER CORNETT,
President, Pneumercator Company, Inc., New York

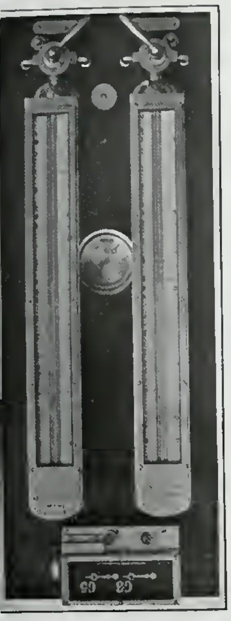


Figure I—A typical Pneumercator group with its annunciator as mounted on U. S. B. S. California.

THE following is a brief description of an important installation of Pneumercator tank gauges on the United States battleship California, now under construction at the United States Navy Yard, Mare Island, California. This is a duplicate of the installation on the battleship Tennessee, built at the New York Navy Yard.

Practically all the large oil-burning vessels in the Navy have been equipped with the Pneumercator system for measuring fuel oil.

On board the United States battleship California, all of the fuel oil storage tanks, service tanks, drainage water tanks and steering engine lubricating oil tank, a total of 116 tanks, are equipped with E. T. I. type Pneumercator tank gauges. These instruments are shown in Figure II.

Each instrument is equipped with both tonnage and foot and inch scales and gives an accurate indication of the tonnage in tank regardless of the specific gravity of the oil, the tank temperatures or the temperature of the instrument location.

A balance chamber is installed in the tank near the bottom from which a 7-ounce lead pipe is led through an oil-tight connection in the tank top to the operating cock of the gauge, the static head pressure of the liquid in the tank causing the gauge to function, means being provided at the gauge for establishing the true balance between the liquid head in the tank and the mercury in the gauge. Operating air for this purpose is supplied from a low-pressure compressed air line running fore and aft on both sides of the deck.

The storage tanks are under thirteen pounds' blowing pressure when in service and an additional tube line is led from the tank top to the top of the gauge, thereby cancelling the effect of the blowing pressure on the gauge itself. This makes it possible to get an accurate indication of the tonnage or depth of oil in each particular tank, regardless of the tank pressure.

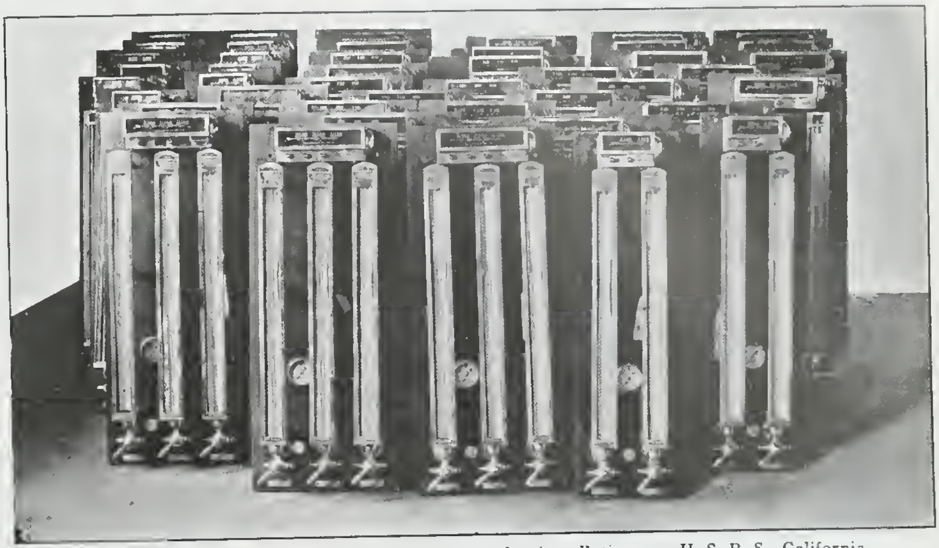


Figure II—116 Pneumercator tank gauges for installation on U. S. B. S. California

Each gauge is also arranged to give both a visible and audible alarm when the tanks are 95 per cent full. This alarm operates on the ship's X circuit, which is the 20-volt call bell or signal circuit. The electrical contacts for this alarm are made at the gauge and not in the tank, and are so arranged as to exclude the possibility of an electrical spark anywhere in the vicinity of the tank.

The fuel oil service tanks each have two gauges: one located in the forward engine room and the other in the aft pump room.

The gauges are all mounted in groups on ebony asbestos boards, as shown in Figure I, with the annunciator for each group mounted on the same board.

The Pneumercator Company's interests locally are looked after by Mr. James C. H. Ferguson, agent, Monadnock Building, San Francisco, and both he and his engineering assistants, Mr. E. S. Ayres and Mr. A. F. Kuehne, have been quite active and been kept busy with installations at the various shipyards in California, as well as at the navy yards.

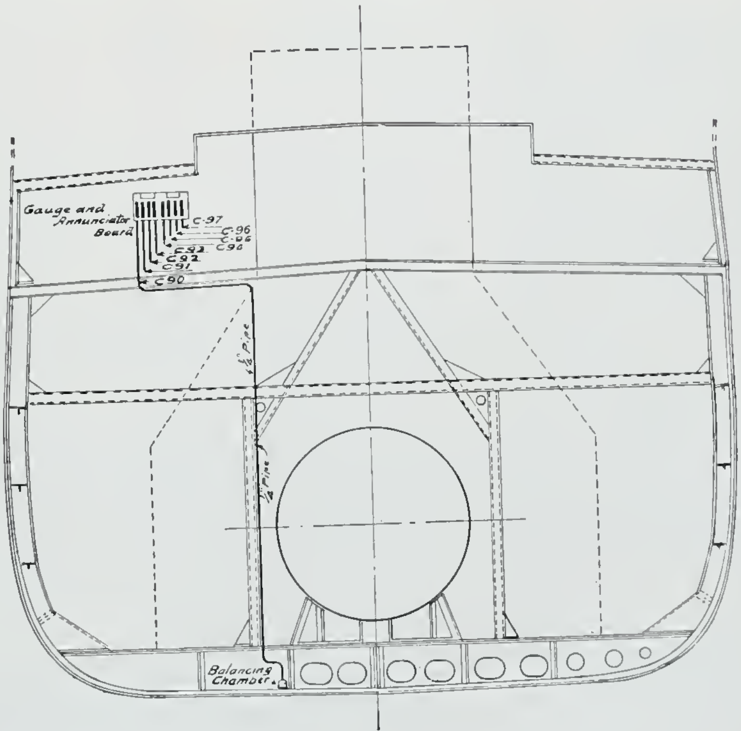
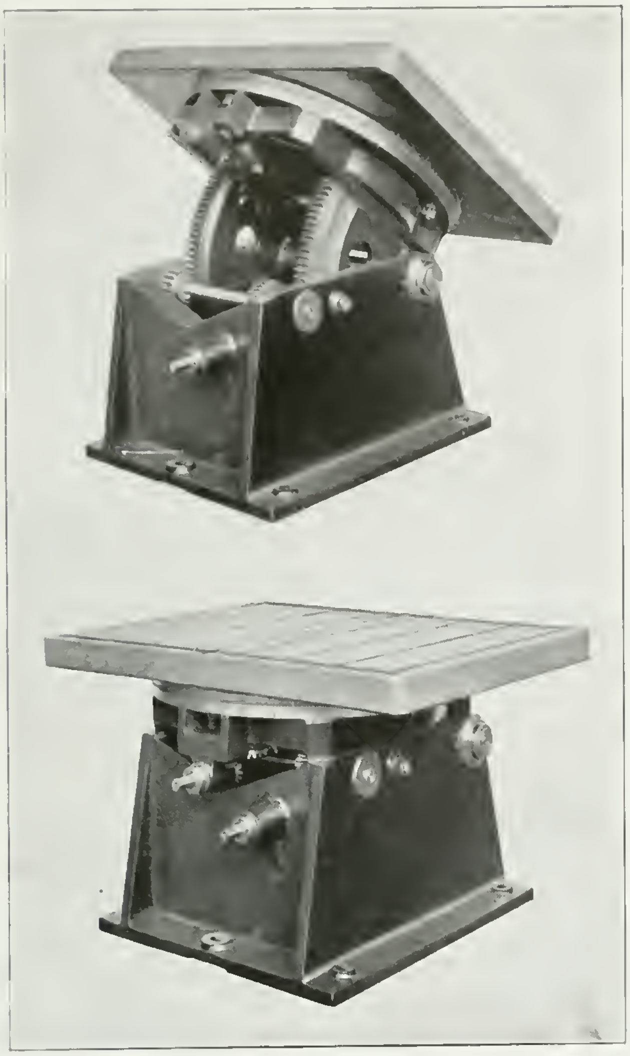


Figure III—Diagrammatic sketch indicating the general method of connecting Pneumercator gauges to ships' tanks

NEW UNIVERSAL TILTING AND ROTARY TABLE


The Pawling & Harnischfeger new universal tilting and rotary table

As a means of speeding up work and reducing machine shop costs, a new work table for use with floor type boring, drilling and milling machines, known as the Universal Tilting and Rotary Table, has been recently put on the market by the Pawling & Harnischfeger Company of Milwaukee. This accessory makes it possible to carry on machining operations on five sides of a piece and at any angle with but one set up. In the illustration the table is shown both in its normal and in one of its tilted positions. It has an elevation of 90 degrees and can be revolved a full 360 degrees at any position, whether flat or elevated.

Conveniently placed to enable the operator to accurately locate the work, there is a graduated dial. The table top is elevated by means of two coarse-pitch spur gear segments driven by worm and pinions, and is revolved independently by a bevel gear and pinion. One revolution of the ratchet handle revolves the table 30 degrees and one revolution of the elevating handle elevates the top 2½ degrees. Adjustment along the bed plate parallel to spindle travel is accomplished by means of rack and pinion. The slots or table edges are used to locate work and the top is provided with trough to catch cutting compound.

A New Drill Chuck

THERE is being placed on the market by the Wayne Tool Manufacturing Co. og Waynesboro, Pennsylvania, a chuck for holding twist drills, which have been broken at the shank. The design is exceedingly simple, the chuck being composed of only six parts, viz: shank, casing, two pawls, two screws and a casing plate.

The drill is ground to a 60-degree point at the broken end. This allows the drill to automatically center itself, on a 60-degree recess in the shank, and on turning the casing the drill is locked in place by the two pawls gripping the drill about the grooves. No wrench is required to tighten or release the chuck.

With the tendency to reduce the expense of small tool equipment, this tool should readily find a place in shops where twist drills are used in large quantities on production work.

A new twist drill chuck manufactured by the Wayne Tool Manufacturing Company.

Automatic Ship Lighting Sets

THE problem of auxiliary lighting aboard ship has been the subject of much discussion during the past few years. The present methods require either storage batteries, which deteriorate in time, or donkey boilers, which frequently are inconvenient because of he long time required to get up steam for power to generate the electricity. Not long ago Mr. C. B. Cooper of the Ship Owners' Radio Service, Inc., saw a demonstration of the Kohler Automatic, power and light apparatus, which was developed primarily for light and power use on the farm. Certainly it is a far cry from lighting stables on the farm to lighting different sections of a ship, but the Kohler device possesses several distinguishing features which serve splendidly for use on the water.

By turning on any light or switch, the engine is automatically started and in less than four seconds it is operating to full capacity. It is a direct connected 110-volt D. C. generating unit with a capacity of 1500 watts—or, in other words, will take care of as many as 100 15-watt lamps commonly used aboard ships for auxiliary lighting purposes. Operating at full load the engine uses about 3.7 quarts of gasoline per hour. Through an automatic control, when the last switch or light on the circuit is turned off, the engine automatically stops.

It is readily seen how valuable this unit would be in any case of emergency aboard ship when in the middle of the night it would be necessary to have light, that merely to turn on the most convenient light or switch would automatically provide enough current within four seconds to give a light wherever a bulb was located; and then what a simple thing to turn off the power automatically with the turning off of the last light when the last man had turned in.

The Ship Owners' Radio Service organization has obtained the distributing rights for marine purposes, and through this organization the Kohler Company expects to maintain their marine service.

Controlling the Electrical Equipment for Merchant Ships.

DECK WINCH EQUIPMENTS

The auxiliary upon which probably more thought and study is being given at the present time, from an electrical standpoint, than any other on shipboard, is the cargo deck winch. This is an especially important piece of machinery, particularly when installed on a vessel handling miscellaneous cargo. In a deck winch equipment reliability of operation and range of speed control in both hoisting and lowering, are of prime consideration. Of only slightly less importance are such details as watertight construction of motors and controlling devices, accessibility of parts for repairs, and convenience of operation.

Some of the earlier vessels utilizing electricity for power purposes, such as Battleships Kearsage and Kentucky, and merchant vessels Minnesota and Dakota, used electricity in the operation of their deck winches, the appliaction, however, in these earlier installations was naturally somewhat primitive and simply applied a motor and controller of more or less standard designs to the winch. In the last two or three years, however, close study has been made of complete designs of electric cargo winches with a view to having all parts arranged to obtain the best operating conditions and service.

Some of these later designs cover a self-contained winch with electrical parts mounted either upon or inside the specially designed bedplate. Others cover an arrangement for the remote control of the winches by small watertight master controllers with the main controlling apparatus, rheostats, etc., located in small adjacent deck housings. This arrangement offers advantage from the standpoint of accessibility of electrical apparatus and ventilation of rheostats, etc.

Speed in Operation Gained Through Proper Control

In view of the importance of this auxiliary on cargo vessels, there has recently been much discussion naturally with regard to the exact character of the control and the results to be accomplished. One point is obvious, however, that the ideal electric deck winch is one which provides, as nearly as practicable, a straight horsepower curve accommodating its speed automatically to the value of the load and permitting the handling of light and heavy loads without the necessity of changing gears. Also, one that gives in lowering, as nearly as practicable, corresponding range of speed for handling light loads down to the empty hook, as time gained in hoisting and lowering the empty hook is that much clear gain in loading and unloading cargo.

Compared to that control just outlined, the early types of control furnished for deck winches are crude. However, it is now possible to get electric equipments much better suited to the actual requirements of a vessel, and Cutler-Hammer engineers are constantly giving their close study to these needs.

The Cutler-Hammer Mfg. Co. is prepared to supply complete electrical equipments for deck winches and will be pleased to furnish you with general or detailed information on request. Our Publications No. 819 and No. 890 illustrate some work which has been done along these lines.

Marine Department

THE CUTLER-HAMMER MFG. CO.

50 Church Street **New York City**

WORKS: MILWAUKEE AND NEW YORK

District Offices: Chicago, 323 No. Michigan Ave.; Pittsburgh: Farmers Bank Bldg.; Boston: 77 Franklin St.; Philadelphia: Commonwealth Bldg.; Cincinnati: Dixie Terminal Bldg.; Cleveland: Guardian Bldg.; Detroit: Kresge Bldg.; St. Louis: Railway Exchange Bldg. Selling Agents: H. B. Squires Co., San Francisco; 583 Howard St., Los Angeles; 308 E. 3rd St., Seattle; 552 First Ave. So.; Igranic Electric Co., Ltd., Bedford, and London, Eng.

NEW ENTERPRISE DIESEL ENGINE

OUR illustration shows the cannery tender and towboat Grizzly II which was built at the Schertzer plant for Captain Frank Nordland and is now busily engaged in towboat work on Puget Sound. The Grizzly II should be particularly interesting to San Francisco towboat owners in that she is engined with one of the new Enterprize full Diesel oil engines.

This engine is of the same type as that which was fully described on page 61 of Pacific Marine Review for April. It is the 4-cylinder size, nominally developing 100 H. P. and capable of operating continuously at a very considerable overload.

The new engine is very compact and simple in its design and shows in operation a very great economy as compared with any gasoline, distillate or kerosene engine. Its fuel cost is less than one-quarter that of the ordinary distillate engine of the same power when operating on full load, and at fractional loads this ratio would be greatly increased in favor of the Diesel.

The cannery tender and towboat Grizzly II engined with a four-cylinder 100-horsepower Enterprise Diesel cil engine

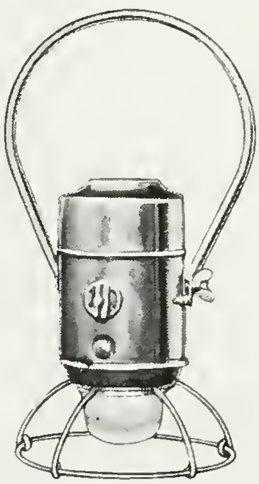
The care of this engine under operating conditions and its maintenance and repair do not present any problems differing from those with which the ordinary internal combustion engineer using distillate has to deal, and its very obvious economy should recommend it to all operators of small tugs, tenders, fishing boats, and other craft requiring dependable power at low cost for their propulsion.

The engines for marine purposes are equipped with the well-known Enterprise reversing gears, and the long experience of the Enterprise Engine Company in the building of marine engines for Pacific Coast needs enables them to put into this engine everything that is required to make it a dependable servant to the operators of boats on our difficult coast.

The engine starts very readily on compressed air at 140 pounds, and once started and kept lubricated it can be depended upon to remain in operation under all ordinary circumstances while fuel supply holds out.

A FOUR-IN-ONE LANTERN

AN unusual electric lantern, the Quick-Lite, which has been perfected and placed upon the market by the Kwick-Lite Electric Corporation, 360 Kearny street, San Francisco, will interest shipowners and others to whom oil-burning lanterns and unguarded electric lights are constant sources of danger. The Quick-Lite bears a superficial resemblance to the ordinary railroad lantern, in that a heavy wire guard is one of the conspicuous features; but in its essentials the new light is a considerable advance.

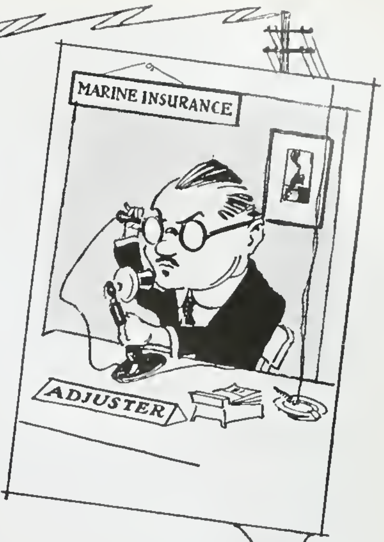


The Quick-Lite electric battery lantern

It possesses two globes and a Quick-Lite duplex battery, so that either globe, or both, if an unusual light is required, may be switched on. This design makes possible an instant intensifying of the light given; but more important, it increases the working life of the batteries considerably, since one may be rested for half the time, and the two, alternately, give 75 hours of burning from the one battery. Not only has the Quick-Lite Electric two globes and a duplex battery, but it also has two colors, white and red, either being supplanted by the other when the operator presses a button.

The upper portion of the lamp, which contains the battery, consists of a steel cylinder, copper-finished and lastly nickel-plated. Below this projects a heavy glass globe, within which are the incandescent bulbs, and the glass globe, in turn, is protected by a wire frame. As a result of this sensible design, the light shines downward, precisely where it is wanted, instead of being obscured, as in oil-lanterns, by the oil-container.

The Quick-Lite electric has manifold attractions for the railroad man, camper, automobile driver and a hundred other persons, but not least for the shipowner and sailor. It should be especially valuable in tank steamships, which often have been the scenes of explosions when ordinary incandescent globes have been broken and the hot wire exposed to gases. How such an accident could occur with the Quick-Lite electric is difficult to imagine, because the wire guard and the heavy glass, both of which serve as guards to the incandescent lights, give protection against any probable mishap or mishandling. As a Northwestern Pacific switchman wrote to the Kwick-Lite Electric Corporation: "While trying one of your electric lanterns switching in Santa Rosa yard, the car I was riding on was derailed and threw me on the ground, and I rolled about ten feet. The lantern went about ten feet further than I did and was still burning, so I got up and got the lantern and gave a stop signal."



SUTTER 44-19

Mr. Shipowner—Mr. Merchant

Your business is world wide—so is our service.

Shanghai, Sydney, Nagasaki, Africa, no matter where your vessel or goods go, we take care of your insurance problems—and losses.

Would you like to have your own "Insurance Department" without adding a penny to your payroll?

It can be arranged, call Sutter 44-19.

FRANK B. HALL & COMPANY
INCORPORATED
AVERAGE ADJUSTERS & INSURANCE BROKERS
56 BEAVER ST., NEW YORK

SAN FRANCISCO OFFICE—
322 CALIFORNIA STREET

FRANK K. HITCHING

244 California Street Phone Douglas 4705-6

Agent For

YAMASHITA KISEN KAISHA

Australasian Direct Service

REGULAR MONTHLY SERVICE

100 A1 Steamers

— TO —

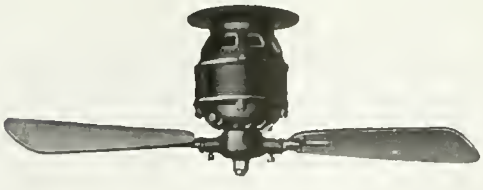
Auckland, Sydney, Melbourne

(other ports if inducements offer)

	Seattle	Vanc, B C	San Francisco
YOSHIDA MARU No. 1	Aug. 7	Aug. 9	Aug. 15
YOSHIDA MARU No. 2	Sept. 7	Sept. 9	Sept. 15

(Via Los Angeles if inducements offer)

DIEHL MOISTURE-PROOF FANS



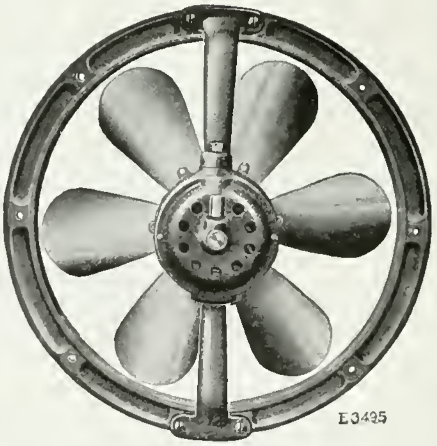
Diehl two-blade cabin fan

ALL fittings and accessories to be used on shipboard must, in order to give good service, be moisture-proof. This is especially true of electrical apparatus where failure to exclude moisture not only results in deterioration of material, corrosion, etc., but may cause short-circuiting of electric conductors with disastrous results.

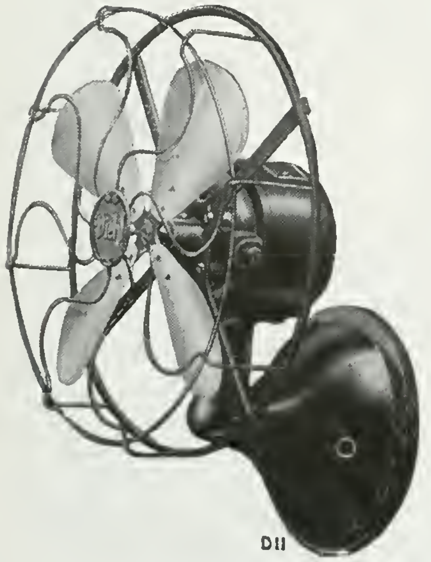
The Diehl Manufacturing Company, in placing before the American merchant marine its line of bracket and ventilating fans, has taken every possible precaution to insure steady service with the least possible maintenance expense and with the greatest efficiency. The direct current motor is made in such a manner that no atmospheric moisture can come in contact with any of its vital parts, and the blades of the fan are constructed of solid brass.

The fans are made both in the oscillating and non-oscillating types. The oscillating type has an oscillating radius of 90 degrees, and the non-oscillating type has a swivel adjustment so that it can be set at any point of the 360 degrees simply by the manipulation of a thumb screw below the motor head. This swivel adjustment has become very popular, the passenger in his stateroom being able to direct the breeze from the fan to any point desired. We illustrate herewith a number of the types of ventilating fans manufactured by the Diehl Manufacturing Company, who have been building fans for the past thirty-two years. Each fan is equipped with cord and plug and packed in a substantial individual wooden case. These fans have been used exclusively in the Pullman service for a number of years and have been very extensively used on shipboard. The following list of ships in which Diehl fans are used, or specified to be used, shows the high opinion with which these ventilating machines are regarded by the maritime trade: Steamships Nanking, Creole State, Wolverine State, Golden State, Hawkeye State, four United States Coast Guard cutters, and four tankers under construction for the Anglo-Saxon Petroleum Company, Ltd., at the Union Construction Company, Oakland, California. The Diehl Manufacturing Company furnished Navy fans for all the United States Shipping Board ships built by the New York Shipbuilding Corporation, the William Cramp & Sons Ship and Engine Building Company, Newport News Shipbuilding Company, Sun Shipbuilding Company, Merchant Shipbuilding Company, and Union, Baltimore, and Quincy plants of the Bethlehem Shipbuilding Corporation, Bath Iron Works, and other eastern yards. They have supplied the Navy with moisture-proof fans since 1910. This company also manufactures large motors which are used on hoists and winches.

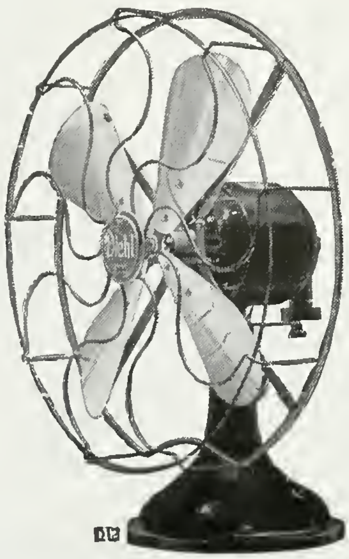
The Diehl fan is handled on the Pacific Coast by the Marine Electric Company, 195 Fremont street, San Francisco, California. The Marine Electric Company has recently received a carload of over 1000 fans to augment their stock so that they will be able to properly care for the requirements of all customers and particularly those using direct current fans. It is their intention to continually be in a position to make immediate delivery of the various types of direct current fans ordinarily required for a vessel's equipment. A complete stock of spare parts will be carried for all types.



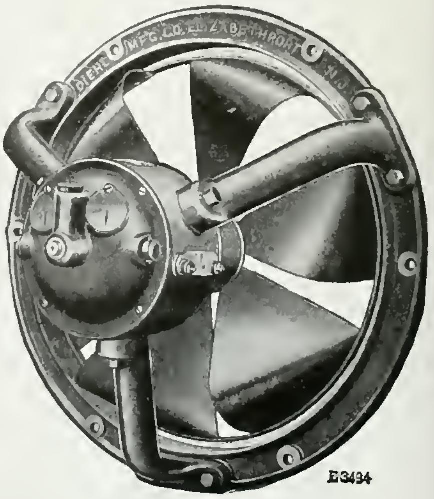
Diehl flat blade ventilating fan



Diehl bracket fan



Diehl oscillating desk-fan



Diehl bucket blade exhaust fan

γεννάω–I Produce!

ONE hundred and forty-four years ago Lavoisier coined the name *Oxygen.*

In choosing the Greek word Γεννάω "I produce," as his main root he had in mind a chemical reaction commonly associated with the gas.

Had Lavoisier been able to foresee the tremendous part that Linde Oxygen is playing in modern industrial development, he would have realized the vast significance of that word Γεννάω "I produce!"

The country over, Linde Oxygen is daily making possible greater production—everywhere it is saving time and cutting costs.

A chain of seventy-five Linde plants and warehouses assures American welders and cutters of a prompt supply of highly pure oxygen—wherever they are, whatever their requirements.

THE LINDE AIR PRODUCTS COMPANY
Carbide and Carbon Building, 30 East 42nd Street, N. Y.
Kohl Building, San Francisco

The Largest Producer of Oxygen in the World

L-502-21

TRADE LITERATURE

The Union Engineering Handbook — Pumping Machinery, Air Compressors, Condensers. Compiled by P. Ordway, M. E., for the Union Steam Pump Company, Battle Creek, Michigan, U. S. A. 450 pages, bound in red seal with gold stampings.

This is a very handsome and most unusually complete handbook on the subjects covered as well as a catalog of the apparatus manufactured by the Union Steam Pump Company.

Section I of 88 pages covers the theory and practice of compressed air engineering and condensing, a great deal of very useful data on the cost of compressing air by the use of various fuels, on the practical calculation connected with installations in industrial plants, on the figuring of pipes for various purposes, and a highly instructive list of the uses to which compressed air is being put in modern industries.

Section II deals with centrifugal pumps, dividing them into two general classes, turbine and volute. This section, which covers 80 pages, forms a complete treatise on the design, manufacture and use of centrifugals. Full directions are given for installing, for figuring horsepower, costs of pumping, friction of water in pipes, and many tables of useful data concerning the flow of water through orifices, nozzles, hoses and hydrants. A very interesting table covering four pages gives the proper materials to be used in the manufacture of centrifugal pumps for handling various kinds of chemical liquids.

Section III occupies 64 pages and treats of condensers and condenser fittings. This section contains much useful data concerning the effects of dry, superheated and saturated steam on condensers in practical operation. It gives complete information concerning the physical characteristics of the various sizes and types of tubes used in condensers.

Section IV is devoted to electrical data and gives some very practical material on the theory and practice of direct and alternating current motors and electrical control equipment.

Section V treats of direct acting steam pumps. This section covers 120 pages, and gives complete practical detailed specifications for the design and manufacture of all classes and types for a very wide range of application.

Section VI is devoted to power pumps and crank and flywheel connected pumps.

In the appendix is carried a very useful collection of tables as complete as will ordinarily be found in the best engineering handbooks. These cover the physical characteristics of iron and steel pipe, the properties of steam, factors of evaporation, various United States standards on pipe fittings, tables of logarithms and trigonometrical functions, circumference and areas of circles, etc., and a very complete and conveniently arranged collection of tables of units and weights and measures with their conversion equivalents.

Taken altogether, this is a book that should find a very welcome place on the desk or book shelf of any engineer.

The Union Steam Pump Company are represented in the San Francisco district by Halloran & Golcher, with offices in the Sharon Building.

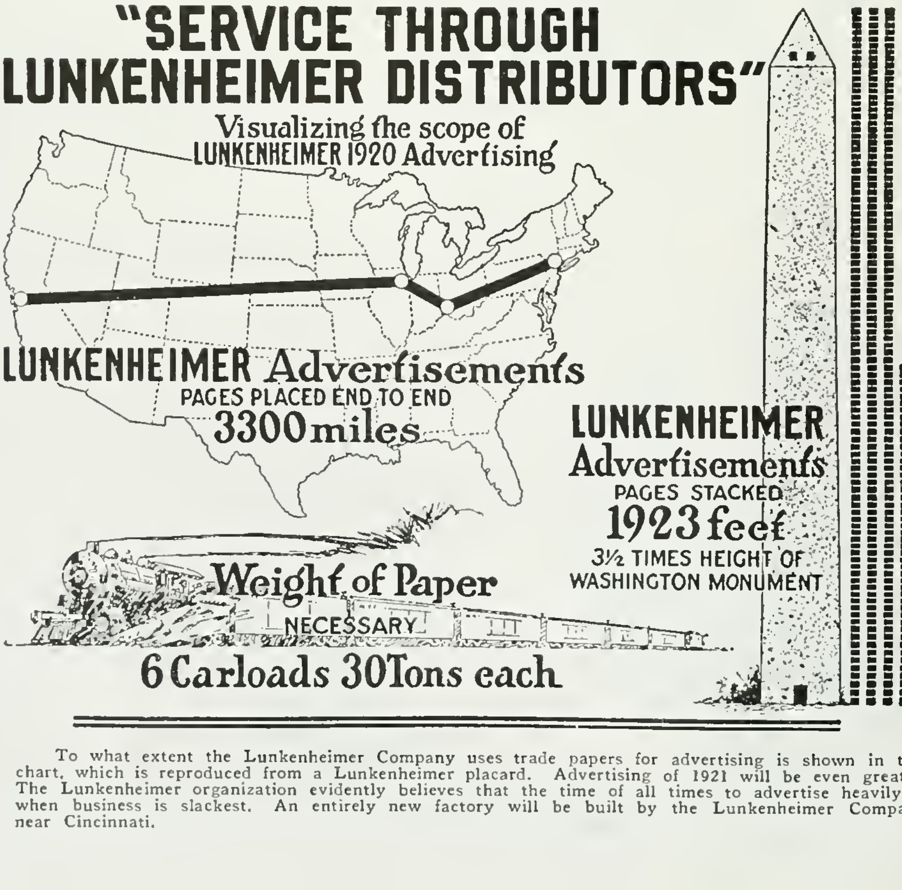
Efficient Marine Equipment Organization

MARINE and industrial power plant engineers who are interested in improving the equipment of their plants should pay a visit to the office of Halloran & Golcher in the Sharon Building and study the display of equipment which is on exhibit there.

Of particular interest is the full sized Radojet air pump cut on the center line so as to reveal the construction and principles of operation of this modern method for obtaining high vacuums in steam condensers. A number of other interesting pieces of equipment are shown, and there is quite a collection of new catalogs and data books.

Halloran & Golcher are factory representatives in this district for condensers manufactured by the C. H. Wheeler Manufacturing Company; for Radojet and Rotrex vacuum pumps; for Kerr economy turbines and reduction gears for turbo-auxiliary equipment; for Engberg generating sets and vertical engines; for the Union Steam Pump Company simplex and duplex marine type steam pumps; for the gauges, revolution counters, etc., manufactured by James P. Marsh & Company.

This firm is ready at all times to give prompt service and advice on marine equipment of all sorts and on industrial power plant equipment.


"SERVICE THROUGH LUNKENHEIMER DISTRIBUTORS"
Visualizing the scope of LUNKENHEIMER 1920 Advertising
LUNKENHEIMER Advertisements
PAGES PLACED END TO END
3300 miles
LUNKENHEIMER Advertisements
PAGES STACKED
1923 feet
3½ TIMES HEIGHT OF WASHINGTON MONUMENT
Weight of Paper
NECESSARY
6 Carloads 30 Tons each

To what extent the Lunkenheimer Company uses trade papers for advertising is shown in this chart, which is reproduced from a Lunkenheimer placard. Advertising of 1921 will be even greater. The Lunkenheimer organization evidently believes that the time of all times to advertise heavily is when business is slackest. An entirely new factory will be built by the Lunkenheimer Company near Cincinnati.

"NACO" *Electric* CAST STEEL

ANCHOR CHAIN CABLE

Meets every requirement of a dependable Anchor Chain Cable

Strength — Tests show the tensile strength of Naco Chain to exceed that of ordinary commercial anchor chain cable, size for size, by over 70%. This great strength makes it possible to furnish Naco Chain to specifications 40% higher than those established on any other type of Anchor Chain Cable.

Resistance to Shock — Subjected to the most severe usage of marine service, Naco Chain has established a new standard of safety for life and property. Because of its great tensile strength and high elastic limit, it withstands without distortion, shocks that destroy ordinary chain cables.

Uniformity — The process of manufacture, by which each link of the same type and size is made off identical patterns, assures absolute uniformity in size and shape of links.

Permanency of Shape — The solid stud cast integral with the link, together with the inherent quality of Naco Steel, which enables Naco Chain to withstand excessive shocks without distortion, protect the permanency of shape of each link throughout the life of the chain.

Ease of Operation — Because of this uniformity and permanency in size and shape of links, Naco Chain always operates smoothly over the wildcat. The casting of the stud solid with the link eliminates the possibility of loose or lost studs and assures against kinking.

Resistance to Corrosion — The corrosive action of salt water is less on Naco Steel than on other chain materials. In tests of long duration, Naco Cable lost less than half as much weight as wrought iron cable exposed to the same conditions. Its homogeneous structure resists the corrosive action, which eats into the fibre or laminations of wrought iron, in constantly increasing areas, and with deeper action than is visible, or can be measured.

Resistance to Wear — Naco Chain has superior wearing qualities. Because of its greater hardness (its Brinnell Number averages 260, as against wrought iron's 110) Naco Chain affords a correspondingly increased resistance to wear and abrasion.

Weight — In weight, size for size, Naco Chain is made the same as wrought iron; insuring the sag required for easy riding at anchor.

Official Rating — Naco Chain carries the official approval of Lloyd's Register of Shipping, American Bureau of Shipping, and the Bureau Veritas, and is furnished to their specifications.

THE NATIONAL MALLEABLE CASTINGS CO.

CLEVELAND, OHIO

APPRAISAL OF TERMINAL PROPERTIES

IN the April, 1921, number of Pacific Marine Review Mr. H. McL. Harding, consulting engineer of the State of New York on barge canal terminals, presents an interesting article on the requirements a modern freight terminal should possess. Mr. Harding states:

"There is now arising a demand for terminal facilities for water-borne freight and this demand is not confined to any one section of the United States, but in front of nearly every ocean or inland city where there are inquiries for terminal locations by the Federal government, the states, municipalities, corporations, and private individuals."

He sums up the features which should influence the appraisal of terminal properties in a series of questions or statements and it is interesting to note how completely Berkeley's proposed harbor development plans—Pacific port terminal—meet these ideal requirements:

1. The size of the area as an undivided whole.

A. The situation on the East Bay water frontage presents the possibility of extensive terminal development extending as it does from the Key Route mole to the Contra Costa county line.

2. The length of the water frontage and its width in proportion to its frontage length. Certain relative proportions of the above lengths and width give the greatest value.

A. The length of this water frontage is about 25,000 feet. The average distance from the shore to the outer end is about 15,000 feet.

3. The position of the federal government pierhead and bulkhead line in relation to the whole property and the possibility of modification.

A. Both the pierhead and bulkhead lines are determined by the location of the four moles on the area and follow the quay walls of each.

4. The possibility of projecting suitable piers into the waterway and the number of piers and slips of commercial width that can be constructed.

A. Plans provide for four great quays or moles, each 3000 feet wide and 13,000 feet long with basins 3000 feet wide between. Should necessity require, lateral piers could be constructed from these moles and not interfere with provision of ample turning basins for ships.

5. The present depth of water along the present or proposed quay line or piers and the depth required.

A. The present depth of water is about eight feet. By the dredging method for constructing the moles, however, water to the depth of thirty feet will be provided so as to accommodate deep sea vessels.

6. The number of cubic yards of dredging and the character of the bottom to be dredged.

A. Dredging for the initial development on the south side of the first unit amounts to about 4,000,000 cubic yards. The bottom to be dredged is covered on its surface with a blanket of mud, sand and gravel, the average elevation of which is about eight feet below mean low water level to the top of the mud. Underlying this blanket of soft material is a harder sand and gravel at an elevation of about 25 feet below mean low water The character of the materials, together with the continuity of its stratification, permits favorable dredging operations.

7. The character of the subsoil and its pile sustaining power.

A. Considering the hard bottom to average 25 feet below mean low water and the depth to be pumped in channels 30 feet below mean low water (1) gives the first 17 feet of pumping in soft material and only 5 feet at the bottom in a harder material; (2) produces a very desirable hard bottom at an economical depth into which to found piles, both for creating a permanent bulkhead, giving it the necessary bottom to withstand great outward pressure and also for foundation purposes.

8. Is the construction of a marginal way of sufficient width for railway tracks and drayways feasible? The present drayage requires wider marginal ways.

A. Each mole or quay will be 3000 feet wide and ample room is provided for all necessary railway tracks and roadways to serve all buildings and wharves.

9. Is there sufficient room for transit or trans-shipment sheds of proper dimensions parallel to the frontage of the quay or the pier?

A. With the width of 3000 feet for each quay, ample provision is given for necessary transit sheds and of almost any length which could possibly be desired, all arranged parallel to and adjoining the wharves.

10. Can warehouses or manufacturing lofts be constructed in correct relation to the waterfront or the transit sheds?

A. Each mole provides a land area of 1500 acres and the plans call for construction of warehouses immediately back of and connected with the wharves and transit sheds. Factory sites are also provided and none of the warehouses or factories will be more than 1500 feet from the wharves, all co-ordinated in such a manner that the necessity for using freight cars in moving commodities between ships and factories or warehouses will be practically eliminated.

11. Are there good roads affording easy rail or dray approaches to the terminal?

A. The plans call for well paved roadways to all industries located on the terminal, as well as to the wharves. There are now excellent street approaches from all east bay cities and the interior. Railway connections with all transcontinental lines lead direct to all industries located on the terminal and alongside the wharves. At an exterior portion of the quay, ferry facilities are provided for railroad car floats, as well as for passenger and vehicular service.

A large railroad yard is provided near the shore end of the quay and all cars coming to the various portions of the quay must first pass through this yard. Trains can be brought in from the east, classified and routed for the various industries and storage buildings or for shipping, and provision is also made for the classification of particular commodities coming in from ships, the warehouses or from factories. Freight coming to the yard would there be classified in so far as possible into carlots and broken into trains for various railroads. Another yard for the car float service is located at the outer yard.

Railroads will deliver trains into the terminal yards.

Operation on the terminal itself will be under the control of the terminal company, thus affording equal and uniform service.

12. Can there be railway tracks or drayways along the waterfront so as to secure the all-important co-ordination between vessel and the shore?

A. The answer given to question 11 fully answers this also.

13. How many ship or barge units can be laid out along the available water frontage?

A. One unit provides 35,000 lineal feet of quay or berthing space for 70 ships of 500 feet each, at one time.

14. What is the possible space for bulk or coarse freight?

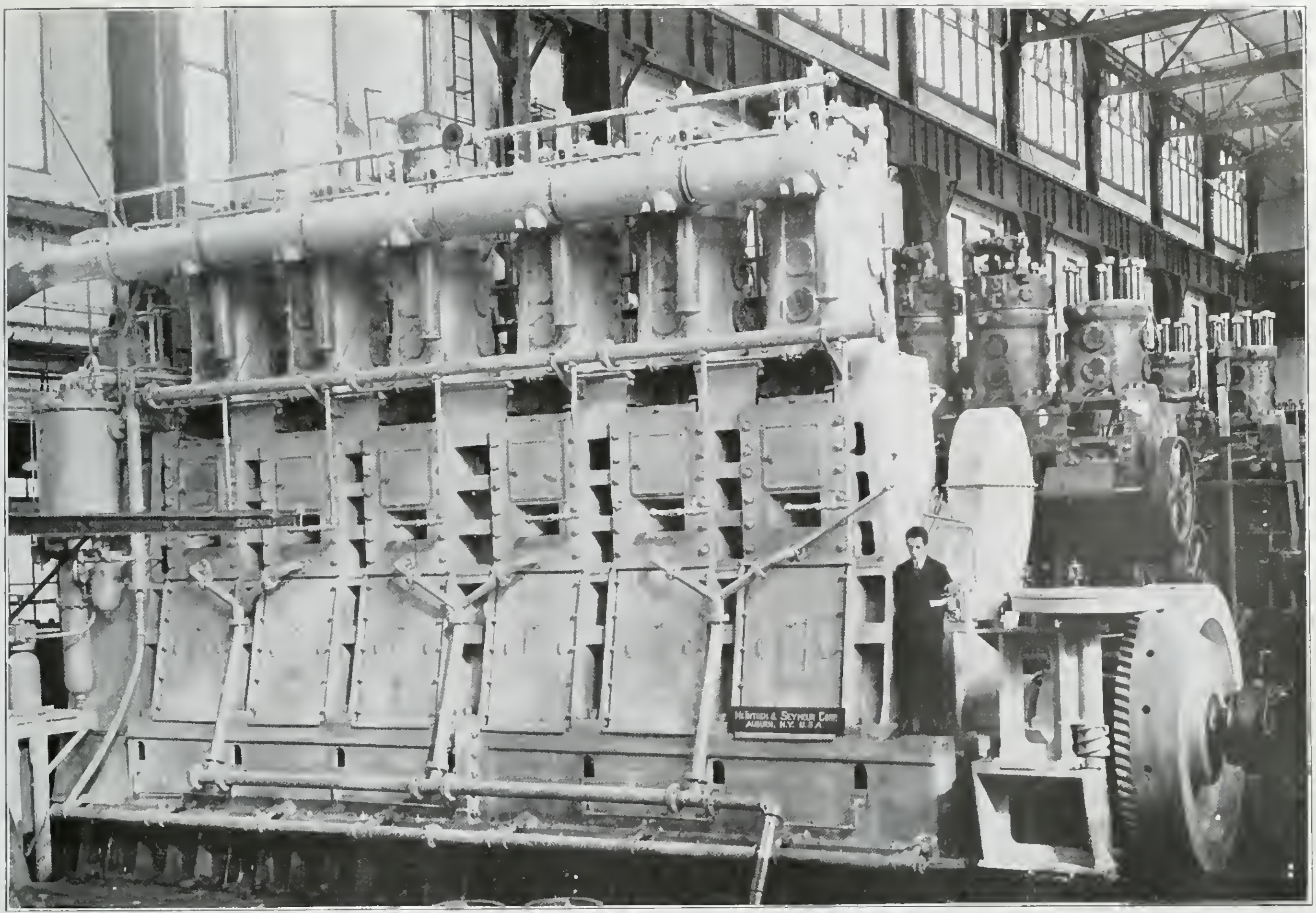
A. On the southerly side of the outshore end is provided a coaling station, either for bunkering ships or for loading cargo coal, and in this location will be provided storage space for oil, which may be led through pipes along both faces of the quay so that ships may be supplied with oil while they are loading other commodities. Grain elevators are provided on the north and south quays with certain separate yards for the direct loading of grain into vessels, and from these grain elevators, conveyors may be planned to run along the face of the pier sheds above the roof where desirable, so that ships may be loaded with grain at any point along the commercial quay front.

An area is reserved for the handling of lumber which may come in by rail from the interior and may be loaded directly out of cars into ships or from ships to cars, or may be stored temporarily and then loaded into ships. For this purpose heavy gantry cranes are planned, serving the lumber area.

15. Annual tonnage transferring capacity per linear foot.

A. Three hundred tons or more.

16. Character of the soil to the rear of the bulkhead



The above picture shows one of our 1200 I. H. P. Directly Reversible Marine Engines on the test floor. A pair of these engines have been installed on the M/S "KENNECOTT."

Other sizes available for Marine work, 390, 640, 1550, 2000 and 3000 I. H. P. all four cycle and directly reversible.

DIESEL TYPE MARINE ENGINES

HEAVY DUTY

McINTOSH & SEYMOUR CORPORATION

AUBURN, NEW YORK

149 BROADWAY
NEW YORK

412 BISBEE BLDG.
JACKSONVILLE, FLA.

815 SHELDON BLDG.
SAN FRANCISCO, CAL.

in respect to securing stable foundations for superstructures.

A. All of the area provided for industries is filled-in land capable of sustaining any weight desired. See answer to question 7.

17. Determination of the best type of superstructure, whether of the crib, concrete wall or relieving platform type.

A. Plans call for dividing the warehouse buildings by fire walls into sections 150 feet by 50 feet and this has been considered good practice for this class of building.

The floor loading provides the following: The ground floor being directly on the fill would be susceptible of any weight to be determined by the character of the fill. The second and third floors should be designed for 300 pounds per square foot and the floors above that 250 pounds per square foot.

The height of the floors will be: first floor, 15 feet in the clear, and floors above that 12 feet in the clear.

The wharf shed is designed for 500 pounds per square foot on the first floor and 300 pounds per square foot for the second floor. The first floor will have a clear height of 20 feet and the second floor a clear height of 16 feet.

The factory buildings are designed to be 80 feet wide, which is considered sufficiently narrow to operate industries without artificial lighting. The floors will have a live load of 200 pounds per square foot with a clear floor height of 16 feet.

Automatic sprinklers are provided through the entire district. Tanks for fire protection and auxiliary pumps will be installed with high pressure fire service lines and hydrants at frequent intervals on the entire property.

18. Distance from the civic centers for the origin and consumption of freight.

A. All of the east bay communities—Alameda, Oakland, Emeryville, Berkeley, and Albany—may be considered as a commercial unit. All of the industrial sections of these communities are within easy trucking distance of the terminal and in no case exceed ten miles; the greater portion are considerably less than this. The distance from the Oakland city hall, which may be considered as about the center of the industrial section, is but 5.1 miles from the terminal; industries located along the Oakland estuary, on the western waterfront and in East Oakland, are slightly further away than this; those located in Emeryville, Berkeley and Albany are much nearer. Well paved roads from all industrial sections lead directly to the terminal.

19. Sewers, slaughterhouses and other nuisances may have an influence on terminal values.

A. The zoning laws of the municipality prevent the possibility of any obnoxious industries or nuisances being located on the property.

20. For comparison with adjacent waterfront sales, such properties must be similarly situated with like physical characteristics.

A. In Oakland—the western area of the city—land ranges from 10 cents to $1 per square foot, according to proximity to rail and water transportation; along the inner harbor prices range from $1 to $2.50 per square foot; in East Oakland the values run from 75 cents to $2 per square foot, all either served by rail or water transportation, or both. The amount of such land available, however, is very limited.

21. The nearness of the terminal to elevated, subway or trolley lines and the proximity of a labor market have an important influence on its value.

A. Trolley lines leading from the terminal reach all of the east bay cities—Berkeley, Oakland, Albany, Alameda, Richmond, and Hayward. Ferry lines operate direct to San Francisco and to other points around the bay.

The unusual situation prevailing because of the proximity of the various municipalities—San Francisco, Oakland, Berkeley, Alameda, Albany and Richmond — produce a labor supply not found in communities the size of the one in which this terminal is located — i. e., Berkeley. The available labor supply therefore can be measured by the population of these closely interlaced districts: Alameda county, 344,127; San Francisco, 506,676. In this connection it may be noted that within a zone of 100 miles from this terminal reside 1,500,000 persons and that this is the exact center of the population of the Pacific Coast. Fifty per cent of the residents of the east bay district own their own homes.

22. The value is also increased if the property is practically necessary to the municipality or to some company or individual other than the owner, for a contemplated improvement.

A. The entire enterprise is one in which the municipality of Berkeley has a direct share in its revenue, as the lease provides that the city of Berkeley shall receive one-half of all the profits accruing from the collection of wharfage charges on the portion of land leased from the city.

23. Its value is also dependent upon its nearness to barge, lighter or harbor craft traffic.

A. Barge, lighter and other harbor craft is able to operate direct from the terminal to any portion of the bay. River boats from Sacramento and Stockton here find their first landing place.

24. The size of the population, of its hinterland and their consuming capacity, and the volume of tonnage and value of the traffic passing by its waterfront, should affect its appraisal value.

A. Directly opposite the Golden Gate are situated the east bay cities. Immediately back of these cities lies a range of low hills, making one of the most delightful residential districts on the Pacific Coast. The bay, some fifty miles in length, stretches from the north to the south and is enclosed by two jutting peninsulas, the one to the south containing the city of San Francisco proper. The northern peninsula, by far the more rugged, is wholly unsuited for commercial development. The east bay cities, located directly in the center of the continental side of this expanse of water, are directly opposite its only accessible entrance from the sea.

The bay at large is most admirably fitted for commercial development, but a casual glance will disclose that the most intensive development at present—namely, the city of San Francisco itself—is isolated from the continent by the very bay which makes its development possible. The east bay cities, however, it can be said without fear of contradiction, possess the most strategically located sites for commercial expansion. On the transcontinental side of the bay, harboring four of the termini of the transcontinental rail carriers, the east bay cities are the western gateway for the railroads for central United States.

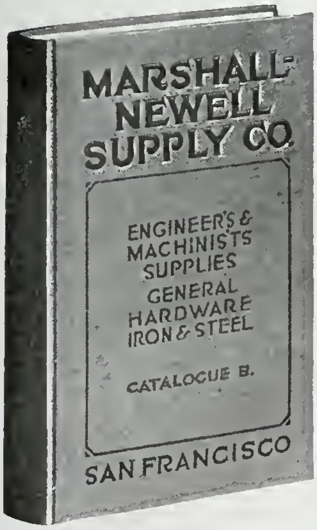
According to the 1920 census, California ranks eighth in population among the states, showing a gain of 44.1 per cent over 1910—a total population of 3,426,536. Nine counties surrounding the bay of San Francisco have a population of 1,184,000. Other sections of the state also have their outlet through the bay of San Francisco with populations as follows: San Joaquin Valley (eight counties), 425,000; Sacramento Valley (nine counties), 214,000; Northern California (five counties), 73,000, which together with the population immediately adjacent to the bay make a population of 1,896,000 directly contributory to this locality.

The tonnage handled over the piers at San Francisco now approximates 10,000,000 tons annually. It is conservatively estimated that at least 50 per cent of this now originates or is destined to points on the mainland side and passes by Pacific port terminal and the unnecessary expense and delay caused by transporting this tonnage across the bay or making a long detour is now charged against it.

25. The elevation of the land terminal area, whether level or on grade, whether it should be excavated or filled, and what expenditures would be necessary to make the land area suitable for terminal purposes, should be considered in the appraisal.

A. The great value to land on Pacific port terminal is the fact that it is all filled, all level, and no expense is incurred in leveling or cutting down land, which because of physical characteristics is unsuited for industrial purposes until this is done. Also the land is made at the same time as the channels are dredged.

Trade Literature



Catalog B, Marshall - Newell Supply Company, San Francisco.

The Marshall-Newell Supply Company have issued a very handsome book in this general catalog. It covers 750 pages, completely indexed, and with very numerous cuts, all bound in green buckram with red and black stampings. The Marshall-Newell Supply Company are factory representatives in San Francisco for the following firms: The Lunkenheimer Company, Yale & Towne Manufacturing Company, Ashcroft Manufacturing Company, Reed Manufacturing Company, Greenfield Tap & Die Corporation, Durabla Manufacturing Company, Heller Brothers Company, Consolidated Safety Valve Company, The Penberthy Injector Company, Wahlstrom Chuck Company, Open Coil Heater & Purifier Company, Joseph Dixon Crucible Company, Oliver Ames & Sons Corporation, Foster Engineering Company, Toledo Pipe Threading Machine Company, Armstrong Brothers Tool Company, E. C. Atkins & Company, Norwalk Lock Company, Youngstown Sheet & Tube Company, Penn Oiler Company, Hayden & Derby Manufacturing Company, Jenkins Brothers Company, Peck, Stow & Wilcox Company, Taylor Instrument Companies, Joyce - Cridland Manufacturing Company, L. S. Starrett Company, Cleveland Twist Drill Company.

Bulletin No. 330, The Griscom Russell Company, describes the Reilly submerged type self-scaling evaporator.

As long as evaporators have been used for distillation of sea water to provide boiler feed make-up on ship board, the cleaning of salt scale accumulations from the coil surfaces has been both a problem and a nuisance. This scale is sure to form as a result of evaporation and its presence decreases materially the rate of heat transfer from the steam in the coils to the salt water in the shell and therefore scaled coils decrease the evaporator capacity. When a ship reached port it was necessary for the chief engineer to open his evaporator and clean the coils either by hammering them to crack the scale off, or by heating them in a charcoal fire.

The radical differences between the Reilly evaporator, submerged type, self scaling, and all previous evaporators of various makes, and which differences account for the self scaling feature, are the following:

1. The Reilly evaporator, submerged type, self scaling, is equipped with the new patented enveloping baffle, which is the only device allowing the tube surface in a salt water evaporator to be entirely submerged. Without this baffle it is necessary to have the greater part of the tube surface above the water level in order to dry the foam out of the salt water vapor.

The entire coil surface being submerged causes the scale on the coils to be kept moist and effectually prevents the baking on of the scale, which was the principal trouble heretofore.

2. The pitch of the convolutions of the coils is designed to exaggerate the expansion and contraction movement. This pitch has been carefully determined by exhaustive experiments.

S. L. KREIDER
SHIPPING

Gen'l Agent
TOYO KISEN KAISHA
WILLIAMS S. S. CO., INC.

At Los Angeles
375 Pacific Electric Building
At San Diego
239 Spreckels Building

PRATT & WHITNEY STAYBOLT TAPS

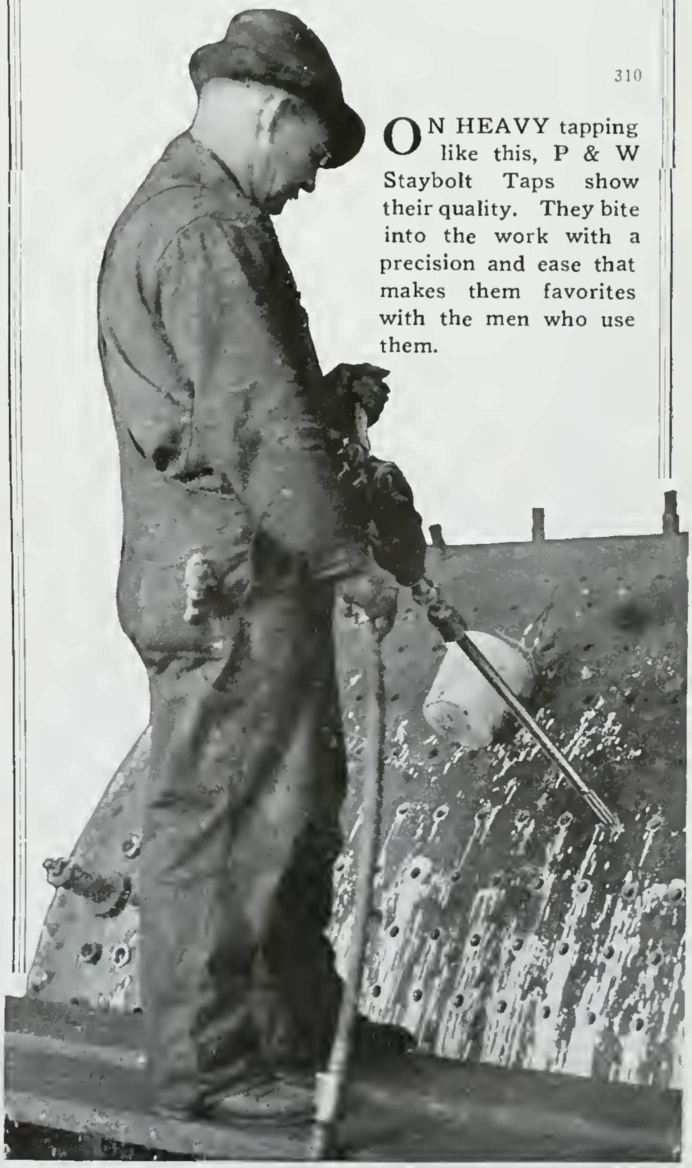
TO MEET all your boiler requirements, we build P & W Staybolt Taps in five standard styles, as well as Spindle Staybolt Taps with and without threaded end and also Combined Reamer and Tap to tap continuous hole in the reamer hole of the far boiler plate.

Our reputation for precision and high quality stands behind these tools. Buy them in any of the styles and sizes listed in our Small Tool catalogue which is yours for the asking.

These taps and our complete line of Small Tools are on sale at our offices in Boston, Philadelphia, Birmingham, Rochester, Cleveland, Detroit, St. Louis, Cincinnati, Seattle, St. Paul, New Orleans, San Francisco.

PRATT & WHITNEY CO.
111 BROADWAY NEW YORK
Works Hartford, Conn.

310



ON HEAVY tapping like this, P & W Staybolt Taps show their quality. They bite into the work with a precision and ease that makes them favorites with the men who use them.

OPERATORS, ATTENTION!

A PRETTY row is in prospect between the merchants who make it a business of supplying steamships, the paint manufacturers, the rope manufacturers, the steam packing manufacturers, and the steamship companies operating government ships, on the one hand, and the Shipping Board on the other hand, over the method of purchasing supplies and equipment for these ships.

This row has been brewing for some months past, and was brought nearer to a head on Tuesday, April 26, when the bids of various paint manufacturers for the supplying of paint for government vessels operated by American Steamship Companies, were opened by the Shipping Board in Washington.

Among the bids was one from the Durham-McQuade Paint Company, a subsidiary company which manufactures marine paint and which is owned by the John McQuade Company, with offices at 7 Pine street, New York, and factory in Brooklyn, New York. The Durham-McQuade Paint Company refused to bid on a paint according to the specifications of the Shipping Board, and offered paints of their own manufacture and which have been commonly used by steamship companies for years. A protest was entered by the company signed by its president, Robert W. Swan, Jr.

Mr. Swan denounced the specifications, stating that a paint manufactured in accordance therewith was absolutely unfitted and unsuitable for use on shipboard. In his protest he said:

"After a careful study of the Shipping Board's paint specifications, and a report from chemists as to the character and quality of a paint made up according to the specifications, we can commend, and will recommend, the Shipping Board's paint to be of a splendid quality for painting houses, chicken-coops, barns, outhouses, cellars, pantries, kitchens, attics, and even wooden fences, but for shipboard purposes we feel certain it will be anything but satisfactory."

The entire protest was an attack upon the system of purchasing supplies under contract, as is being employed by the Shipping Board, Mr. Swan claiming that this was a wasteful, extravagant, and unbusinesslike method, especially to contract for supplies months in advance, while the market has been steadily receding. As an example of the evils which he claimed savored very much of those existing during the war period, he quoted upon a number of articles required by steamship companies, and on which the Shipping Board had entered into contracts with manufacturers, quoting the prices paid by steamship operators through their own purchasing departments in the open market of qualities time tried and entirely satisfactory and for the same materials quoted prices being paid on Shipping Board vessels under Shipping Board contracts the period being from November 1, 1920.

	Steamship Company Pays	Shipping Board Contract Price
Marine engine oil	$0.62 per gallon	$0.72¼ p. g.
Cylinder oil	0.57 per gallon	0.72½ p. g.
Ice machine oil	0.45 per gallon	0.47 p. g.
Flax packing	0.40 per pound	0.80 p. p.
H. P. steam packing	1.30 per pound	1.60 p. p.
Sheet rubber packing	0.40 per pound	0.48 p. p.
Gaskets	1.00 per ound	1.05 p. p.
Semi-metallic packing	1.50 per pound	1.80 p. p.
Asbestos sheet packing	0.55 per pound	1.30 p. p.

In his criticism of the contract system he refered to the bottom paint contract, which caused such dissatisfaction among the shipping companies. It is believed that this paint was furnished by a paint company in which was financially interested one of the members of the Shipping Board, who resigned his official position with the paint company upon his appointment to the Shipping Board.

One of the stories told concerns the S. S. John Adams which was placed in Jahncke's Dry Dock, New Orleans, where her bottom was painted. She sailed for Pensacola, Florida, a distance of a few hundred miles, and upon entering the harbor, suffered an accident and was compelled to put back to New Orleans where she went into dry dock once more, to have her plates straightened, when it was discovered that in less than three weeks' time all of the paint on her bottom had been washed off, necessitating a repainting, according to the report of her master. Shipping men say this is but one of many instances in connection with Shipping Board contracts.

In the protest it was pointed out that the contract system opens up opportunity for political manipulation, and the creation of thousands of political sinecures for so-called inspectors, investigators, surveyors, and other impedimenta, all of which will lead to delays in the speedy dispatch of ships, and a day's delay means a loss of $1500 or more on each ship, all of which adds to the operating cost of the ships and handicaps the American merchant marine in its attempt to compete with the more economically operated ships of other countries.

The Durham-McQuade Paint Company, in addition to their protest to the Shipping Board, have taken up the fight in behalf of the steamship operators, and supply dealers. They have incorporated their protest into a circular headed in large black type "The Shipping Board Demand House Paint for Ships, Why Not," and then shows the picture of a house, surrounded by a question mark, after which follows their protest.

This they have sent to every supply dealer in the United States, as well as every member in Congress, or other government official interested, and to all steamship companies asking them all to co-operate in doing away with this expensive, extravagant contract system and permit steamship companies to operate government ships under what is known as a "bare boat charter." This means that the government allocates to various steamship operators vessels of government ownership at a specified charter price, and the operators pay for their upkeep in accordance with the terms of the charter and operate them in the same economical manner that they operate the privately owned vessels.

Owing to stagnation in the shipping industry, those companies that were organized overnight for the purpose of securing government vessels through political influence, have gradually fallen by the wayside, failed in their obligations to the government, and in many of our harbors may be seen dozens of Shipping Board vessels tied up to the piers or anchored in the bay, without cargo and many without operators. In Jamaica Bay, there are almost sixty vessels, and it has been announced that there soon will be seventy-five. The Shipping Board claim savings in wharfage through anchoring them in Jamaica Bay, but neglect to say anything about the losses on the vessels overhead, due to their idleness, and unbusinesslike policy of the Shipping Board. The steamship companies are strongly organized and are prepared to back up the protest of the paint company and make this contract an issue, due to the very impracticability of the specifications and contract itself.

Trade Literature

The Precision Truing Machine. Bulletin No. 21 of the Precision Truing Machine & Tool Company, Inc., Cincinnati.

A four-page leaflet describing Style No. 21 of the Precision truing machine. This device consists essentially of a spindle mounted on ball bearings with a heavy flywheel on one end and a small grinding wheel on the other. The bearings and flywheel are enclosed in a dustproof and waterproof aluminum housing.

In truing up an emery wheel this machine is bolted to the table of the grinding machine and the face of the small wheel on the truing device is brought in contact with the face of the large grinding wheel while the grinder is running. The action of the two wheels running together in this way trues up and dresses the grinding wheel and produces a finish which is said to be superior to that produced with the ordinary diamond device. The only expense connected with its operation is for replacement of the truing emery wheels, which is very nominal.

Portolift—Portable Electric Stacking Elevator. Allan Cunningham Company, Inc., Seattle, Washington.

An eight-page bulletin profusely illustrated describing a portable electric elevator or tiering machine which is designed as an attachment for an electric storage battery platform truck and can also be furnished as an independent portable unit mounted on its own four-wheel wagon type truck. In the latter case the mechanism is called a portable tiering elevator.

The great advantage claimed for this machine over other types is that of no projecting wheelbase or body on the front of the platform guides so that the elevator platform itself can be lowered until it rests flat on the floor or platform on which the machine is working. With a bevel edge it is possible with the elevator platform in this position to wheel loaded hand trucks directly onto the platform and to lift them bodily with their loads. This feature of course greatly facilitates the unloading and loading of freight cars and the placing of heavy pieces on upper tiers on platforms in warehouse.

Both types of the machine can be furnished with lifting capacity from 800 to 4000 pounds with hoisting speeds of 15 to 60 feet per minute. They can be fitted with either direct or alternating current motors for plugging into dock or warehouse mains or with low voltage direct current motors to take the current from the storage batteries of the electric truck.

Two of these machines have been in operation on the docks at Seattle and have been found to be so satisfactory that the Port Commissioners have ordered enough additional machines to serve all of the main aisles of their warehouse. It is estimated at Seattle that these machines pay for themselves in a very short time in the reduced labor costs of stacking cargoes and the possibilities of saving valuable floor space by higher tiering.

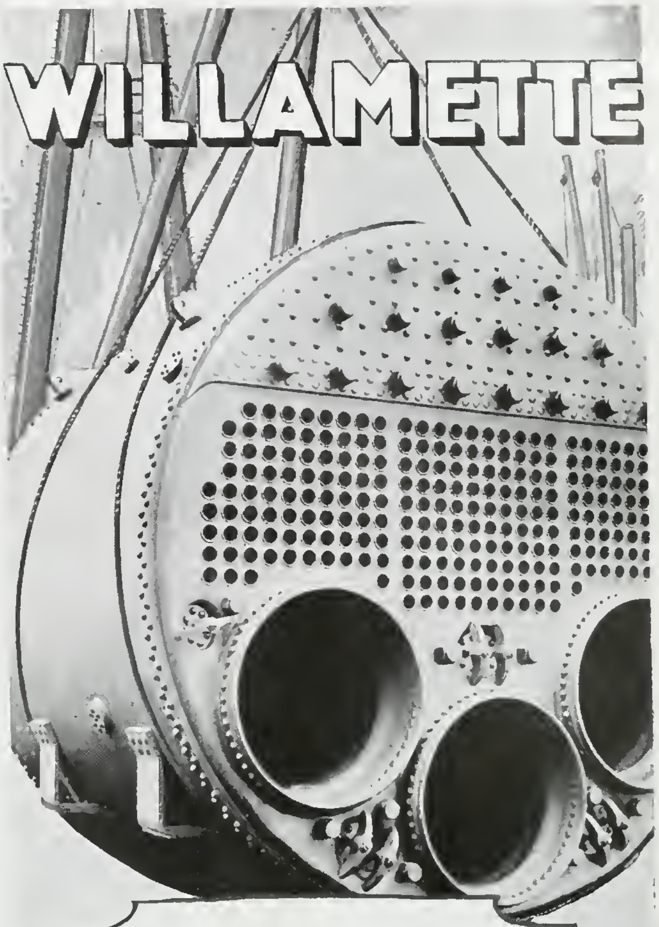
Threads — Volume X, No. 2. Shop organ of the Geometric Tool Company, New Haven, Connecticut.

A very neat book of 20 pages devoted to the interests of the employes of the Geometric Tool Company and setting forth in a very interesting manner on some of its pages the advantages of shop work with the geometric die head.

Liquid Fuel Burners for Open Hearth and Other Regenerative Furnaces. Bulletin LF-101 of the George J. Hagan Company, Pittsburgh, Pennsylvania.

The George J. Hagan Company of Pittsburgh maintain a service covering the entire field of industrial heating, particularly in that aspect of that field which has to do with fuel application. The application of liquid fuel in the industries has rather indefinite boundaries. There are some operations where no other fuel will be considered and then there are many operations where liquid fuel would be considered only as an auxiliary to solid or gaseous fuel. Often the application of oil is attempted in operations where from every standpoint of engineering other fuels would be very much better. It is, therefore, the desire of the service of the George J. Hagan Company to carefully analyze every individual problem and give their clients the benefit of their long experience in the application of the various fuels.

The present booklet describes Hagan liquid fuel equipment as especially adapted to open-hearth furnaces. This equipment includes burners of the swinging type and the Hagan flow control stand. The burners are applied to the ends of the furnace and the flow control stand is mounted on the charging platform. The function of the control stand is to permit convenient reversal of the firing from one end of the furnace to the opposite end or the suspension of operation entirely. Included also in the Hagan open hearth line is a ladle heating burner.



REINFORCED by wide experience covering many important marine operations, the Willamette plant is well prepared to undertake and complete your work with satisfaction, economy and dispatch.

MARINE MACHINERY

MARINE AND STATIONARY BOILERS

DECK MACHINERY AND AUXILIARIES

MARINE REPAIRS OF ANY CHARACTER

Willamette
IRON & STEEL WORKS
Portland, Oregon, U. S. A.

1043 Monadnock Bldg.,
San Francisco, Cal.
1920 L. C. Smith Bldg.,
Seattle, Wash.
Canadian Office
916 Rogers Bldg.,
Vancouver, B. C.

The Lillie Evaporator. Bulletin No. 114 of the Wheeler Condenser & Engineering Company, Carteret, New Jersey.

In this 25-page booklet are described in considerable detail the features peculiar to the Lillie evaporator and several installations for sugar work, distilling water, and for evaporating many kinds of chemicals, solutions and waste waters. The solution is forced to the top of the body of an effect and evenly distributed over the outside of the tubes in thin, rapidly-moving films. Thus all of the available temperature difference is utilized for causing heat transmission and an unusually high rate of heat transmission is attained. Incrustations are taken care of by periodical reversals of both vapors and liquors through the effects. Those interested in the production of distilled water for boiler make-up feed on shipboard and in power plants will be interested in the description of the Lillie six-effect evaporating plant on the U. S. S. Tennessee and California. A perspective diagram is also given of the triple effect and auxiliaries recently installed at the power station of the Chile Exploration Company of Tocopilla, Chile.

Specifications—Bituminous Anti-Corrosive and Water-Proof Coatings for Iron, Steel, Concrete and Wood—Asphalt Mastic and Composition Floorings. Hill, Hubbell & Company, San Francisco.

An attractive cover of the loose-leaf variety enclosing bulletins No. 1, No. 2, No. 3, No. 4, and No. 5, of Hill, Hubbell & Company. Bulletin No. 1 is a questionnaire setting forth facts about Biturine Enamel and Biturine Solution is a question and answer form.

Bulletin No. 4 sets forth the advantages of Biturine protective coatings for marine uses. From the years 1916 to 1920, inclusive, Biturine was used on a total of 455 ships built on the Pacific Coast for the United States Navy and for the Emergency Fleet Corporation.

Bulletin No. 2 shows the economy through the use of Biturine as a protective coating for water tanks, as evidenced by its application to the surfaces of over 200 water storage tanks in the metropolitan district of San Francisco.

Bulletin No. 3 advises the use of Biturine protective coatings for underground pipe lines. The Ozark Pipe Line, running 430 miles from Cushing, Oklahoma, to East St. Louis, Illinois, coated by Biturine solution after exhaustive tests by the contracting engineers, Sanderson & Porter, is functioning perfectly under the protection of Biturine and many hundreds of miles of gas mains, hydro-electric and irrigating installations, and water piping throughout the western part of the United States are enjoying immunity from rust and corrosion through the wise provision of this protective coating.

Bulletin No. 5 is devoted to the subject of Vulcanite Mastic Flooring. Mastic might properly be called a bituminous concrete.

As an acid and alkali resistant it has an extensive application for the flooring of battery rooms and for the lining of concrete, metal or wooden tanks. It also has an extensive application for the roofs of hotels, apartments, stores, factories, schools, or any roof spaces which are used for recreation or business purposes. It may be laid with satisfaction and economy on a previously placed floor of wood, concrete or brick, the only requisite being that the material upon which is it laid shall be solid with no great vibration.

Winton Marine Oil Engines. Winton Engine Works, Cleveland, Ohio.

A 34-page art brochure, beautifully illustrated with Winton engined vessels of various types equipped with the directly reversible Winton marine Diesel and also with the Winton-Westinghouse Diesel electric drive. The detail of construction of this serviceable oil motor is shown pictorially and described in the text. The engines are built in 3, 4, 6 and 8 cylinders with horsepowers from 50 to 450. The four smaller sizes are fitted with reverse gears; the three larger sizes are self-reversible.

Winton Diesel Oil Engines—Commercial Type. Winton Engine Works, Cleveland, O.

An eight-page booklet describing the non-reversible Winton Diesel oil engine for direct connection to electric generators. Complete specifications, dimensions and weights of the engines are given.

Winton Air Compressors.

A four-page folder describing Winton-built air compressors. These compressors are put up in four types: Model W-18 geared to an electric motor mounted in line with compressor on the same bedplate; Model AC-3 driven by a twin cylinder steam engine directly connected and mounted on the same bedplate; Model AC-3 with bedplate adapted for electric motor drive through silent chain gearing; and Model W-18 driven by a 6-cylinder Winton gasoline motor mounted on the same bedplate and geared down to compressor speed.

Gasoline Marine Engines. Winton Engine Works, Cleveland, Ohio.

An eight-page folder describing the Winton gasoline marine engine, in 6 and 8 cylinder sizes, in horsepowers from 80 to 200, with special planetary type reverse gear, all gears and pinions being of chrome vanadium steel. These engines are all equipped with the Winton air starter, with Bosch coil magneto and battery current, and a high tension magneto working on high tension plugs, giving two independent and complete systems of ignition. Lubrication is worked entirely on the pressure system, and oil is filtered through a series of easily removable screens in the circulation system.

The Pneumercator Afloat. Pneumercator Company, Inc., 118 Liberty Street, New York.

A 20-page booklet describing and illustrating the uses of the Pneumercator on shipboard as an instrument of precision for indicating the fore and aft draft and registering the main draft and displacement. The Pneumercator is usually located in the captain's office on a ship and is an accurate check on the weights carried in cargoes and bunkers. The instruments are practically "foolproof" and provide means in themselves of proving absolutely the accuracy of their own readings. They are extremely valuable to a navigating officer in that he has under his eye constantly and accurately the trim and list of his vessel under all conditions.

The Pneumercator Ashore. Pneumercator Company, Inc., 118 Liberty Street, New York.

An 18-page booklet describing the application of the Pneumercator as an instrument of precision which will indicate the level and the weight or volume of any liquid in any tank, stand pipe or reservoir. The Pneumercator also has been variously used in measuring the depths of rivers, stages of tide, etc., of water flow over dams, and many other similar purposes.

Steering Gear Catalog. American Engineering Company, Philadelphia.

A 30-page book with artboard covers describing and illustrating the various steering mechanisms manufactured by the American Engineering Company. Hand steering gears, mechanical, hydraulic and electric transmission systems, steam gears for mechanical transmission, hand and steam gears for mechanical transmission, screw gears, differential gears, steam tillers, steering gears, and electro-hydraulic, are all described and their best use indicated.

Instructions for the Care and Operation of the American Automatic Towing Machine. Bulletin No. 107 of the American Engineering Company, Philadelphia.

A four-page leaflet giving the working drawings of the tow-

SWITZERLAND
Marine Insurance Co., Ltd.
THAMES & MERSEY
Marine Insurance Co., Ltd.
LIVERPOOL &
LONDON & GLOBE
Insurance Co., Ltd.
(Marine Department)
HARTFORD
Fire Insurance Co.
(Marine Department)
LOUIS ROSENTHAL
General Agent
302 California Street

ing machine and winding device with printed notes of direction for installation, for winding the rope on drum, and for setting the machine for towing, together with various instructions on different methods of towing and on lubrication, upkeep and repairs.

Ideal Pump Governor. Bulletin No. 1-A of the Atlas Valve Company, Newark, N. J.

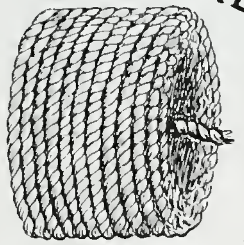
A 12-page booklet describing the various styles and types of the Ideal pump governor, which is described as a "piston actuated pressure controlling valve for governing either reciprocating or turbine driven pumps."

This governor varies in style according to whether the pressure desired from pump is fixed or variable. The actuating piston of the governor works in an oil bath, the body of oil not only lubricating the piston but preventing the liquid from entering the control cylinder, thus eliminating any possibility of the sticking of the piston due to corrosion or sediment. There are only two moving parts, the steam valve, which is of the double seated balanced type, and the control piston; no diaphragms, cup leather packings or small delicate parts to get out of order.

London's Life Saver and Ship Recoverer. C. E. London, Vancouver, B. C.

A booklet of 16 pages describing a newly patented device designed by C. E. London and illustrated with artist's sketches showing the application of this device on wrecked ships.

The device consists of a buoy which upon the sinking of the ship is released automatically but is still attached to the ship by a light cable which unwinds from a drum. The end of the light cable is attached to a heavy cable, this heavy cable being solidly attached to the framing of the ship and clearing itself from the drum when completely unwound. In the buoy are stored food, water and clothing. When the ship sinks,



YNCHAUSTI CORDAGE
MADE IN MANILA, P.I.

MANILA ROPE

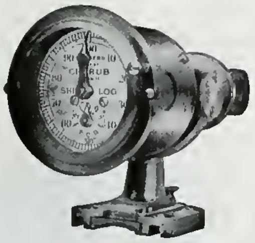
To the Purchaser:

If Manila rope is your need secure Ynchausti Manila Rope.

It is made where the world's supply of Manila Hemp is produced, in the most modern and efficiently equipped hard fiber factory in the Orient. The superior quality, strength and durability of Ynchausti Rope has created a satisfaction and confidence among buyers of high class cordage. Year after year the reliability of Ynchausti Pure Manila Rope has been consistently demonstrated.

Complete Stocks Maintained on the Pacific Coast
Write for revised rope booklet

405 Sansome Street
GUY T. SLAUGHTER & CO.
SELLING AGENTS FOR U. S. A.
San Francisco



WALKER'S PATENT
"Cherub II" Ship-Log
THE Log for speeds up to 16 knots

Unsolicited Testimonial — "The unvarying aeeuracy of the 'Cherub' pattern Log that I possess calls for grateful comment from me. During an extensive use of Ship-Logs, I found that this one is absolutely 'uneannily' accurate, if I may say so, and in spite of wear and tear keeps up its standard."

For higher speeds, use Walker's "Trident" Ship-Log

To be obtained through Marine Opticians and Ship Chandlers.

THOS. WALKER & SON, LTD.
58 OXFORD STREET, BIRMINGHAM, ENG.
MAKERS TO THE LEADING NAVIES AND SHIPPING COMPANIES OF THE WORLD

JEFFERY'S PATENT MARINE GLUE NO 7 BLACK

DOES YOUR BOAT LEAK?

Send for Booklets—"HOW TO MAKE YOUR BOAT LEAKPROOF," and "MARINE GLUE—WHAT TO USE AND HOW TO USE IT."—Each grade is for a different purpose. IT IS IMPORTANT THAT YOU USE THE GRADE WE RECOMMEND. Any old boat, so long as the frames are in fair condition, can be made water-tight by following the instructions in the above booklets. This applies to anything that floats, from a canoe to a yacht, wood or steel. Put your leak troubles up to us, we will help you to stop them.

JEFFERY'S MARINE GLUE IN ALL THE VARIOUS GRADES

For sale by all Yacht, Boat and Canoe Supply Houses; Hardware, Paint and Oil, and Sporting Goods Dealers.
L. W. FERDINAND & CO. - - - - - 152 Kneeland St., Boston, Mass., U. S. A.

CAM, CRANK
STEAMSHIP
SHAFTING, SHOES
AND DIES, PULVERIZING BALLS

Forrest FORGINGS

OIL AND WATER
WELL MACHINERY
TOOLS AND
SUPPLIES

EDWIN FORREST FORGE COMPANY
OAKLAND
SAN FRANCISCO

the buoys varying in number according to the size of the vessel, float on the surface, unwinding their cables as the ship sinks. The survivors finding refuge on the buoys, by opening the hatch, obtain access to the food, clothing and water, and are thus enabled to comfortably survive the rigors of shipwreck for a very considerable length of time. The survivors being picked up, the buoys are left to mark the location of the wreck. Upon the arrival of the salvage vessels the buoys are picked up, the light cable is hauled in, followed by the heavy cable, which is then attached to the cranes on the salvage lighters and the sunken hull hoisted to the surface.

G-R Regenerative Compressor. Bulletin No. 350 of the Griscom - Russell Company, 90 West street, New York.

A 12-page booklet describing the use of an auxiliary for evaporators.

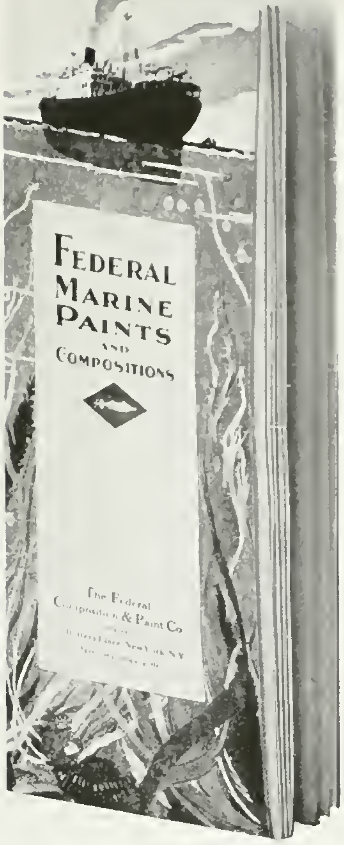
Evaporators installed on shipboard have to be of a size suitable for the maximum distilled water requirements, but there are many periods when the vessel is operating under reduced speed or is in port, during which this maximum evaporator capacity is not needed. Quite frequently the reduced requirements are as low as 25 per cent of the rated evaporator capacity.

The G-R Regenerative Compressor installed on an evaporator gives increased efficiency by compressing and delivering to the evaporator coils a portion of the vapor taken from the evaporator, thereby reducing the total steam required for evaporator operation. The latent heat contained in this evaporator vapor would ordinarily be thrown overboard in the distiller or condenser circulating water.

The compressor is so installed that with the evaporator working at full capacity the compressor may be cut out through a bypass system by the manipulation of the valves. The compressor is of the jet flow type.

Development of Electricity in the Merchant Marine. The Cutler - Hammer Manufacturing Company, New York.

A 16-page beautifully illustrated booklet describing the use of Cutler-Hammer control apparatus for the application of electricity to the driving of the auxiliary machinery on board ship. The Cutler - Hammer Manufacturing Co. is probably the oldest manufacturer of electric control equipment in the United States. Their experience in the marine field began with the early use of electrically driven machinery in the United States Navy, and in the design of control apparatus for marine use they have had probably a wider and longer experience than any other manufacturer in the United States.



Marine Geared Turbines for Merchant Ships. Bulletin No. 49015 of the General Electric Company, Schenectady, N. Y.

A forty-page beautifully illustrated and printed book with art cover describing the advantages of the General Electric system of marine geared turbines for merchant vessels of 2000 to 4000 S. H. P. The Curtis steam turbine as manufactured by the General Electric Company is described in detail with working diagrams showing action of steam and detailed drawings showing the entire construction, both of turbine and gearing. The double reduction gears of the General Electric Company are described and numerous drawings displayed showing the development of the teeth forms and the construction of the hollow quill pinions, and flexible shafts and couplings with detailed sectional drawings. A very instructive and interesting report on the operation and manufacture of the turbine and gears.

Howden's Forced Draft. Bulletin No. A-2. James Howden & Company of America, Wellsville, New York.

An eight-page folder giving general specifications for the Howden forced draft system, including the fan, fan engine, furnace fronts, and ducts. Howden's system has become almost standard in high pressure marine installations. As is pointed out on the cover page of this folder, Howden's forced draft is fitted to the largest and fastest steamers in the world, including such ocean grayhounds as the Leviathan, the Imperator, the Aquitania and the Mauretania, each of which has in excess of 60,000 S. H. P. in its ahead turbines.

Fulton Diesel Oil Engines. Fulton Iron Works Company, St. Louis, U. S. A.

A 35-page bulletin describing in detail the principal features of the Diesel engine manufactured by the Fulton Iron Works Company, which is a development from the original designs and patents of Franco Tosi of Legnano, Italy. The Tosi engine has been described more than once in the columns of Pacific Marine Review. It is a vertical multi - cylinder 4-cycle engine with an A-frame construction and all of the bearings accessible even while the engine is in operation.

Special emphasis is laid on the perfection of the lubricating system and the starting mechanism in these engines. The lubricating system consists of gravity sight feed to the main journals with centrifugal ring fittings on the crank pins. The piston pins are lubricated by forced feed under sight feed control. The cylinders are lubricated by multiple forced feed oilers driven from the camshaft with from two to four individual feeds to each cylinder.

In the starting of the Fulton Diesel oil engine the valves proper are of simple construction actuated by compressed air and permit centralization of the entire control of the engine in one hand wheel conveniently located. To start the engine this hand wheel is turned to the first starting position, permitting high pressure air to pass to the starting valves opening them in proper sequence. Only two of the cylinders are equipped with starting valves. After a few revolutions under air, the hand wheel is moved to the second starting position which puts in action the fuel pump plungers for the other two cylinders, leaving air on the starting cylinders. When the engine has taken its first impulse from the fuel, the hand wheel is turned further to the running position, automatically cutting off the starting air and putting the two starting cylinders under fuel.

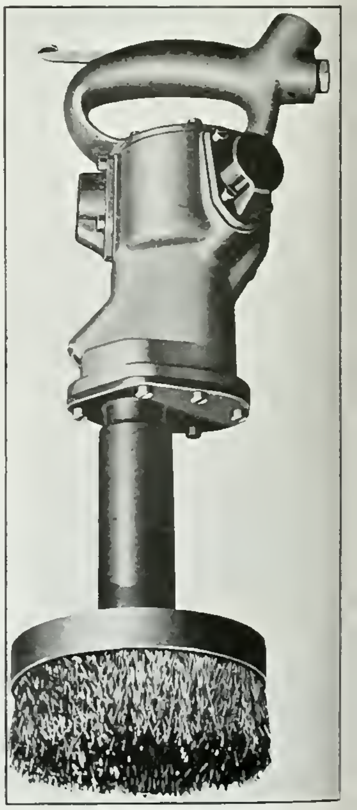
"Little David" Wire Brush Cleaner

WIRE brush cleaning of metal surfaces offers an opportunity for considerable saving of time and labor over that required by hand in removing paint, rust, scale and dirt. However, it has been difficult to obtain a wire brush of proper design and materials which would work effectively on an air motor and not wear out too rapidly.

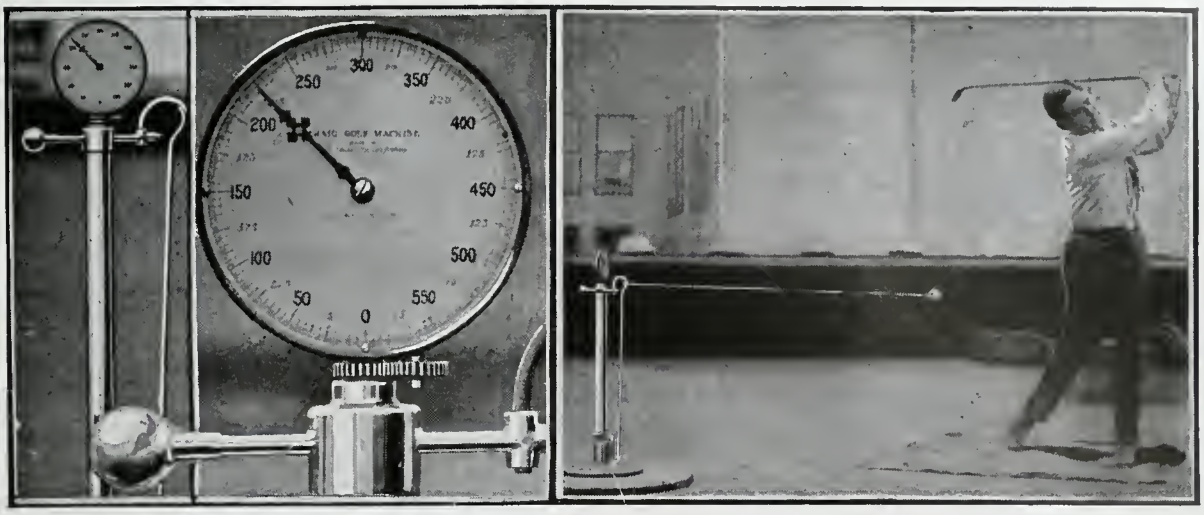
A wire brush of very rugged design has recently been placed on the market by the Ingersoll-Rand Company, 11 Broadway, New York, for use with its standard No. 6 "Little David" drill. It is a brush with face diameter of five inches and is made up of wires of a special heat treated steel which has been found to have very good wearing qualities. It is sturdily constructed and will stand up under severe service.

It is manufactured particularly as an attachment for the No. 6 drill (as illustrated), this type of machine being especially suited for work of this nature. The drill has liberal bearings to take up all the end thrust when pressing down on the work; a high speed and very reliable motor, and moreover is of light weight and small overall dimensions. It can be used in sharp corners and other cramped spaces. The whole outfit weighs only 11½ pounds.

The wire brush outfit is adapted for removing paint, rust, scale and dirt from tanks, steel cars, structural steel and all sheet metal surfaces. It is very useful for cleaning iron, steel and aluminum castings.



A NEW DECK PASTIME



Maurice F. Mc McLaughlin, the "Comet" of international tennis fame, playing golf on the Craig Golfmeter on top of the Dyas building in Los Angeles. Inserts at left show details of gauge and column

AFTER having seen the new Craig golf machine in operation, it seems to us that the operators of passenger steamships who do not install at least one of these machines on deck are overlooking a very good method of providing pleasurable pastime for passengers and possibly added revenue for themselves.

Captive Ball

The Craig golf machine has come into wide use among golf players, both for private practice in their own room or yard and for public use at golf clubs. As shown in the illustration, the machine is a captive ball device. It uses a regulation golf ball attached to a cable, the other end of which is held by a pulley traveling on a highly tempered spring steel wire trolley pivoted on the vertical stand so that when the ball is struck by the club it travels in a circle around the stand, working on practically frictionless ball bearings and balanced by a counter weight. The bearings carrying the trolley are geared to the gauge dial so that the yardage of the ball is recorded, each revolution amounting to ten yards in actual distance.

With the aid of a putting cup and with the particulars of any golf course at hand, contests can be played out with this machine between players approximating very closely the actual conditions of straight drive playing on the links. Many of the best professionals use the machine to keep themselves in practice.

Small Space Needed

It is very easily assembled, stands 33 inches high, and weighs 25 pounds. The space necessary for the full use of the machine, including the swinging of the club, is approximately 11 feet by 16. Free space of this size is easily obtainable on the decks of the majority of passenger liners, and there is no reason why the golf enthusiast should not take his links to sea with him. For straight driving and for achieving that form to which all would-be golfers aspire so earnestly, practice on the machine is much more easily acquired and under conditions more suitable for concentration on the work than is possible on any public golf links.

Professional Endorsement

MacDonald Smith, a nationally known professional, says of the Craig golf machine that "it is ideal for the golfer who wants to practice and also for the thousands of golfers who always **intend** to practice."

The Craig Golf Machine Company of 590 Howard Street, San Francisco, are manufacturing these machines, which are being installed as part of the equipment in many golf schools, golf clubs, gymnasiums, business men's clubs, resorts, hotels, hospitals, on shipboard, on the roofs of downtown buildings, and in many private homes. The cost of the machine is nominal, and as the balls are never lost, practice on these machines is much less expensive than on a golf course. It is perfectly reversible and can be used with equal facility by either right or left hand players, for short or long shots with any style club.

On a clean, smooth hit the travel of the ball on the Craig machine shows up with no vibrations and absolutely even flight. When the ball is improperly hit, you not only get the unmistakable "feel" on the impact of the club, but this is confirmed unmistakably by the unevenness of the revolutions, the dipping from side to side, and the generally unsatisfactory flight of the ball in its revolutions around the central post. It is impossible for the machine to operate smoothly or properly unless the ball is properly hit so that you have a constantly visible register of your progress toward perfection in the "canny art" of golf.

Trade Literature

Catalog No. 28 of the Dake Engine Company, Grand Haven, Michigan.

Seventy pages handsomely bound in heavy buff art paper with black stampings describing the air and steam motors, pneumatic hoists, contractors' hoists, crane hoists, hoisting engines, swinging engines, motor crabs, electric hoists, steam steering gears, spud hoists, gangplank hoists, capstans, windlasses, fish net lifters, and other apparatus for contractors' use built by the Dake Engine Company. This is the twenty-eighth edition of the Dake catalog and in it are introduced a number of important changes for the improvement of Dake engines.

The Dake engine is a double reciprocating engine which imparts a rotary motion to the shaft through a very simple and exceedingly compact arrangement of hollow cam and pin type. They can be used advantageously either with steam or compressed air, are very handily reversed, readily accessible for repairs, and occupy so little room as to be almost a negligible part of the entire space occupied by the apparatus which they are driving. The steam consumption compares favorably with that of an ordinary slide valve engine. There are no eccentrics and no bolts or nuts inside the piston chamber. The Dake engines have demonstrated their reliability and efficiency for over twenty-five years. The catalog describes their application to various forms of hoist and other handling apparatus especially designed for their use.

UNITED STATES SHIPPING BOARD EMERGENCY FLEET CORPORATION
Washington, D. C.
OFFERS FOR SALE
SURPLUS MACHINERY

The United States Shipping Board offers for sale surplus machinery which is available for inspection at the locations designated:

The following Triple Expansion Vertical Marine Engines.

$5 to $10 per I.H.P., according to make, condition and location

700 IHP—At Hog Island, Pa., So. Norwalk, Conn.; Chicago, St. Johns, Ore.; Erie, Pa.; Corliss, Wis., and Tacoma, Wash.
850 IHP—At So. Norwalk, Conn.; Chicago, and Erie, Pa.
1400 IHP—At Hog Island, So. Norwalk, Erie; Corliss, Wis.; New Orleans, Beaumont, Tex.; San Francisco, St. Johns, Ore., and Tacoma, Wash.
1600 IHP—At Hog Island, Erie, Pa.; Corliss, Wis.
2800 IHP—At Hog Island, Erie, Pa.; Corliss, Wis., and Alameda, Calif.

WATER TUBE MARINE BOILERS—

200 lbs. pressure—$1.00 to $1.50 per sq. ft heating surface, according to make, condition and location

Standard 2500 HS—At Hog Island, So. Norwalk, Erie, Pa.; Corliss, Wis.; Beaumont, Tex.; Alameda, Cal.; St. Johns, Ore.; Tacoma, Wash., and Baltimore.
Heine Safety Boiler Co., 2875 sq. ft. heating surface —At Erie, Pa., and Baltimore, Md.
Colvin 2500 sq. ft. heating surface at So. Norwalk.
Badenhausen Boiler Co., 3000 sq. ft. HS—Tampa, Fla.
Foster 3050 sq. ft. HS—Hog Island, Erie and San Francisco.
Babcox and Wilcox 2975 sq. ft. HS—Hog Island.

SURFACE AND CONDENSERS

50c to 75c per sq. ft. cooling surface, according to make, condition and location

760 ft. cooling surface Wheeler—At Baltimore.
1000 ft. cooling surface Abberger—At Hog Island.
1000 ft. cooling surface Kerby Mfg. Co.—At Hog Island.
1500 ft. cooling surface Smalley General Co.—At Corliss, Wis.
2000 ft. cooling surface Smalley General Co.—At Erie and So. Norwalk. St. Johns, Ore.; Tacoma, Wash., and San Francisco.

STEAM STEERING ENGINES—

$750 to $1,500, according to make, condition and location

6x½ Hyde Windlass Co.—So. Norwalk, Conn.
7x7 Lidgerwood—St. Johns, Ore.; Tacoma, Wash., So. Norwalk.
7x7 Hyde Windlass Co., Beaumont, Tex.; Corliss, Hog Island, New Orleans, So. Norwalk, and Tacoma, Wash.
7x7 American Hoist and Derrick Co.—Tacoma, Wash.; Corliss, Wis.
7x7 Shake Co.—Tacoma, Wash.
7x7 Richards—Corliss, Wis.
8x10 Lambert—So. Norwalk, Conn.
8x7 American Engineer Co.—Hog Island.

STEAM CAPSTANS—

$250 to $500, according to make, condition and location

6x6 Am. Engr. Co., So. Norwalk, St. Johns, Ore.; Tacoma, Wash.
6x6 Hyde Windlass Co., So. Norwalk, Hog Island. Tacoma and Beaumont, Tex.
6x8 Hesse Martin Co., St. Johns, Ore.
8x8 Hyde Windlass Co., at Hog Island and New Orleans.

ANCHOR WINDLASSES—

$1,000 to $1,500, according to make, condition and location

8x8 Am. Hoist and Derrick Co., at So. Norwalk, Chicago, Erie, New Orleans and Beaumont, Tex.
8x10 American Engr. Co., at Erie, Beaumont and Tacoma, Wash.
8x10 Hesse Martin Co., at New Orleans, Beaumont and Alameda.
8x10 Hyde Windlass Co., at Corliss, New Orleans, Beaumont, and Saginaw, Mich.
8x12 Am. Hoist and Derrick Co., at Alameda, Cal.
8x12 Am. Engr. Co., at Alameda, Cal.
9x9 Am. Engr. Co., at New Orleans.
10x10 Wheland Co., Bristol, Pa.; Alameda, Cal.
10x12 Am. Engr. Co., at Hog Island.
11x12 Mane Electric Co., at Hog Island.

STEAM WINCHES—

$100 to $400, according to make, condition and location

6x8¼ Hesse Martin Co., at Tacoma, Wash.
7x12 Am. H&D Co., at Corliss, Beaumont, Alameda.
6x12 Am. H&D Co., at Beaumont, Tex.
8¼x8 Lidgerwood, at Hog Island, So. Norwalk, New Orleans and Corliss.
8¼x8 Hyde Windlass Co., at So. Norwalk.
8¼x8 Fairbanks, at So. Norwalk, Conn.
8¼x8 Am. Clay Mch. Co., at So. Norwalk and Beaumont.
8¼x8 Amerson-Brantingham, at Hog Island, So. Norwalk, Corliss and New Orleans.
8¼x10 Lidgerwood, at New Orleans and Beaumont.
9x9 Am. H&D Co., at Corliss, Wis.
8x10 Vulcan Mfg. Co., at Alameda, Cal.
Standard horizontal Duplex pumps, from 4½x2¾x4 to 12x8x12 Worthington, Scranton, Epping Carpenter, McGowan Dow, D&P Co., and other makes.

TERMS:—10% to accompany any offer to purchase, 10% upon acceptance of said offer and the remainder upon delivery of materials sold. Shipping instructions to be issued within 15 days after date of acceptance of offer and property to be removed by purchaser 60 days after date of acceptance.

For further information apply—Office of Director of Supply and Sales, United States Shipping Board, Washington, D. C.

The Board reserves the right to reject any or all offers.

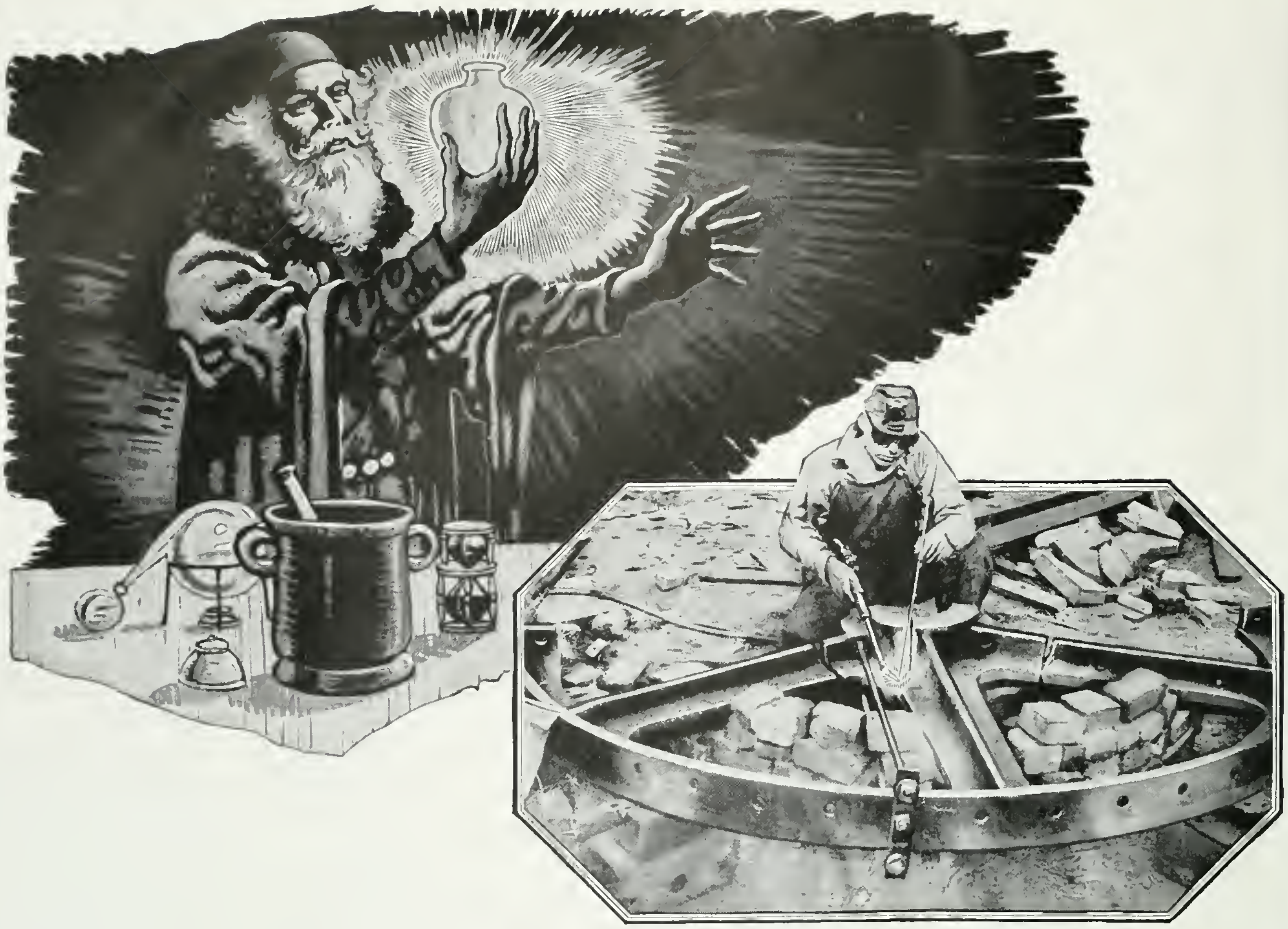
All offers of purchase should be addressed to Office of Director of Supply and Sales, United States Shipping Board, Washington, D. C.

Pacific Marine Review

The National Magazine of Shipping

AUGUST
1921

Pacific Marine Review, Vol. 18, No. 8. Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.



The age-old dream of the alchemist is realized because of Linde

THROUGH countless centuries man dreamed of transmuting the baser metals into gold. Patiently, laboriously, often consecrating their very lives to the work, the Alchemists of old toiled on toward their elusive goal.

As late as 1873 James Price, the last of the Alchemists, sought death by his own hand rather than acknowledge the failure of his experiments.

Linde Engineers of to-day have made this dream of by-gone ages come true.

By producing uniformly pure oxygen in industrial volume, they have made it possible for oxy-acetylene welders and cutters to reclaim thousands of tons of metal machinery annually—turning base metal into gold—a saving in money far in excess of any vision of wealth dreamed of by ancient philosophers.

And Linde does more than supply oxygen of absolutely uniform purity. Thanks to a chain of twenty-nine plants and forty-six warehouses it delivers Linde Oxygen when and where it is wanted in any volume.

THE LINDE AIR PRODUCTS COMPANY
Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco

THE LARGEST PRODUCER OF OXYGEN IN THE WORLD

L-500-21

Pacific Marine Review

CONTENTS

AUGUST, 1921

Challenge Cup Race 461
Lipton Cup Race 462
Our Cover 462
A Modern Flying Dutchman 463
Editorial 464
An Optimistic Shipbuilder 465
The Largest Sugar Refinery in the World—An Interesting Account of a Great California Enterprise 466
The Moore Shipbuilding Company, by Frank L. Mulgrew 468
The Cleopatra's Barge, by J. M. Lydgate 469
Oil Engines and Motorships 472
Motorship Era, by R. Z. Dickie; European Motor Shipbuilding
Ridiculous Engineering, by Sea Flame 476
Marine Borers at Crockett, by George M. Rolph, General Manager California and Hawaiian Sugar Refining Corporation 479
Shipping Industry of Norway 480
New 6000-ton Floating Dock—Sparrow's Point Plant, Bethlehem Shipbuilding Corporation 481
European Marine Notes 482
Book Reviews 484
Propelling Machinery of the U. S. S. Tennessee 486
Marine Terminals and the Motor Dray, by H. McL. Harding 487
Admiral Line Expansion 489
Marine Insurance 491
With the Exporters and Importers 495
Oriental News 497
Full Speed Ahead 501
Pacific Machinery . . . . 54 Industrial Section

Craftsmanship—What It Means

One of the oldest and noblest of human ideals is the ideal of the Craftsman—the code which bids the workman take pride in the skill of his hands, and employ that skill in none but worthy and useful ends.

Good intentions in shipbuilding would have little value unless expressed through skill in performance of each and all the complex tasks involved in the construction of a modern ship.

In the 19,000 men on our payroll, we have for twenty years and more been building up, primarily, an organization of CRAFTSMEN.

NEW YORK SHIPBUILDING CORPORATION
Camden, N.J.

Pacific Marine Review

The National Magazine of Shipping

August, 1921

Copyright, 1921, by J. S. Hines

CHALLENGE CUP RACE

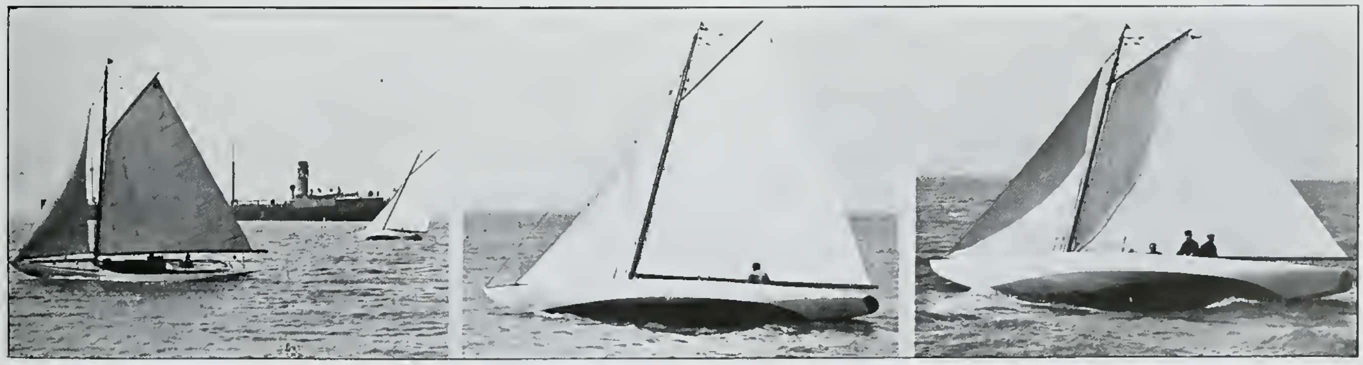
IN the nineteenth race for the San Francisco challenge cup, the sloop Machree, defender, of the San Francisco Yacht Club, defeated the Bob, challenger, of the Corinthian Yacht Club, in San Francisco Bay July 10. The Machree was sailed by John R. Hanify and the Bob by Frank Stone. Corrected time gave the Machree the race by 5 minutes and 5 seconds.

The Bob, measuring 19.97 feet, was given 34 seconds over the defender, which measured 19.77, Class R measurements. Herbert Madden of Sausalito built the Machree in 1918; the Bob was built by Mr. Stone. The course was as follows: From starting line, leaving the stake boat leaving that buoy to port; thence to and around Goat Island shoal buoy leaving that buoy to port; thence to and around a stake boat anchored 2⅛ miles N. N. W. magnetic, leaving the stake boat to port (this stake boat is located as follows: With Point Blunt and Lime Point in range and Southampton Shoal light bearing N. W. by W. ¼ W. magnetic); thence to and around the Presidio shoal buoy, leaving Alcatraz Island to starboard and Presidio shoal buoy to port; thence to finish across starting line; leaving stake boat to port. The start was made at 1 o'clock; the Machree finished at 4:04:57 2/5, and the Bob at 4:10:36 2/5.

All the nineteen races for the San Francisco cup have been sailed in San Francisco Bay except that of 1914, which was in Humboldt Bay. The record of the races is as follows:

The sloop Machree of the San Francisco Yacht Club, winner of the nineteenth race for the San Francisco challenge cup

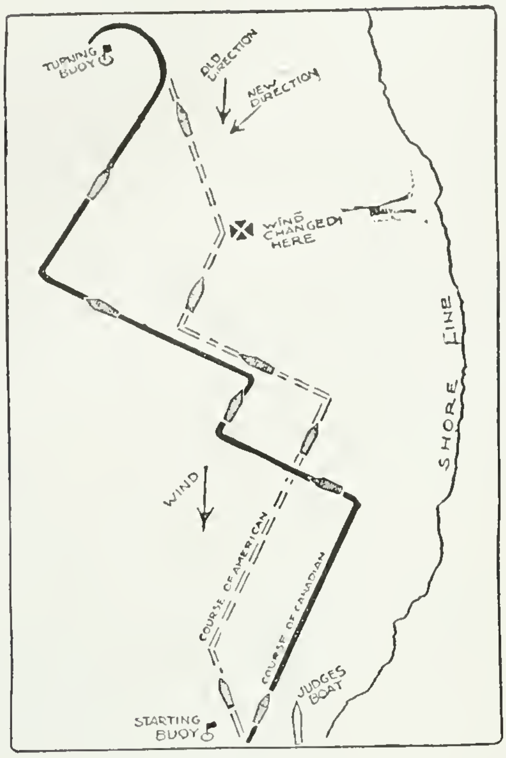
DATE	WINNER	LOSER
Aug. 31, 1895	El Sueno, Encinal Y. C.	Queen, S. F. Y. C.
Aug. 15, 1896	Fawn, Encinal Y. C.	Catherine, S. F. Y. C.
June 26, 1897	Aeolus, Corinthian Y. C.	Fawn, Encinal Y. C.
Sept. 23, 1899	Gadder, S. F. Y. C.	Truant, C. Y. C.
Aug. 4, 1900	Aeolus, C. Y. C.	Gadder, S. F. Y. C.
Aug. 10, 1901	Presto, C. Y. C.	Helen, Vallejo Y. C.
May 31, 1902	Challenger, S. F. Y. C.	Harpoon, C. Y. C.
July 9, 1904	Corinthian, C. Y. C.	Challenger, S. F. Y. C
July 17, 1905	Corinthian, C. Y. C.	Challenger, S. F. Y. C
Aug. 3, 1907	Discovery, C. Y. C.	Valkyrie, South Coast Y. C.
May 23, 1908	Discovery, C. Y. C.	Neva, S. F. Y. C.
June 19, 1909	Presto, C. Y. C.	Mah Pe, South Coast Y. C.
May 21, 1910	Ruby, C. Y. C.	Merry Widow, Aeolian Y. C.
Aug. 19, 1911	Presto, C. Y. C.	Challenger, S. F. Y. C
Sept. 3, 1912	Fleur de Lys, S. F. Y. C.	Moonlight, C. Y. C.
May 25, 1913	Oreades, Sequoia Y. C.	Challenger, S. F. Y. C
May 1914	Ruby, S. F. Y. C.	Cecelia, Sequoia Y. C.
Aug. 11, 1918	Active, S. F. Y. C.	Moonlight, Aeolian Y. C,
July 10, 1921	Machree, S. F. Y. C.	Bob, C, Y. C.



Left to right—The start of the San Francisco challenge cup race, July 10, 1921. Machree sailed by John R. Hanify. The Bob sailed by Frank Stone

LIPTON CUP RACE

IN two races, the first of which was at Cowichan on July 2 and the second at Victoria July 4, the Seattle Yacht Club's Sir Tom defended her title to the Lipton challenge cup by defeating the Patricia of the Royal Vancouver Yacht Club twice. Carrying 1900 pounds more lead in her keel and twenty feet more canvas than the challenger, the Sir Tom never was headed from the starting line to the finish of the first race. She led at the end of the first leg by 30 seconds, but was almost overhauled by the Patricia; she overcame trouble with her spinnaker, however, and led at the finish by 2 minutes and 37 seconds.



Course of the Lipton cup race, July 4, 1921

Second Race Better

The second race was even better. The Patricia got away to a better start, which the Sir Tom overcame in part by taking the chance of fouling the Patricia in cutting across her bows. The Sir Tom soon after tacked to port. The Patricia, then on the starboard tack, tried to cross the Sir Tom's course, but failed and was forced to put about, after which both yachts squared away on the port tack only a few feet apart. On a starboard tack the Sir Tom caught a veering and fresher breeze and held a straight course for the buoy, while the Patricia fetched up to leeward and had to make a long tack.

The Isherwood race will be run between the Sir Tom and Patricia September 3-6 in English Bay, Vancouver. By the time next summer's Lipton race is held Victoria will have an R-class yacht. A $5000 subscription is being raised.

About Ted Geary

The Seattle Times publishes the following interesting sketch of Ted Geary, who sailed the Sir Tom:

Only once in his fourteen years of international yacht racing on the Pacific Coast—from the days of Spirit I down to Sir Tom—has Ted Geary, who learned the art of sailing in Elliott Bay, when he and the Johnson "Boys"—Dean and Lloyd—raced one another in canoes fitted with sails made of gunnysacks, known what it was to taste defeat.

This wonderful success of the young Seattle man, who has designed and sailed his own sloops in the International cup races, comes in for proper recognition now, in view of his latest triumph over the worthiest rival he ever met.

Out-Designed Two Greatest

In those fourteen years he has pitted his skill in seamanship against the best that British Columbia and California could produce, and, most marvelous of all, he has out-designed the two greatest English yacht designers who have lived during the past quarter century, namely, Fife and Nicholson.

It was Fife who designed Shamrock I and Shamrock II for Sir Thomas Lipton, and it was Nicholson who designed Shamrock IV, the last challenger Lipton brought out for the America cup.

Beat Fife and Nicholson

It was Fife who designed Alexandra, the sloop that Geary beat with his Spirit I at Seattle in 1907 after a series of three sensational races, the first two being by half-boat-lengths, the Seattle sloop winning the first that July day in 1907 and the Canadian winning by the same margin three days later, only to lose by a half mile in the deciding race.

It was Nicholson who specially designed the Patricia for the races in which she was defeated at Cowichan Bay and at Victoria a week ago—beaten by Geary's own-designed and personally-sailed Sir Tom.

When Ted Geary defeated Fife's Alexandra in 1907 he had just reached his majority.

Sir Thomas Arrives

In 1908, Spirit I was beaten for the Dunsmuir cup by Alexandra. That convinced the young Seattle yachtsman that he had to build another sloop. He brought out Spirit II in 1909 and with it obtained his revenge, beating the Alexandra handily. Having beaten the Canadians with his second Spirit, he let them have it. They bought it in 1910.

Sir Thomas Lipton came along shortly afterwards and put up his fine $2000 trophy. Geary built his Sir Tom forthwith and promptly took hold of the trophy by defeating the British Columbia boat, the Turenga, in 1914.

In 1915 the Sir Tom successfully defended the Lipton cup against the Myth of Everett. Then the Sir Tom was taken to San Francisco to race in the international regatta for sloops of her class. There, against not only her own but against other yachts, the great Seattle sloop won seven races—every one in which she started.

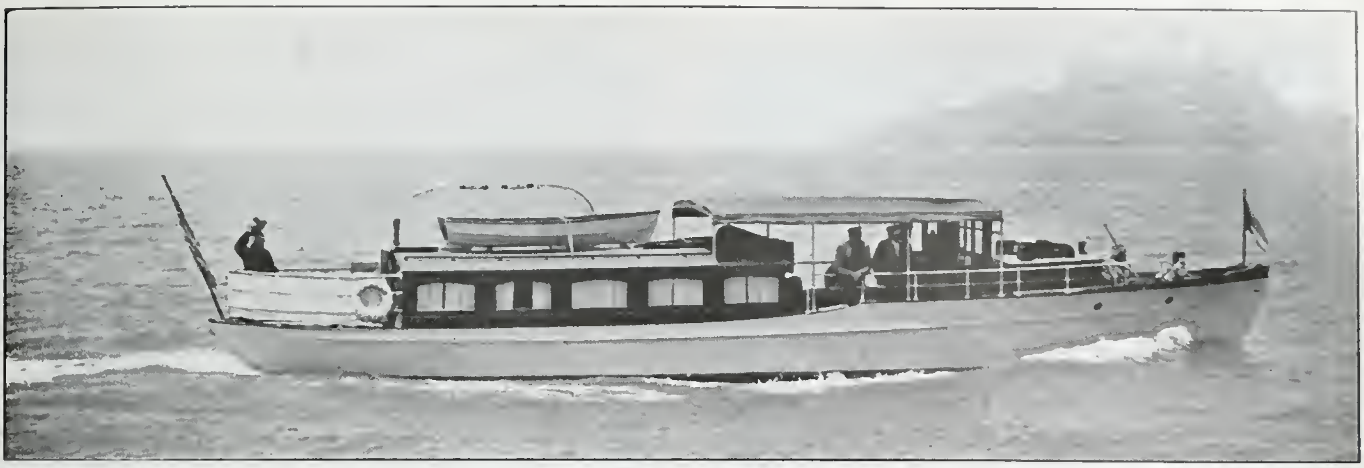
Meet Again in September

In 1916 Sir Tom successfully defended the Lipton cup again against the Defender, also of this city. In 1920 the Turenga got another beating from Sir Tom at Cowichan Bay and Victoria, and then, this year, came the Nicholson-designed Patricia—and, she got hers, too.

Incidentally, the Sir Tom and the Patricia are to meet again this year—and very shortly. They will race for the Isherwood cup, in English Bay, Vancouver, between September 3 and 6.

OUR COVER

This very remarkable marine photograph was taken upon the occasion of the recent maneuvers of the Pacific fleet off the southern California coast, and shows the torpedo boat destroyers going into action with their smoke screen flung out across the water.



The power cruiser Marlin

A MODERN FLYING DUTCHMAN

THE accompanying chart of the passage of the ship Edward Sewall around the Horn in 1914 is taken from the Fireman's Fund Record, which comments upon it as follows:

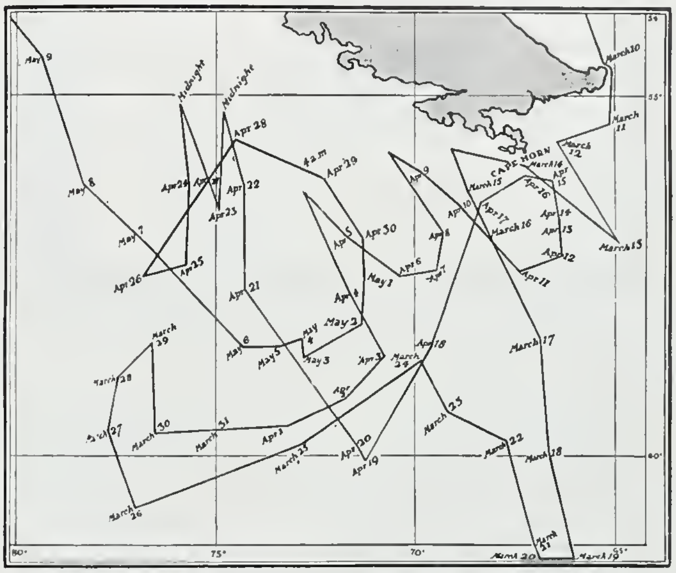


Chart showing the wanderings of the American sailing ship Edward Sewall rounding Cape Horn in 1914

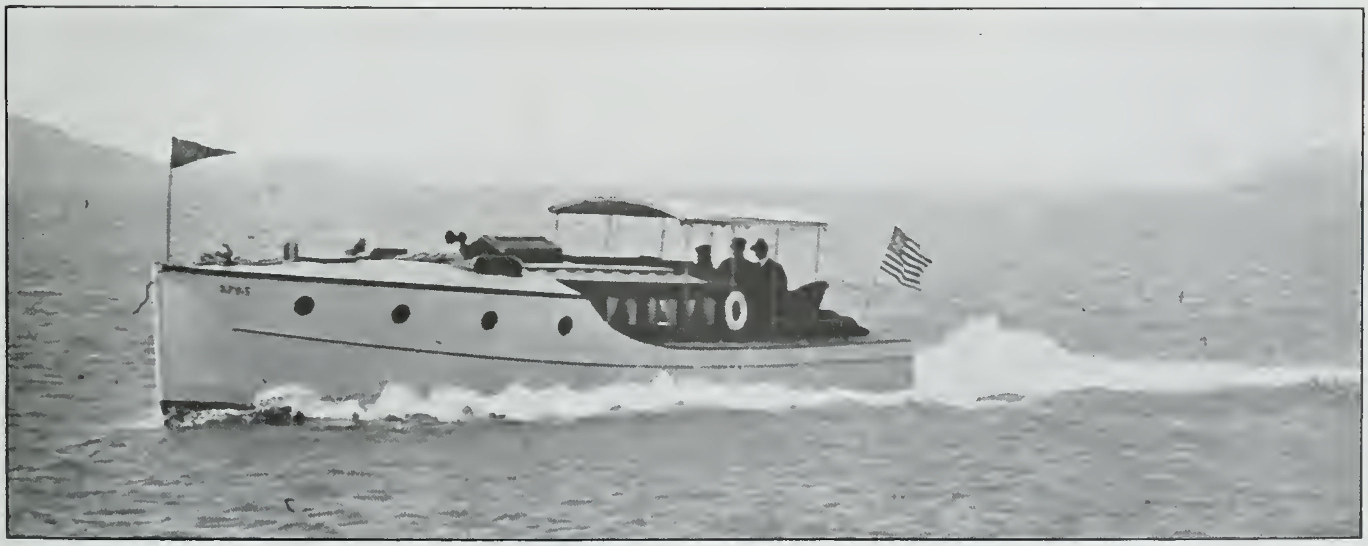
There is a basis of fact in the legend of The Flying Dutchman—the ghost ship that is eternally trying to round Cape Horn and forever being beaten back. The above chart shows why sailor folk gave the cape its bad name.

Follow the course on this chart day by day.

The course is that of the sailing ship Edward Sewall while trying to round Cape Horn in 1914.

It took her sixty-seven days to get from latitude 50 south on the east of the continent to the same parallel on the west side. On ten previous voyages the ship had made this portion of the voyage in from ten to twenty-three days, the average being 16.4 days. The illustration gives the course in detail between the 54 degree line. The coast line is indicated with no suggestion of the treacherous isles and inlets.

A glance at the dates showing the vessel's location day by day makes the story clear. On April 19, for instance, she was further east than on March 30, and so it went. Those bare lines are the skeleton of a sea romance—but the Sewall made it in the end.



Speed boat Pisces

Pacific Marine Review
The National Magazine of Shipping

576 Sacramento Street
SAN FRANCISCO, CALIFORNIA U. S. A.

Official Organ of the Pacific American Steamship Association

Subscription Price, per year (Domestic) $2.00
(Foreign) $3.00
Single Copies . . . . 25 cts

J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor

NEW YORK OFFICE
339 at 30 Church Street
M. B. STEWART, Manager

Pacific Marine Review is sold at all leading News Stands
Entered as second class mail matter at Postoffice
San Francisco, California

Published on the First of Each Month. Copyright
1921 in the United States by J. S. HINES

THE SHIPPING BOARD

THE chairman of the Shipping Board is to be congratulated on his recently announced appointments of three vice-presidents for the Emergency Fleet Corporation to take charge of the division of operations of that organization. The tentative plan of Chairman Lasker for the division of responsibility between these three appointees was to place one in charge of allocations and charters, one in charge of traffic, and one in charge of physical operations, which includes repairs and maintenance.

For the first position Mr. Lasker has secured the services of J. B. Smull of New York, a partner in the freight brokerage firm of J. H. Winchester & Company, who has gained a reputation in the eastern metropolis as one of the most efficient men of his profession. It is currently reported that his income from his private business amounts to $250,000 a year.

For the traffic department W. J. Love was chosen. Mr. Love has been for some years the freight traffic manager at New York of Furness, Withy & Company, a British firm which is close to the top among the great freight steamer operators and owners of the world. Mr. Love, an American citizen, thoroughly American in his outlook on life, is considered one of the ablest of the younger shipping executives, and should prove a very efficient director of the traffic department of the Emergency Fleet Corporation.

For the third vice-presidency in charge of physical operations, the chairman has chosen Mr. A. J. Frey of Los Angeles. Mr. Frey's reputation as a steamship operator is very well known on the Pacific Coast, where he was for many years connected with the old Pacific Mail Company and more recently has been operating the Los Angeles Steamship Company.

These three men should be able to give the operating division of the Emergency Fleet Corporation very efficient leadership. They have already begun to effect drastic changes in the personnel of the department and are pledged to change the fleet over as rapidly as possible to the bare-boat charter plan.

In making these appointments Mr. Lasker has made a good beginning in clearing out inefficiency in the operation of the Shipping Board, and these men undoubtedly will have the backing of the entire marine fraternity in their efforts to stop the leaks and pick up the loose ends and unravel the tangles which have been so characteristic of Shipping Board operation.

AT WASHINGTON

AT the same time that Albert Lasker, chairman of the Shipping Board, and his carefully chosen aids are endeavoring to straighten out Shipping Board tangles, Congress is apparently busily engaged in providing more difficulties. The administration has made a call upon the Shipping Board to get the government out of shipping; Congress has practically commanded the Shipping Board to turn the fleet over to private operation, has approved the idea of bare-boat charter; and yet at the present time there are up in the House before various committees bills which would add to the operating responsibilities of the Shipping Board and would perpetuate commercial operation under the government.

A bill is at present before the House Committee on Merchant Marine and Fisheries which would concentrate all army transport and the Panama Railroad steamship operations under the Shipping Board, and at the same time the Secretary of the Interior has slipped into his Alaska bill a section providing that the Shipping Board be directed to transfer to the Secretary of the Interior ships suitable for establishing a commercial steamship line under the jurisdiction of the Department of the Interior from the mainland of the United States to points in Alaska.

This section in the latter bill will have to be carefully watched and, if possible, nipped in the bud, especially as there is nothing in the title of the bill to indicate its existence. The full title is as follows: A bill to provide for the consolidation or redistribution of the powers and duties of the several executive departments of the government of the United States relating to the territory of Alaska **and for other purposes.**

There is no doubt that if Alaska be allowed to develop normally under her tremendous resources, there will be ample business for not one but several privately operated lines and ample opportunity for the growth and prosperity of the Alaskan population which, under the present system, is either stationary or constantly diminishing.

THE MARINE ENGINEERS

THE National Marine Engineers' Beneficial Association has capitulated to the Shipping Board and signed with that body an agreement covering six months. This agreement calls for a very substantial reduction in wages and for drastic changes in working rules. William S. Brown, president of the M. E. B. A., in the July issue of the American Marine Engineer, official organ of the Marine Engineers' Beneficial Association, prints a very elaborate statement covering twenty-seven pages and setting forth the inside history of the strike from the standpoint of the marine engineers.

This statement should be read carefully by all marine engineers and by all ship operators. In it President Brown proves the fallacy of the doctrine of collective bargaining, and in it is shown very plainly, so that he who runs may read, the danger to union labor and to industrial America from the cheap politicians who are exploiting union labor for their own benefit.

The Marine Engineers' Beneficial Association is composed of men who should be highly trained executives. The position of chief engineer on a modern ocean freighter requires mental capacity of no mean order. It would, therefore, be expected that in such a union the principle of collective bargaining would be successful, if success could be found for such a principle in the dealings between employer and employe, but we find in the report of William S. Brown that the local districts of this organization, although obligated by very strong pledges to follow the lead of their national representatives, in many cases not only refused to follow that lead, but during the negotiations hampered in every way the efforts of their national representatives to arrive at any agreement, going so far as to falsify the reports and to use propaganda directed solely for the purpose of furthering their own local ambitions.

Any fair-minded man reading this report would say that the resolution of the American Steamship Owners' Association refusing to have any dealings with the National Marine Engineers' Beneficial Association was wisely taken and should be strictly upheld.

There are probably many engineers among the ranks of the Beneficial Association who will learn a valuable lesson from the failure of this strike. Indeed, we would venture to predict that the ranks of this association will be very much thinner in the near future than they have been during the "fat years" of America's merchant marine just left behind. Many of the younger men from all ranks of civilian life who seized the opportunity to get big wages easily when it was easy to get papers will now be forgetting all about marine engineering and going back to the trades and professions from which they came. That will be good, both for the American merchant marine and for the Marine Engineers' Association.

AN OPTIMISTIC SHIPBUILDER

JOSEPH J. TYNAN, general manager of the Union plant of the Bethlehem Shipbuilding Corporation, which includes the Alameda works, the Potrero works and Hunters Point drydock, has just returned from the East, where he has been engaged in a series of important conferences with the officials of the Bethlehem Corporation and has completed a tour of industrial centers, so he has had a very exceptional opportunity to judge of the present condition in American business and industrial affairs.

In an interview with Mr. J. S. Hines, publisher of Pacific Marine Review, Mr. Tynan takes an emphatically optimistic position in direct contrast with that taken by the majority of American shipbuilders. He states that in his opinion there is far more need for constructive optimism at the present time than for much of the sadly pessimistic views that we have been having, and he is fairly well satisfied that there is going to be an improvement along the main lines of industry—an improvement that will be almost immediate in its inception and very wide in its scope. In other words, he thinks that we are now standing on the bottom and looking upward, and that our industrial affairs on the Pacific Coast, especially in the San Francisco Bay region, are infinitely better than they were in 1906.

Mr. Tynan had the following remarks to make, particularly about the Bethlehem interests and their local plants:

"Speaking for the Bethlehem interests, I can say very emphatically that we are not downhearted. The report that we are planning to shut down our Alameda yard is without warrant. We have no intention of closing either the Alameda or the Potrero works. If we can't get ships to build, we'll build something else. We are going to operate both works. We are on the eve of a great industrial revival—the greatest, I believe, that the world has ever seen. And the Bethlehem organization is going to be on its feet and moving when the new day dawns.

We have secured the rights to build the best Diesel engine in the world. We are not only going to build the engines here, but we are going to build everything that goes with them—ships, auxiliary machinery and everything. Our experts will be back shortly from Europe, where they have been making an intensive study of the new engine and every detail of its production.

I have just returned from a trip through the East, and would like to tell those who complain of local conditions that we in San Francisco don't know what hard times are. I saw shipyards in the East whose entire force consists of two men — a day watchman and a night watchman.

We are not going to come to that here. Speaking for Bethlehem, we have an organization of mechanical experts capable of functioning in many manufacturing lines besides shipbuilding and industries related to it. It took a lot of time and money to get that organization together. Our plans on both sides of the bay represent a tremendous investment in the highest type of equipment. We are going to hold our organization and make that equipment pay for its keep. We are too busy getting ready for the busy days ahead to be downhearted. San Francisco has more to be grateful for than any city in the world."

What Mr. Tynan has to say about the future activities in general lines of engineering on the part of the local plants of the Bethlehem Shipbuilding Corporation is of great interest. The Potrero works, or the Union Iron Works, as it has always been known locally, have built up a great connection in the general engineering field and in mining engineering which will undoubtedly stand them in very good stead in the absence of new ship construction. The plants at Hunters Point and at the Union Iron Works are also very well fitted out and adapted for marine repair work of all sorts, and undoubtedly they will handle many large reconditioning jobs which will increase in number and size as the world's shipping gets back to a more normal basis.

Pacific Coast owners and operators will be greatly interested in watching the building of Diesel engines by this firm, as without doubt there will soon be a large demand for the conversion of many of our steamers into motorships, and with two plants like the Alameda works and the Potrero works of the Bethlehem Shipbuilding Corporation, fitted and in readiness to turn out standardized Diesel engine propulsion units to take the place of the reciprocating engine, there will undoubtedly soon be a sizable fleet of steel motorships on the Pacific Coast.

THE LARGEST SUGAR REFINERY IN THE WORLD

An Interesting Account of a Great California Enterprise

This article is compiled from the subject matter of an address on the subject, "Something About Sugar Refining," which was delivered before the San Francisco Section of the American Society of Mechanical Engineers at their May meeting by Mr. George M. Rolph, general manager of the California and Hawaiian Sugar Refining Corporation. The address was so interesting and comprehensive that many of the engineers expressed a desire to inspect the plant of the corporation at Crockett, which is located on San Francisco Bay about one hour and a half ride by train and boat from San Francisco.

There have been incorporated in the article some observations taken from a booklet prepared by the California & Hawaiian Sugar Refining Corporation as a souvenir for the mechanical engineers on the occasion of their visit.

Readers of Pacific Marine Review will be particularly interested in the arrangements for handling the sugar cargoes at Crockett, and it is with that idea in view that this summary stresses the material handling devices installed there. A more detailed account of these devices will be found in a separate article. Necessarily this article, covering such a large subject, gives a very sketchy outline, and we shall in future issues elaborate in greater detail certain features of this "World's Greatest Sugar Refinery."

ALL sugars are carbohydrates. There are many varieties, the most important among which are the groups classed under the names of sucrose and glucose. Sucrose contains 12 atoms of carbon, 22 of hydrogen, and 11 of oxygen. Cane and beet sugars belong to the sucrose group. The most common variety of the glucose group is dextrose, which is found in raisins, small grains, and occurs quite frequently in small fruits. It has less sweetness than sucrose and possesses the property of preventing the crystallization of sucrose when combined with it in small amounts, and hence is used in the preparation of soft fillings for cream candy.

Sucrose, derived from various vegetable sources, is a solid in a crystalline form with a specific gravity of 1.6 and a melting point of about 320 degrees Fahrenheit. It is soluble in about half of its weight of cold water and in almost any portion of boiling water. It is practically insoluble in such fluids as alcohol, turpentine, ether and chloroform. The principal sources of sucrose are sugar cane and sugar beet. In the account of the California and Hawaiian Sugar Refining Corporation sugar cane alone need be considered.

Sugar Cane

Sugar cane (saccharum officinarum) is a giant perennial grass which grows from 8 to 24 feet in height. The stem of the cane is solid with joints every 3 to 6 inches and ranges in diameter from 1 to 2½ inches. The pith of the cane contains the sugar juice, and the tops with their leaves are not crushed but are used for seed bed purposes, as the plant is produced from the eyes or buds which grow on stems around the joints. The roots of the cane throw up canes or rattoons for many seasons. In Hawaii the growers do not count on rattoons for more than a few crops, but in Cuba the process is repeated for many years.

Ripe cane usually consists of about 12 per cent fibre and 88 per cent juice, this percentage varying from time to time, both as regards quality and quantity.

Cane Growing

In Hawaii cane is usually planted from March to September, and the cane ripens about one year from the following December. Growing cane requires water every seven days, the amount of water used being tremendous. A plantation producing 35,000 tons of raw sugar a year requires twice as much water per day as the city of San Francisco. In December and January cane flowers indicate maturity and readiness for cutting. As the ripening goes on tests are made with a polariscope to determine the amount of sucrose in the juice. Upon the indication of these tests cutting is begun and usually continues until well into July and August.

Raw Sugar

Operations necessary for making raw cane sugar from sugar cane are as follows: Extraction of the juice, purification of the juice, evaporation to syrup point, concentration and crystallization, separation of the crystals from molasses.

The cane is fed by mechanical contrivances into two large rolls with interlocking corrugated teeth, the juice being squeezed out into a metal trough through which it runs into a large tank. This juice contains much dirt and other impurities. It is pumped to the top floor of the mill where a solution of milk of lime is added to neutralize acidity, the mixture is heated, and the hot juice run into large settling tanks, from which after a time the clear juice is drawn off. This clear juice then goes through filters, being strained through fibre excelsior, and is run thence to the receiving tanks or evaporators. It is now light brown in color but thin and watery and must be reduced to syrup consistency. It is next boiled in a multiple evaporator and reduced to a point where it contains approximately 35 per cent water and 65 per cent solid. This syrup is then boiled in a vacuum pan and reduced to crystals, which are separated from the liquid by means of centrifugal machines. These crystals are packed into sacks holding about 125 pounds each, and the sugar is now ready to be shipped to the refinery at Crockett.

The raw sugar thus produced would contain practically 96 per cent of sucrose, and there would be little or nothing gained in carrying the process of manufacture beyond this point, as the final extraction of all impurities and the production of pure white granulated sugar is the work of the refinery.

The cargoes of sugar collected from various ports in the Hawaiian Islands and received at Crockett range from 5000 to 12,000 tons. The daily capacity of the refinery is 2000 tons. The plantations produce sugar over a period of about eight months. The refinery operates for a period of eleven months. These two facts make necessary very large warehousing facilities, as during the fall months it is necessary to store at the same time three months' supply of raw sugars and at least thirty days' production of refined, which would mean a total of approximately 150,000 tons.

Handling at Dock

At Crockett there is ample depth at all stages of the tide for the heaviest draft ships to dock alongside the warehouse. The warehouse was designed especially for the expeditious unloading of sugar from the ship. Many schemes have been tried out for the handling of the sugar from the ship to the dock by means of conveyors, but so far they have been unable to compete with the sling and cargo boom arrangement using the ship's cargo winches.

This fact should not discourage the designers and manufacturers of cargo handling machinery for docks and warehouses, as the Matson Navigation Company's ships, which are used in the carriage of this sugar, were designed and arranged especially with the idea of a quick discharge of sugar at this particular terminal, and the terminal itself, on the other hand, was designed particularly with these ships in mind, while the warehouse and refinery are equipped with one of the most complete systems of conveying machinery to be found anywhere.

The new dock and its warehouse are arranged so that there are double landing stages, and the conveyor system has a very large part in the quick dispatch in that they get the slingloads and truckloads of sugar out of the way faster than they can be landed on the dock by the slings and by the gangs of stevedores using trucks out of the side ports of the ship.

As the sugar is landed on the dock it is sorted as to brand, weighed in the presence of representatives of the refinery and the producers, and out of each truckload as it passes the scales a sample is taken so that the producer may be credited with the proper quality. Inside of the warehouse the sugar is handled entirely on conveyors. These are arranged so that any part of the warehouse may be easily reached, both by incoming or outgoing sugar, and the sugar may be piled readily to any height within the capacity of the warehouse.

A raw sugar storage bin with a capacity of 1500 tons is installed in the refinery adjacent to the warehouse, making it possible to send a large proportion of each cargo from the ship direct into the refinery without storage in warehouse, thereby eliminating much unnecessary handling.

The main belt conveyor system running from the dock side of the warehouse to the refinery is a very large installation of its kind. This 7-ply canvas and rubber belt is 36 inches wide and 1600 feet long. There are two belts of these dimensions, both of which are used when the plant is operating at full capacity. The belt has a capacity of 40 sacks of sugar per minute. These belts are run in a continuous straight line arrangement returning over large pulleys. The lower side carries the raw sugar from the dock or warehouse to the head of the raw sugar bin, while the refined sugar comes back to the warehouse on the return of the same belt. Smaller lateral belt conveyors deliver the raw sugar from the warehouse onto this belt at convenient points, and other conveyors are arranged to switch off the refined sugar from the main belt to its point of destination in the warehouse.

At the time of the visit of the mechanical engineers the Matson liner Manoa was at the dock discharging a 6500-ton cargo of raw sugar. All of the belt conveying system was working in perfect order, and the sugar was being handled out of the ship with great dispatch and with no confusion or straining of effort on the part of anyone.

A few days previously the largest cargo of raw sugar ever delivered to this refinery had been brought in on the Manulani of the Matson Line. This cargo consisted of 10,234 tons of raw sugar and was discharged at the rate of 2325 tons per day of eight

(Continued on page 490)

The plant of the California and Hawaiian Sugar Refining Corporation at Crockett. The largest sugar refinery in the world.

THE MOORE SHIPBUILDING COMPANY

By FRANK L. MULGREW

Robert S. Moore

OUT of the greatest shipbuilding program ever completed in an American shipyard the Moore Shipbuilding Company has emerged as the largest repairing plant on the Pacific Coast. A vision of the future, born in the midst of record-making accomplishment, has proved the wisdom of its conception by giving to the Oakland plant a permanency at a time when the shipyards of other centers are being closed and dismantled. With the close of the story of war-time work, of the unusual demand for bottoms, of expansion and achievement, there has opened another that is written with all of the initiative, foresight and energy of the first. Oakland and San Francisco bay are to remain the center of shipbuilding and ship repairing activities of the Pacific, for here are all the facilities, ready at hand and busily enengaged in making fit the carriers of the western ocean.

With the launching on Saturday, July 9, of the 10,000-ton tanker Birkenhead for the Vacuum Oil Company, New York, a shipbuilding program that eclipsed that of any other shipyard in the country closed at the Moore Shipbuilding Company. Since 1916 sixty-two hulls (totaling 563,755 deadweight tons) have been launched, forty-eight for the Shipping Board and fourteen for private companies. Of the government vessels thirteen were tankers, eight refrigerator ships and twenty-seven freighters. The privately owned vessels include tankers for the Vacuum Oil Company, Standard Oil Company and Southern Pacific Company, and freighters for the Matson Navigation Company. They ranged from the 9400-ton freighter which Robert S. Moore designed and made the standard to the great 16,340-ton Tamiahua, built for the Southern Pacific to sail on Atlantic waters.

Time and again the shipbuilding accomplishments of the Moore Shipbuilding Company brought to Oakland and the Pacific Coast the attention of the world. Scarcely a week passed in those days when every effort was being strained to furnish the needed carriers for war duty without the shattering of record and tradition.

At the beginning of the war the Moore Shipbuilding Company had just begun the construction of new vessels. It was already a shipbuilding plant, and had there been no war would have built a number of vessels for the government and for private owners. Once the world trouble started the entire energies of the company were focused to turning out the vessels which played so large a part, not only in shortening the conflict, but in the victory. The call came for a "bridge of ships" and every man in the plant responded.

When this call came the Moore plant was small and without organization for so studendous a program. Yet the authorities at Washington, D. C., had confidence in the concern and placed with it contracts for many millions of dollars in vessels. The manner in which this confidence was justified is shown in the record of achievement. The plant expanded and developed, organized armies of workers, added building ways, shops and foundries and brought in more steel than industrial Oakland had ever seen. There came the time when 13,000 men were employed and when the weekly payroll was $275,000. The one slip grew to ten building ways. New methods were devised, clockwork organization was put into effect and the work of the great shipyard co-ordinated in a manner that made it a pattern for both coasts. The genius at work in all this was Robert S. Moore, the same man who made the plant a shipyard in the days before the war and who could see, even in the midst of an epoch-making construction period, the need to make ready with drydocks and marine railways for the labors that were to come with peace.

Double launchings, which have become ordinary, were unknown a few years ago, and it was the Moore Shipbuilding Company that showed the way. The story had scarcely ceased echoing in marine circles when the company launched three 9400-ton tankers on the same tide and the word again traveled to all of the ports of the world. Before any other company had succeeded in duplicating the feat the Moore shipyard had repeated the triple launching and arrangements were made for a feat so much beyond anything hitherto accomplished that it became an important news feature with all of the press associations, brought out the motion picture camera men and was featured in marine journals as a brilliant upsetting of precedent. This was the sextuple launching on Saturday, December 20, 1919, when three 9400-ton freighters and three 10,000-ton tankers—a total of 58,200 deadweight tons—took the water on one tide in fifty-five minutes. The memory of that occasion will live long with the thousands who saw it. Six launchings without a hitch and the problems of a narrow estuary and of clearing the stream for the succeeding hulls cared for in masterly fashion!

While all of this shipbuilding history was being made, and while a task of gigantic proportions was under way, Robert S. Moore saw beyond the circle of a tremendous present and planned for the future. He began to prepare for the ship repairing that would come with the close of hostilities, and, at his suggestion, the company expended $8,000,000 in new docks and facilities. Today no other concern on either coast is better equipped for building, repairing or overhauling vessels.

THE CLEOPATRA'S BARGE

By J. M. LYDGATE

The Cleopatra's Barge, or Pride of Hawaii, needs little introduction to students of old maritime records, but even they doubtless will find much that is new in this account, and those to whom the vessel is unknown have here an opportunity to become acquainted with her. This article was read by J. M. Lydgate of Lihue, Kauai, before a meeting of the Kauai Historical Society. Mr. Lydgate is one of the foremost authorities on early Hawaiian days.

THIS is the time and this is the place to recall the story of the famous private yacht called Cleopatra's Barge; the time, because it was just a hundred years ago that she was the wonder of the world, and the place because it was on Kauai that she terminated her eventful career.

The Crowninshields were a sturdy and enterprising family of Salem merchants, doing a large business with India and China—away back 150 years or so ago—and out of this business they accumulated very comfortable fortunes. Nevertheless, every boy of the family, whatever his ultimate destination, was given a nautical education and sent to sea to learn every branch of the far-reaching business. George Crowninshield, in whom we are particularly interested, went through this training like all the rest and was finally taken into the traditional firm together with his brother, Benjamin. After a few years this brother, Benjamin, retired from the firm to become secretary of the navy, and shortly after the father died.

A World Wonder

Already possessed of a liberal fortune and unmarried, with no one dependent upon him, George determined to build a yacht and see the world in her. Salem was one of the leading seaports of New England in those days and had turned out a good many famous vessels, and one Retire Becket, or "Tyrey" Becket, as he was known, was the crack builder of fast clippers. To him was intrusted the building of the Cleopatra's Barge, which should be the finest and fastest yacht that the world had known. She was started in the spring of 1816 and finished, ready for sailing, early in December of the same year. Even while she was on the stocks, the fame of her spread abroad and people came far and near to see her.

She was just about the same in dimensions as the famous yacht Mayflower—83 feet on the water line, 23 feet wide and 11½ feet deep; 191½ tons. She was what is called a hermaphrodite brig, that is, square-rigged on the foremast and fore-and-aft on the mainmast. She carried every kind of sail that you could put on a yacht, some of which have gone entirely out of use now.

But it was in her cabin fittings and appointments that she was the marvel of the age. The main cabin measured 19 by 20 feet and was panelled in mahogany inlaid with birdseye maple and other fancy woods. The furniture was mahogany, upholstered in red velvet, decorated with gold lace. There were two large sofas, with gilt bronze ornaments, a chandelier, a sideboard, two large mirrors, etc., and an elaborate and expensive service of silver and china, made expressly for her. The furniture of the cabin was valued at $8000. The vessel herself cost $50,000, which was a lot of money for those early days.

Completed in 1816

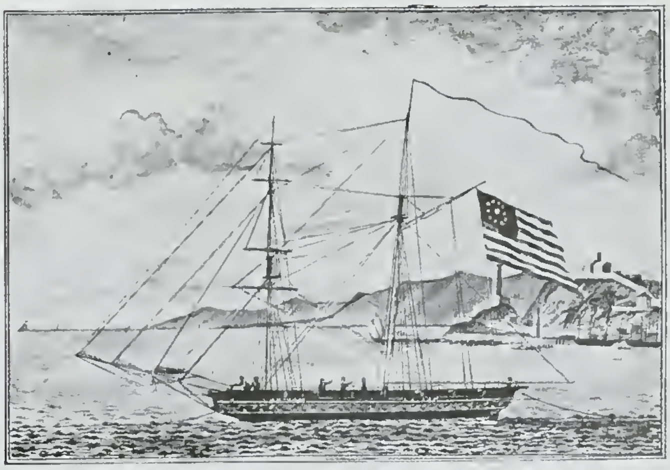
She was finally completed December 6, 1816, and after being shown to the family was opened to the public at large. On the opening day 1900 ladies and 700 men came aboard to inspect and admire her, and many useful and valuable gifts were added to her equipment; and as long as she remained in Salem, she was crowded with visitors. While she was being fitted up for her long voyage, the owned lived on board and received a great many people at dinner parties and other entertainments. He selected his cousin, Benjamin Crowninshield, as his captain, and his son, Benjamin, Jr., went as passenger and incidentally kept a very careful, illustrated journal of the voyage. The crew was of about the usual size for such a vessel, with rather better provision for the commissariat.

On March 30, 1817, she sailed for the Mediterranean, her departure being witnessed by a great concourse of people. The first port of call was the Azores, where she remained in the harbor of Fayal for a week and where she was visited by all the principal people, and hosts of them were entertained.

Calls at Madeira

From there to Madeira was a short voyage. At Madeira the yacht remained a week. During this time almost everyone on the island visited her and met with a cordial reception, for Crowninshield was a democrat to the core. Everyone was welcome who knew enough to behave. The consequence was, here and elsewhere, that so many people availed themselves of this liberty that it was almost impossible at times to carry out the daily routine of the ship, and the visits of these people became a great nuisance.

At some of the ports at which the vessel stopped later in the Mediterranean, the crowds were so great that it was found necessary to try to keep them back and at Barcelona the vessel had to be hauled out of the harbor into the outer road to prevent the pressure of these great crowds. It was in vain, however, for they followed the vessel in boats, and many of them becoming deathly sick, that was added to the other discomforts. It was at Barcelona, also, that many



The Cleopatra's Barge at Genoa
From catalog of the Cleopatra's Barge exhibition, Peabody Museum, Salem, Mass.

people in the endeavor to get on board, were crowded overboard, and among them three ladies.

Leaving Madeira the Cleopatra's Barge sailed for the Mediterranean, where she visited the following places: Tangiers, Gibraltar, Malaga, Cartagena, Port Mahon in the island of Minorca, Barcelona, Marseilles, Toulon, Genoa, Leghorn, the island of Elba and Civita Vecchia.

Paint Never Dry

The owner was very particular about having everything kept "shipshape" and in applepie order. During the short space of two months, while she was in the Mediterranean, she was repainted no less than three times; in fact, the paint was hardly ever dry. At Marseilles an army of workmen came aboard, the gilt work was all regilded, additions were made to the cabin upholstery and one stateroom was dismantled and refurnished in a different style.

Before setting out on his voyage the owner had provided himself with 300 letters of introduction to the most eligible people at the different ports where he intended to call. And the presentation of these letters no doubt helped to augment the number of daily visitors.

Some idea of the interest that was taken in the vessel may be gathered from the fact that on an average 3500 people a day visited her while she was in port, and one day at Barcelona, by actual count, no less than 8000 people came aboard. Many dinner parties were given and entertainments were served every day in the saloon to her invited guests. In order the better to entertain these guests the generous host engaged a number of professional musicians and at Elba these were increased to a full band.

A Surprised Baron

At Genoa an interesting episode occurred that must not be overlooked. A certain baron, von Zach, a German astronomer of distinction, came aboard with all the rest of the world, and he gives an interesting account of his visit. In the course of the conversation, the name of Bowditch was mentioned—Bowditch was the standard authority on navigation aboard all American ships and was held in becoming respect even by the rest of the world.

"He is a friend of our family and our neighbor in Salem," replied the captain, "and that young man, whom you see there, my son, was his pupil; in fact it is he, and not myself, who navigates the ship. Try him and see how much he knows."

The German astronomer turned to the young man, saying: "What was your dead reckoning error in making the Straits of Gibraltar?"

"Six miles," was the answer.

"You must have got your longitude mighty close. How do you get it?"

"By chronometer and by lunar distances, both."

"What! Do you know how to work up the longitude by lunar distances?"

"Why, our cook can do that," replied the young man.

"Here, Jack," calling to the negro cook, "come and show this gentleman how you get the longitude!"

More Surprises

The cook came up with a dressed chicken in one hand and a butcher knife in the other; and the baron put him through a cross-examination in regard to working lunars that quite satisfied him that he knew perfectly what he was talking about. The captain told him to put down his chicken and get his books and journal and show the gentleman his work, which he did. And everything proved to be entirely in order, according to the highest standards of the best navigation, which is more than can be said for most ordinary sea captains. This negro cook had been round the world as cabin boy with Captain Cook in his last voyage and was well acquainted with the particulars of his death at Kealakekua in 1779.

Crowninshield was an ardent admirer of Napoleon and made a point of going to Elba to see where he had been in exile, from which he had escaped only a couple of years before. Many of his friends were still there, whose acquaintances he made and who in turn gave him letters of introduction to the Bonaparte family in Rome. So from Elba they went to Rome, where they remained a couple of weeks, largely as guests of the Bonapartes. These Bonapartes were more or less under supervision for fear they might attempt to rescue their great leader in exile at St. Helena and the attention paid to them by the wealthy owner of this fast yacht, that could outsail anything afloat, was regarded by the French authorities with suspicion. So they set a French man-of-war on her track, to keep watch of her, but the Cleopatra soon left her far in the rear.

The Owner Dies

Crowninshield had hoped to extend his voyage to the Eastern Mediterranean, the Greek islands and even Constantinople, but the lateness of the season warned him that he must give up this plan and return to America, which he did, arriving in Salem on the 3rd of October, 1817. He at once began to plan another voyage for the coming year. But "man proposes and God disposes;" within two months he was dead.

In settling his estate the Cleopatra's Barge was sold at auction the following summer for $15,000, her cabin furniture and fittings being reserved. She made one or two voyages to South America in the merchant service and was finally sold to Kamehameha, king of the Hawaiian Islands. In pursuance of this sale agreement, she departed from Salem June 18, 1820, and arrived in Lahaina, November 6 of the same year.

Trader for Sandalwood

On the 16th of November, 1820, Liholiho, or Kamehameha II, and his prime minister, Kalaimoku, purchased the Cleopatra's Barge from Captain Sutter for $90,000 to be paid for in sandalwood by installments. Her name was then changed to Haaheo O Hawaii (The Pride of Hawaii).

During the next three years she led a somewhat checkered career as flag-ship of the incipient little Hawaiian navy, and the private yacht of the king and royal family. As there was at this early time no regular means of transportation between the islands, the Haaheo O Hawaii came in for all kinds of varied service, from royal dispatches to the outer islands to return loads of taro and pigs. She was so vast an improvement on the unseaworthy and unsavory craft that they had been used to that they regarded her as a paragon of beauty and comfort, and every alii (chief or noble) who could possibly manage it sought for the favor of an inter-island trip aboard of her.

A Treacherous King

One of thes trips deserves special mention. On one occasion King Liholiho, either from a drunken whim, or to carry out a crafty design, sailed for Ewa in an open sailboat, and then when he once got to sea compelled his attendants to continue the voyage to Waimea, Kauai. Arriving there the next day he threw himself, entirely helpless, into the power of King Kaumualii. That noble chieftain, instead of taking any advantage of Liholiho's defenseless condition, gave him a hospitable reception and sent his own brig to Honolulu to make known the king's safety and to carry his commands. In two days the five wives of Liholiho arrived on board the Cleopatra's Barge. The two kings then spent several weeks in a tour of the island of Kauai, and Kaumualii spared no pains or expense to give his royal guest the best kind of a time that he could devise, which in this case was mainly plenty of drink.

And what return did Liholiho make for this generous hospitality? On their return to Waimea the king invited Kuamualii to spend a few hours aboard his flag-ship, the Haaheo O Hawaii, and while the unsuspicious prince was seated in the cabin, orders were secretly given to make sail, and he was torn from his kingdom, to remain henceforth a virtual prisoner of state in Honolulu.

In the best of circumstances these old Hawaiian chiefs were surrounded by a scurvy lot of beachcombers and reprobates. Naturally a weak and dissolute prince like Liholiho gathered this kind about him almost exclusively, and it is a matter of no great surprise that the Pride of Hawaii was manned by a drunken, dissipated, irresponsible crew from the captain down to the cabin boy. Nor is it a matter of any surprise that she should come to an untimely end.

This happened about the end of April, 1824, at Hanalei, where she was stranded on the Monolau reef just off the mouth of the Wailoi River.

The early missionary, Rev. Hiram Bingham, came to Waimea on a visit about this time and finding the chiefs and many of their effective followers had gone to Hanalei in response to the call for help to save the stranded vessel, he followed them thither, taking three days for the trip.

On his arrival he found a large concourse of people busily engaged, under the leadership of the chiefs, in efforts to salvage the vessel. They collected from the woods and margins of the river nearby large quantities of hau bark, from which they made several thousand yards of strong rope. This they stranded together into three large twelve-fold cables. These three cables were then attached to the mainmast of the brig, a few feet above the deck, and then strung out inland in three parallel lines. The plan was by means of these cables to roll her bodily over the reef into the quiet water within, where she could be repaired, and then floated out through the channel.

Every available man was gathered up and distributed on the cable and when everything was ready, Kiaimakani, the luna nui (director) for the occasion, passed up and down the lines enjoining silence—nuke-hamau i kalee. Then the official chantey man took up the chantey song and everyone stood ready for action till the chorus "huke!" (heave away), came and the three great lines of surging power strained the great cables so that the juice fairly ran out of them. The brig felt their power; rolled up slowly until her side struck the solid wall of the reef; then she stopped; but the lines of men went on—something had to give. The mainmast broke short off and fell over the quiet water within the reef.

These well-considered plans to save the vessel being fruitless and she being now in worse condition than before, they became discouraged and gave up the attempt, leaving her there. And there she remained until gradually the pounding surge of the trade-wind seas broke her up.

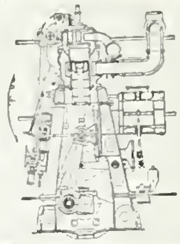
Mr. A. S. Wilcox, whom I interviewed a few years ago relative to wreckage from the Cleopatra's Barge, gave his recollections substatially as follows:

When I was a boy, somewhere along in the '50's, I remember very distinctly the efforts of A. S. Nuuanu, a Hawaiian of a good deal of energy and executive ability, to recover materials from the wreck of the Cleopatra. He had a scow anchored out in front of Waipa, off the present Waipa bridge, and by means of divers he got up two iron cannon and some wooden wreckage, perhaps part of a capstan.

I remember my brother Edward made a ruler out of a piece of the wood. The two cannon were about Hanalei for many years and indeed until comparatively within recent times. Sometime ago I inquired about them and was told by Mrs. Deverill that they had been carried off by an English man-of-war. Since I have built at Hanalei I have wanted to get hold of them to set up in my yard, and failing the recovery of these, I reverted to the brass cannon, said to be imbedded in the bottom of the sea, where the Cleopatra was wrecked. Native fishermen report having seen such a cannon in a hole in the reef. I made an arrangement with Kaheleike to locate this cannon with a view to raising it, but thus far, we haven't found it.

Crowninshield's Wharf, Salem, during the embargo of 1806, showing sailing ships tied up for lack of freight
From illustration in "The Marine Room, Peabody Museum at Salem"

Oil Engines and Motorships



MOTORSHIP ERA

Some Observations of an American Marine Engineer on Board a Swedish Ocean-Going Motorship

By R. Z. DICKIE

ONE of the most noticeable facts in shipping circles today is that, while many steamers are laid up because they cannot afford to carry freight at the present rates, practically all of the motorships are continuing in operation and apparently making profits for their owners. At the same time all of the motorships on the stocks are being rushed toward completion and many are being contracted for by the wisest heads in the shipping game in Europe. Having observed this fact, the writer, when it became necessary for him to make a trip to Europe, decided to take passage on a Swedish motorship in order that he might observe at first hand the methods employed on board these ships and the operation at sea of their Diesel engines. He accordingly secured accommodations on the motorship Pacific of the Johnson Line routed from San Francisco through the Panama Canal to Dublin, Ireland.

No attempt will be made in this short article to give a log of the voyage or any of the actual tests, but merely to set down a few observations from the practical operating engineer's viewpoint.

Reliable Operation

The first fact which impressed itself strongly upon the observer was the continuous and entirely reliable operation of the Diesel engines, with apparently even less attention required than had been the writer's experience in connection with reciprocating steam engines.

Another feature was the excellent shop facilities provided for any repairs which might become necessary while the ship was under operation. According to the engineers on this ship, their owners have found it rather difficult to have Diesel engine repairs effected at many overseas ports. In every case the work at shore rates had been extremely expensive and very often badly done. They have, therefore, considered it rather a profitable investment in their more modern ships to install an elaborate machine shop in connection with the engine room, space being easily available for this feature on account of the absence of steam pipes, condensers and auxiliary pumps in the engine room of a motorship. Usually in these shops there will be found a moderate sized lathe, an excellent drill press, a grinding machine, and a shaper, all driven by belting from a small electric motor.

The Pacific carried four wipers, of whom two were competent machinists. As the engines are automatically oiled by forced feed, these wipers have little to do and spend most of their time making minor repairs, making and grinding valves and making adjustments on the engines as required. The chief engineer spoke with pride of the bills for shop repairs. In a period of nearly seven months these were less than $700.

As to the reliability of operation, the chief engineer's log shows that the Pacific had operated thirty days continuously on California oil (asphalt base) and fifty-two days continuously on Texas oil (paraffine base), these runs being terminated simply because the vessel had reached its destination.

In using low grades of oil for fuel the valves sometimes become clogged up with carbon and it becomes necessary to change them. This change can be carried out without stopping the engine, simply by cutting out the cylinder which is to have its valve changed. While this operation is somewhat dangerous, it has often been done at sea in cases of necessity. An efficient engine room crew can put in a new valve in about fifteen minutes where there is necessity for haste.

Engine Room Ventilation

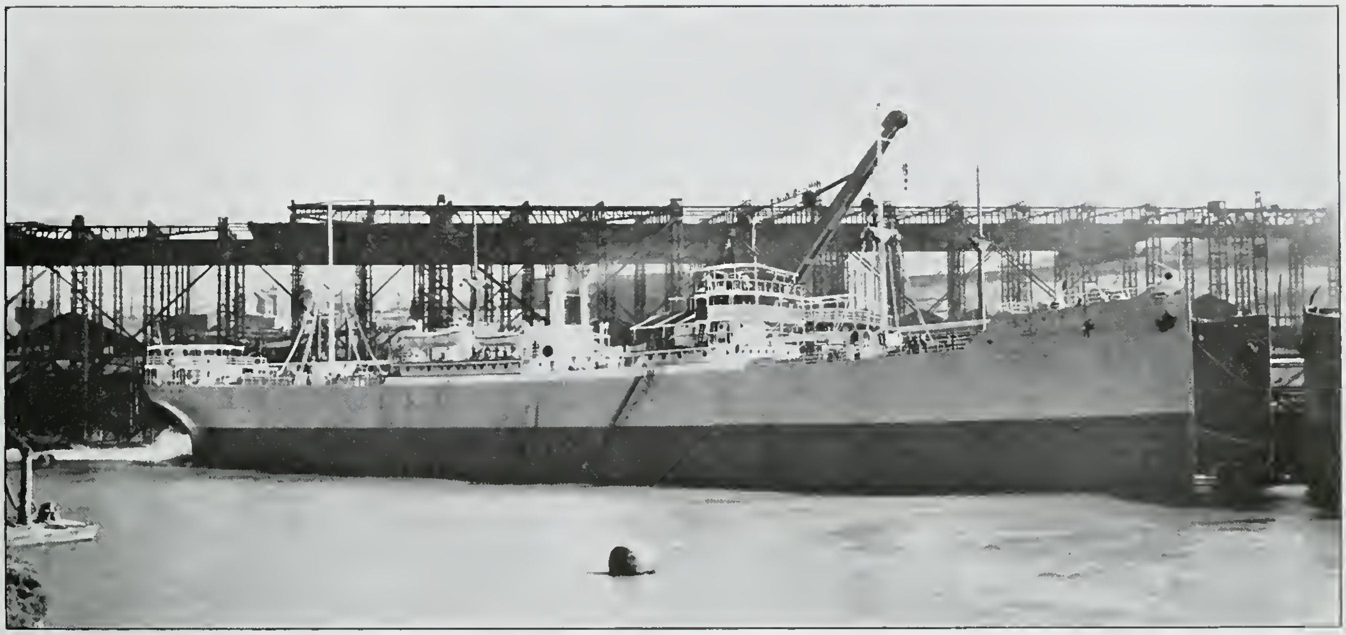
On the working platform of the engine room of the Pacific the temperature averaged about 105 degrees Fahrenheit, but on the top platform it ran as high as 135 degrees Fahrenheit, and this station, particularly in the tropics, became quite uncomfortable. It seemed to the writer that adequate ventilation should be provided at this point, and it would be well for American designers of motorships to thoroughly investigate this feature. Ventilation at the top of the engine room could probably be best accomplished by electric fans arranged to keep air in the engine room within a few degrees of the outside temperature. Such forced ventilation could be divided into several units so that only the necessary number of fans, according to the outside temperature, need be kept in operation. The writer was glad to see, through reading an article recently in Pacific Marine Review, that in the engine room of the American motorship Kennecott the ventilation has apparently been well taken care of.

Propeller Slip

One very interesting feature to the writer in the operation of this ship was the decided slowing down under head winds, indicating great propeller slip. The twin screws of the Pacific are four-bladed, 10 feet in diameter and 8 feet 2 inches pitch, with about 40 per cent surface, and at full power of the engines will turn 134 revolutions per minute, each engine indicating at that rate 1950 i.h.p. With good weather, no head winds, the slip on these propellers would be about 7 per cent. Under some conditions of the weather found on this trip the writer figured that the propeller slip actually reached a figure as high as 34 per cent. With a large, heavily pitched, slow turning propeller, there would of course be no such variation. In motorships this condition can very readily be attained either through reduction gearing, as on the Libby Maine, through electric gearing, as is now being installed in several yachts, or with the perfection of the design of marine Diesel engines it may even be attained on a practical basis with direct connection. In fact, trials have just been had on a single screw motorship built by Doxford and Son at Sunderland, England, powered with a 3000 h.p. direct connected opposed piston, crude oil engine running at 77 r.p.m. full load speed.

Proposed Installations

In connection with the repairing of Diesel engines at sea, it will be remembered by the readers of Pacific Marine Review that in February, 1921, the writer published an article describing a Diesel electric drive in which power was generated by a number of small units. This idea was suggested to the writer by Mr. Milton L. Towne, who also suggested that together with this installation there be fitted a fully equipped machine shop with a small overhead electric crane which could deliver all parts of the various units from the engine room to the machine shop, and that there be added to the crew three Diesel machinists who would effect all of the necessary repairs and adjustments independently of the operating engineers. Since the trip on the Pacific just described the writer is more firmly convinced than ever that some such scheme of installation will characterize the motorships of the future.



Motorship Yngaren, built at the Pallion Works, Sunderland, by William Doxford & Sons, Ltd., and engined with their new opposed-piston marine oil engine. The Yngaren is here shown at her dock trial in the Tyne in front of the Pallion Works

EUROPEAN MOTOR SHIPBUILDING

Exclusive Correspondence Pacific Marine Review

POSSIBLY the writer may be accused of exaggeration when he says that Germany is making a bold bid to become the leading motor shipbuilding country in the world but he has strong grounds for believing this to be the case. It is exteremly difficult to obtain definite information regarding the mercantile shipbuilding programme which is now being carried out in Germany but the following facts are sufficient to indicate that very great activity is being shown in the construction of internal combustion engined ships.

German Activity

In addition to the two 14,000 tonners fitted with geared Diesel machinery which Blohm and Voss are building for the Hamburg America Line, orders have been placed by the same owners for eight standard motor ships of 6,000 tons d.w.c. Two 3,000 ton tank vessels have just been launched for the Stinnes combine in which Krupps engines will be fitted. The Hansa Line has placed an order with the Weser Shipbuilding works for a 10,000 tonner to be fitted with machinery of 3200 i.h.p. of the four cycle type whilst the Hamburg South America Line has contracted with Howaldtswerke of Kiel for a 12,000 ton ship in which two 3000 b.h.p. Sulzer Diesel engines will be installed. At the new Deutsche Werft of Hamburg, standard motor ships are being built equipped with A.E.G. Diesel engines which incidentally are being manufactured in the fine workshops which were orginally designed for the construction of large steam turbines.. This policy of motor ship construction should not be ignored by American shipowners, and in England very careful note is being taken of German progress, although as previously mentioned, the Germans are giving away as little information as possible.

In the meantime it is significant to learn that the very greatest difficulty is being experienced in disposing of surrendered German ships to British shipowners even at the remarkably low prices at which they are offered. It is reported that motor ships are being built in Germany at a cost of 2,500 marks (at present exchange rate about $37.50) per ton deadweight, which is very much lower than either a steamer or motor ship can be built in any other country in the world.

The First Doxford Motorship

The long-awaited trials of the

first Doxford engined motorship have at last taken place and have excited the widest interest among both shipowners and shipbuilders. The vessel in the Yngaren and is one of three ordered by the Transaltantic Steamship Company of Gothenburg, who are now pinning their faith entirely to inernal combustion engined ships. The Doxford engine is probably now so well known it is not necessary to give a full description of the new design. It may be recalled that it is of the opposed piston two-cycle type developing 3,000 i.h.p. in four cylinders 580 m.m. bore each piston having a stroke of 1160 m.m. It has as many departures from existing Diesel engine practice as it is possible to embody in a motor of this design, since air blast injection is abandoned, the compression pressure is reduced from 500 pounds to 300 pounds per square inch, and the speed has been brought down to the very low figure of 77 r.p.m. The fuel is injected into the cylinders from a pump driven off the crankshaft operating at a pressure of 9,000 pounds per square inch, while there is an electrically driven auxiliary pump for use in the event of trouble arising with the main pump.

The control gear is of the simplest possible design and for moving the camshaft when reversing no compressed air is used, the whole operation being carried out by hand, an interesting novelty in connection with an engine of such high power. The motor is controlled by one wheel which is turned to the left for astern and the right for ahead operation, complete control being effected by a movement of the same handwheel which reverses the engine. As an example of flexibility, the Doxford design is superior to all others since the motor can be run continuously at well under 20 r.p.m. and indeed far below the minimum speed required for driving the ship during manoeuvring.

The Yngaren is a standard ship and carries about 9,500 to 10,000 tons d.w. at a speed of some 10½ knots on a daily fuel consumption of 10 tons. At the trials a very representative gathering of shipowners and engineers from various parts of Europe were present and the technical innovations in the propelling machinery were the subject of the most lively interest. The ship is about 420 feet in length and in external appearance is noteworthy as being one of the very few motor vessels built in the United Kingdom in which no funnel is provided. This is due to the wishes of the shipowners, who like most Scandinavians prefer the funnelless ship to one in which the ordinary steam ship funnel is provided.

The auxiliary machinery of the Yngaren also has its element of novelty. Like most British shipbuilders Doxfords had a leaning to steam plant, but the owners considering steam totally out of date required the electrical drive. Doxfords have therefore constructed a type of auxiliary engine which they are now standardizing, operating on the opposed piston principle. There are three units installed each developing 100 b.h.p. in two cylinders of no more than 7 inches diameter. In these small engines also the solid injection fuel system is adopted and low compression employed, this being effected in the case of the main motors by fitting a solid uncooled portion of ingot steel on the top of the pistons. This remains at a high temperature during the whole of the cycle so that the temperature of the air after compression is not required to be so great as when the ordinary cooled piston is used.

Another ship of the Yngaren class for the same owners will be completed during the course of the current year and a third vessel will be placed in commission in 1922.

A New Bibby Motor Liner

Another motor ship which has just been completed in Great Britain is the Somersetshire and as she was constructed at Belfast where the joiners' strike is not effective it has been possible to finish her off completely. All other ships built in England or Scotland have to go abroad for completion or wait until the joiners' strike is over. This applies also to the Yngaren which after trials was sent to Gothenburg for final joiners' work to be carried out. The completion of a number of large motor ships has been held up on the Clyde on account of this very prolonged strike.

The Somersetshire which was constructed by Harland and Wolff for the Bibby Line is practically identical in hull dimensions and engine power to the large United States Shipping Board motorship William Penn, the completion of which has recently drawn attention in Europe to the possibilities of extended development of motorship construction in America. The Somersetshire carries 12,000 tons of cargo and about a dozen passengers, being about 450 feet in length over all. The machinery equipment like that of the William Penn comprises two 2250 i. h. p. Burmeister and Wain type engines manufactured by Harland and Wolff. It is worth noting that the cylinders of these engines with the dimensions of 740 m.m. bore and 1150 m.m. stroke are now standardized throughout the world for Burmeister and Wain are building six and eight cylinder engines with this standard cylinder and Harland and Wolff are adopting the same policy. Moreover, William Cramp and Sons are manufacturing engines with the same horsepower so that it may be said an advanced degree of international standardization has been effected. The full influence of this will be felt when there are enormous numbers of motor vessels on the sea fitted with machinery of similar types for it will be possible for a limited number of spare parts to

Ore-carrying motorship Strasse, first of sixteen similar vessels on order

be kept at various ports suitable for the machinery of many different ships.

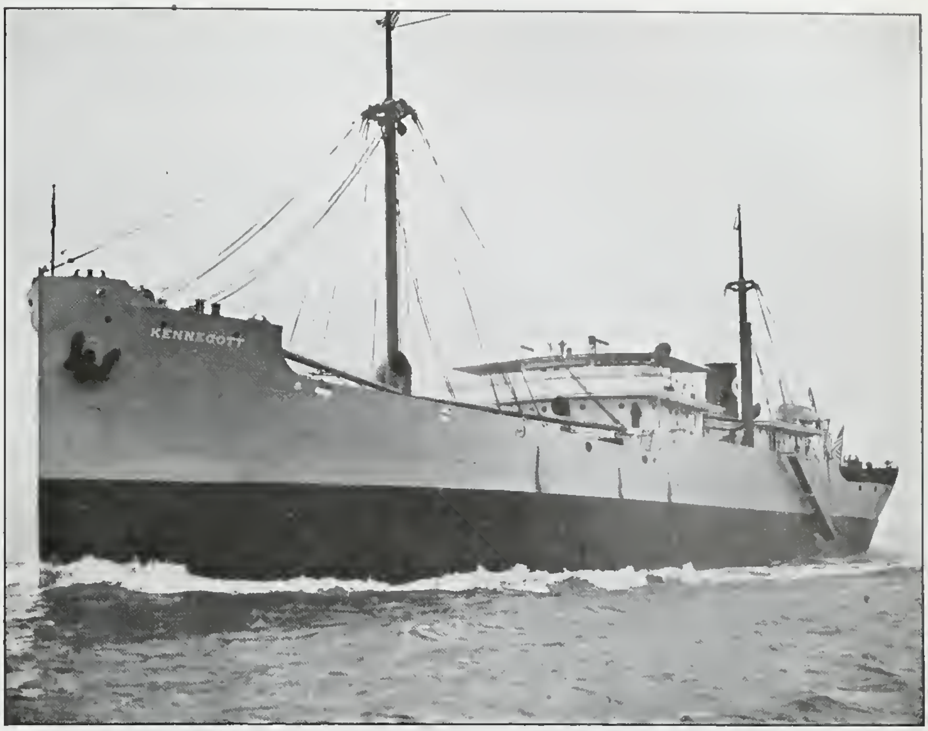
The Somersetshire which was designed for trade to the East is a sister vessel to a motorship owned by the Bibby Line which on her maiden voyage averaged a fuel consumption of only 12 tons daily, for a mean speed of between 11½ and 12 knots. It is estimated that an oil fired steamer of the same size would require between 30 and 32 tons of fuel while a coal burning ship would need well over 50 tons. As the price of oil in England has recently been brought down to £4.10.0 per ton while Welsh coal costs £3 per ton (and needless to say is difficult to obtain on account of the coal strike) the economy of such a motorship does not need much emphasis.

Motor Shipbuilding Active

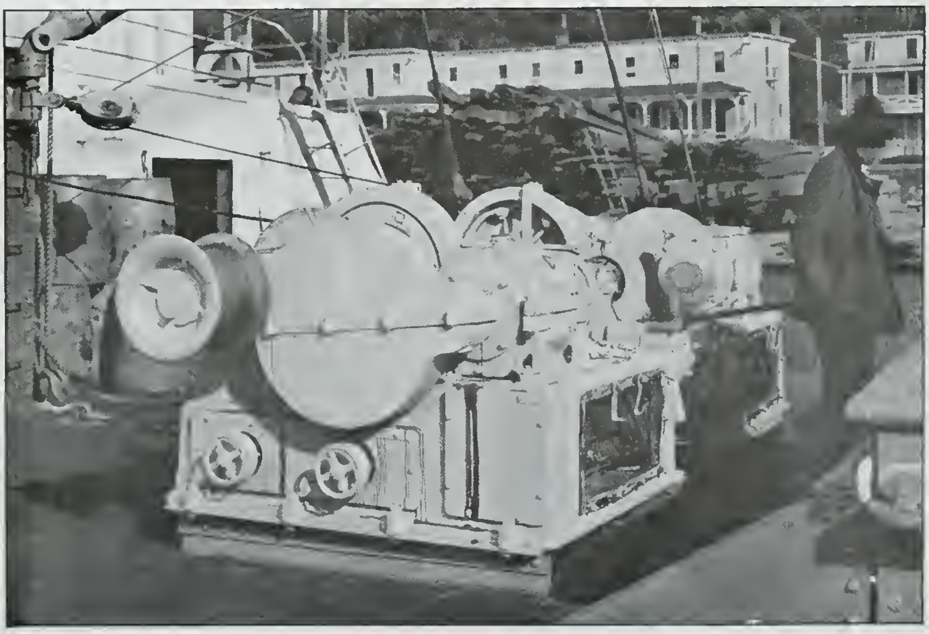
It is a proof of the popularity of the motorship among European motorship owners that while the contsruction of steamers for the most part is being delayed, work on motorships is allowed to progress and in addition to the vessels already mentioned, about half a dozen motorships have been launched or completed during the past month. From Vickers' Works at Barrow the first of four tankers for Tankers, Ltd., named the Scottish Standard was launched while the Seminole, a motorship for the Anglo American Oil Company, of the same size was completed and sailed on her maiden voyage. On the Tyne, Armstrongs launched their first motorship, a 6,000-tonner to be equipped with Sulzer machinery of about 2,500 b.h.p. on twin screws. This latter vessel is more than usually noteworthy on account of the fact that she will be the first large British built ship to be equipped with Sulzer engines.

The Tosi Engine

Although a great deal has been heard of the Tosi engine and Diesel motors of this type were, during the war, largely used on submarines, comparatively little progress has been made in the construction of the Tosi motor for mercantile vessels. The first two ships equipped with such engines have just been completed in Italy and the three Beardmore engined cargo boats built on the Clyde are now well under way, the Beardmore engine being practically the same as the Tosi type. The two ships referred to are the Primula and Ardito. In the latter a couple of 1200 b.h.p. six cylinder motors are installed, the largest of the type that have yet been built. The Tosi firm whose works are at Legnano, Italy, have recently patented several new devices in connction with their Diesel engines with the object of preventing the many troubles to which Diesel engines are liable. Quite the most interesting feature is in connection with valve design. The engines are of the four cycle design and in the cylinder cover are the usual air starting and fuel valves but the air inlet and exhaust valves are combined in one. This valve leads to two separate pipes, one being the exhaust and the other open to the atmosphere through which the atmospheric air is drawn in on the suction stroke. Between the valve and the two pipes is a semi rotary valve which closes one and opens the other pipe alternately according as the engine is exhausting or is inspiring the air. There are two advantages claimed for this arrangement. In the first place one valve is eliminated, thus rendering cylinder cover design more effective and secondly, the exhaust valve should last much longer without needing to be cleaned owning to the fact that the combination valve is continually cooled by the air passing over it on the suction stroke.



Alaska Steamship Company's motorship Kennecott just returned from a round trip to New York, on which she gave a very good account of herself, both in fuel economy and reliability



Two of the electric deck winches of the motorship Kennecott

RIDICULOUS ENGINEERING

Some Ludicrous Mistakes of Marine Engineers

By SEA FLAME

In this article our friend Sea Flame points out some of the ridiculous blunders into which marine engineers are led by lack of experience and training. He also shows how ridiculous is the position taken by the marine engineers in the present argument between the Marine Engineers' Beneficial Association and the owners and operators of our merchant marine, and narrates his experience in engine room operation with an open shop American plan engine room staff.

THE serious side of marine engineering is generally considered. Seldom is any humorous angle presented. There are times, however, when extremely ludricrous incidents crop up. Some of these are attributable to ignorance. Others might be classed as plain foolishness. The writer believes that an anecdote or two on the funny side of engineering might make a smile, and at the same time act as a deterrent to those who do not use their "think-tanks."

A Lively Coffee Urn

On a Lake built ship, of which the writer was chief engineer, several things were found which struck the comical note. Most noticeable was the way the former chief had piped up the coffee urn in the saloon pantry. From correspondence and bills, it appeared that this urn was purchased at a coast city, to be installed by the ship's force. When the writer joined the vessel he was told by the Steward that the urn would not operate, and that letters were in his room regarding it. An inspection showed that the urn had been piped up with the live steam leading to the valve that was supposed to be piped to the fresh water supply, so that both water jacket or coffee receptable could be filled. As the boiler steam was let into this, the result can easily be imagined. Cover blew off of urn, and pantry filled with live steam. But the rest of the piping was about the same. The inlet end of the steam coil in bottom of urn was piped up to the pantry scupper, and the outlet end was open.

Just what ideas the poor chief had who did the job, the writer does not know. The copies of the letter both to and from the suppliers of the urn, showed that the latter were more than astounded that such an absolute ignorance should have been displayed by any engineer. The third assistant engineer who came with the writer to the job fixed it one morning while on watch, and then the troubles ended.

It might also be mentioned that the same vessel was fitted with two Engberg dynamos and engines. Neither of these would hold on the governors. It was found that both governors had been allowed to freeze.

A Tapped Condenser

Another time many years ago, when the writer was working as a machinist, he was ordered by the foreman to get over to a sternwheel boat and do a job that the chief wanted done. He found that the job was to put a hose nipple and valve at the bottom of the condenser. (The job was a compound, condensing one.) The chief had also purchased about fifty feet of ¾-inch hose, with a shut-off nozzle. His idea was that by connecting up his hose to the condenser when the boat was running that he would get nice hot fresh water to wash down with. He very kindly explained to the writer what he was having done. As at the time obeying orders without comment was the rule, the job was done to the chief's idea. When the boat left for up Sound, and things were going well, Mr. Chief slugged her down well with strong caustic water around the wooden floors of the engineroom, and after scrubbing it well with a broom, dragged the hose along and opened the valve to the condenser. The result can be imagined. The vacuum fell, and the engines slowed. Every place but the right one was looked to for the trouble, and as the job had an abnormally large L.P. cylinder in proportion to the highs, she would only go "dead slow" with a low vacuum. The captain of the boat, who also held an engineer's license, came down to see what was up, and found the trouble. Needless to say there was a new chief the next trip.

"A Cool Washroom"

The lack of knowledge and thought among some members of the crew is also the cause of numerous funny incidents. One in particular happened on a Panama line boat. She had refrigeration rooms on the main deck, cooled by the brine system. One hot afternoon the return brine commenced to go up in temperature. The engineer on watch noted this, and increased the ammonia flow. Temperature still rising, he reported to chief, who went on a hunt for trouble. He found it. In one of the cold rooms was a saloon waiter with a couple of buckets of hot water, soap and dirty clothes, having a fine washing day. When growled at for his foolishness, seemed quite surprised, and explained with a deal of self-satisfaction, that he thought he should have been complimented in finding such a nice cool place to do his washing. After that the steward kept a lock on all the rooms.

Searchlight Regulation

Equally comical was the way a mate put on a searchlight to throw illumination onto the wharf while cargo was being worked. He desired a small light, and had the idea if he put the switch in "easy" he would get it. He did. It naturally blew all fuses when she began to arc. After a few trials, he gave it up, and the chief was again appealed to. Explanation followed, and the mate was told that the searchlight was not supposed to be used as a cargo light.

New Engine Accelerator

Again, when the engine room telegraphs first came in, the writer was engineer with a new boat so fitted. The captain had never been with a "telegraph" before, and when docking, would pull the transmitting handle around with a jerk, so quick that the hammer for the gong would not get time to drop. The whole apparatus below would surge and groan under the strain, and only a "grind" be heard as the pointer went around. After docking the chief attempted to explain to the captain that it would be better to pull the lever with a slower motion, as then the gong would ring, and the machine not be put to such a strain. The captain looked at the chief and asked, "Well, doesn't it make the engine go faster to pull it quick?" Sounds incredible, but it's true.

Trial Speed Exaggeration

A very common fault of steamship designers and builders is to exaggerate greatly the speed and carrying capacity of the several vessels turned out. As a matter of fact the percentage that comes up to the estimated tonnage and speed is small.

On speed mainly they fall down lamentably. The writer has before him the prints of propellers for two separate types of vessels. These prints state that at 90 r.p.m. the speed of the ship will be 10½ knots. However, at this speed of propeller, she only makes in one case a fraction over 9, and in the other something short of 10. The designers are also off on slip in nearly every case. Under seagoing conditions the slip will run anywhere from ten to fifteen per cent over that estimated.

Why such a sounding of trumpets and blowing of horns over the trial trip speed, when as a matter of record very few of the freighters lately built come up to it after being in service? This is not due, either, to any inefficiency of those who operate the vessels. On one steamer lately from the East Coast to San Francisco, her speed averaged 9 knots only, at revolutions claimed to be sufficient to drive her 10. She was not dirty, having lately been docked and painted.

This sort of stuff is "bunk" pure and simple, and serves no useful object that the writer can see. It also puts those who handle the vessel in a bad light, especially as regards speed, and many an engineer has been told about the wonderful pace she set up on the trial trip, which by the way, is seldom verified or checked for accuracy, and is generally run with the ship light and under ideal conditions.

Warm "Cooling Water"

It seems regrettable that steamship designers were not as a class more practical men. If so the writer is sure they would not design the many contraptions they now encumber boats with. Things which appear all right theoretically, but under the iron of practical work they fall down lamentably. Take, for instance, many of the so-called "cooling water" systems installed on steamers. With a sea temperature of 56 Fahrenheit and an atmospheric one of around 60 Fahrenheit, the water is kept fine and cool, and plenty of it. However, when she is in low latitudes, with sea at 85 Fahrenheit and atmosphere around 98-104, then there is no cool drinking water, and a howl goes up that the engineer doesn't want to supply it. In most cases had a little more thought been given to small things like this, it would be better for all.

Drains?

Running of scuppers and drains is also given too little thought. All that is believed necessary is to lead a pipe to let the water out, with no consideration as the possibility of foreign matter getting in and stopping it up. Incline is seldom or never considered, with the result that on some fine steamers a slight list to one side will cause drainage to back up into toilets, washrooms, etc.

Again, the writer knows of one very culpable mistake, where to put engine oil down below it is necessary to have the oil barrels hoisted up onto the promenade deck, and this always makes a mess.

Frozen Fittings

The writer had an incident come under his notice lately which shows the lack of good practical sense in designing. The cargo boom derricks were fitted with goose-neck irons bored to almost an exact size for the pintles. No provision for oiling was allowed for. There was absolutely no clearance, the fits being so tight. Result was that a careless and ignorant deck officer let these booms lay in their chocks for several weeks on the run home, and they "froze" fast, and when hoisted and swung over, the socket irons carried away, causing breakage and a sizeable bill for repairs, besides delaying the steamer. While the neglect of the deck officer is inexcusable, the designer who would allow such snug fits on derrick booms does not know the least thing of sea work and the action of salt air and changing climates on metals.

While good fits are admirable, the writer has noticed that in many cases the doors, drawers, lockers, etc., in a new boat are fitted with such an exactness that when they swell the slightest from damp and climatic changes they stick and bind, and then the cook uses his cleaver to open drawers, and the average seafarer uses any old thing handy to open a locker door with the result that in most cases damage is caused that a little thought might have prevented.

Simple Piping

In engine rooms also there are many cases of lack of thought and the old proverb might well be changed to "blessed be the draftsman who can make one pipe do where two did before."

It has been noticed that the best ship draftsmen are those who have had a few years at sea. Then they try to make things handy and simple. The man who doesn't know that a ship rolls and wallows when in service cannot be expected to design for such contingencies. In all cases simplicity is best, even if a fad has to be sacrificed. Of course, it is hard to make things fool proof. The writer has labored for years to evolve things that would hold up under the average ship worker's handling. The only thing he ever designed which they could not break was a pile-driver monkey, and they dropped that overboard.

It has often been asserted by members of labor unions that the independent worker is not efficient. The writer is of a different opinion, and recent experience bears out his belief.

A week after the late maritime strike, we came into San Francisco with a steamer from east coast ports. Calling at San Pedro, were told by the delegates about the strike. As we were on the regular pay, having signed on previous to the first of May, we were not molested, but were told all about what the U. S. S. B. and the steamship owners were trying to do.

Among other things we were told that we would have to work ten hours a day at sea. Also nine hours in port. That a cut of 35 per cent was ordered. That no decent man would accept work under those conditions, etc., etc., **ad nauseam.**

Arriving at San Francisco the facts were ascertained. The writer was of the opinion that the strike was ill-advised and uncalled for; that the M. E. B. A., of which he was a member, had no authority to call a strike; that the association had committed a grave error in identifying itself with labor unions. He also saw steamers under foreign flags being loaded, while American ships lay idle. Like a few more, he felt that the country needed men to help rehabilitate the world, instead of pulling down an already tottering structure. He therefore withdrew from the Marine Engineers' Association, giving his reasons therefor.

The next day he was asked to take out a steamer under the "open shop" plan. Speaking to three other engineers who were also disposed to exercise their right to sell their labor and skill as best pleased them, all agreed to take the places offered. A few more men were found, some of them particularly bright American boys, and we went aboard the vessel, one of the U. S. S. B. boats of the 7500 D. W. type, triple expansion engines, Scotch marine boilers, with the usual auxiliaries of refrigeration, electric plant, etc.

With a very few hours to prepare for the voyage, about six to be exact, a start was made one fine morning. She got away from the dock under her own power, without a tug, and steamed down the bay and out over the bar without any particular difficulty that was noticed. True, we did not attempt to break her "trial trip" record, but we did turn her up to within a few revolutions of it, at that.

Crossed out to sea about noon, and headed south. All went fine. The new men soon picked up the way to fire so as to avoid smoke. The oilers were a bit awkward at the start, and lost and bent a few squirt cans, but within three days all was turning as steady and nice as any job that ever sailed the seven seas.

And the writer must say this, too. The men as a class were eminently superior to the average oiler, water-tender or firemen which he had to put up with under union labor rules.

As a whole they were more amenable to discipline and proper treatment. They did not go around with a chip on their shoulders, trying to show that they were just as good as the next man if not a —— sight better. Neither did they assume any sychophantic manner, but did their work with an air of willingness and pride in it, unhampered by union labor regulations. In fact, some of them were former members of different maritime unions, and had drawn away owing to the acts of idiotic labor leaders. They seemed as a whole more manlike and self-respecting. Not only in the engine department, but all over the ship. The cooks, sailors, boys and all each tried to do what was right and proper, and were considerate of each other.

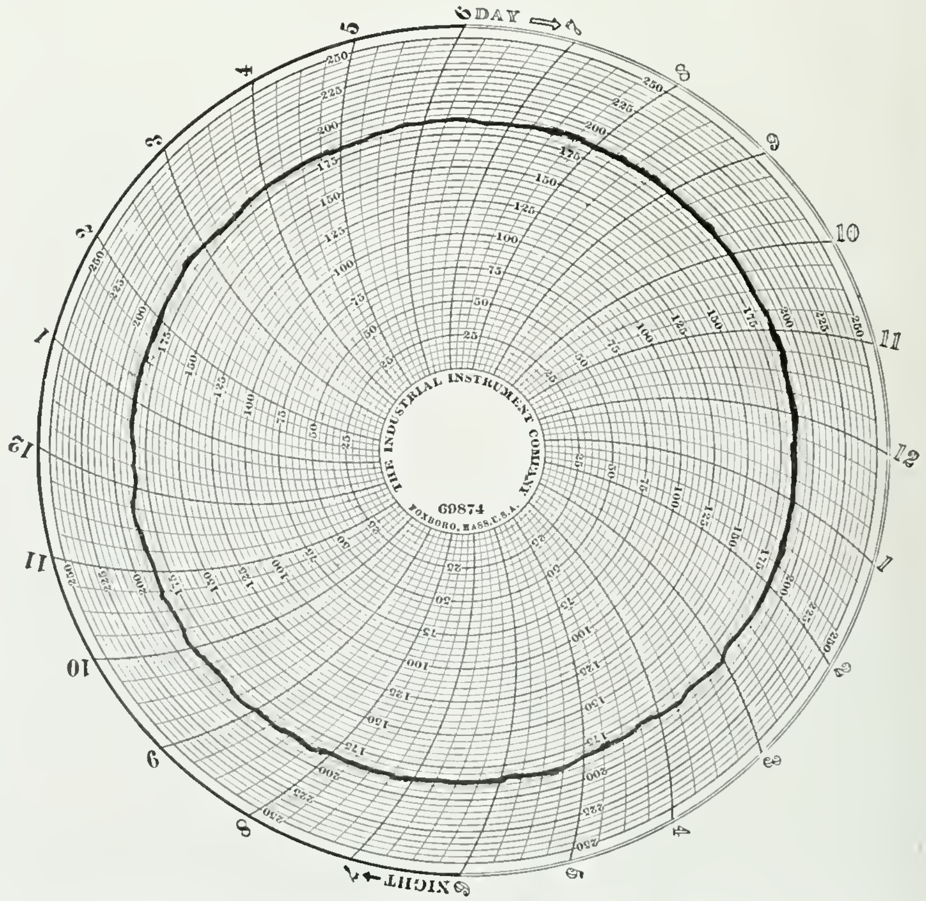
The art of steering straight was a bit hard to master by a few, but these were instructed by those who could steer, and in a day or two, she was doing as well as most ships. One thing, if a man was corrected for any mistake, he did not at once spring it on the officer that he was a union man and knew his business. The writer will say right here that many union men formerly held their jobs on the strength of their membership, not on their ability.

Well, we went along steadily day after day. Press news came in by wireless of sabotage on other ships, but we went on the even tenor of our way, doing each day's work as it came along, and all seeming to be imbued with the idea we were helping humanity toward a solution of some of the difficulties and trouble caused by the war and its aftermath.

Our first run was some three thousand miles. This was made without a stop or slow on account of any engine or boiler troubles. No terrible mental strain was undergone by the chief. He slept well at night, perfectly sure of the loyalty of his boys, and they all seemed anxious to show that they could do their work like Americans, without having to first obtain the permission of a blatant mouthed labor agitator, whose first and only thought was for himself.

For over forty years the writer has been chief, off and on. During that whole time he has never had a better engine room crew to sail with. He has sailed with union ones, and in the old days with some of the old timers who attended to their duty. Unfortunately the past few voyages, or since unionism had become rampant, discomfort, incivility, incompetence, drunkenness, carelessness and a general air of indifference as regards the job was almost always apparent. The trouble seemed to be that a certain class were drunken with an abnormal sense of their individuality. They seemed to have the idea of most ignorant men, that the only way to show their "independence" was to shirk work all they could; to use indecent and profane language; in season and out of season to prate about "overtime."

The change to peace and quietness of an "open shop" job was marked, and any good engineer who tries it once will be loath to go back to the days when the "delegoat" would come aboard and tell him what had to be and had not to be done. It is to be hoped those days are gone forever.



Reproduction of a steam chart taken during regular operation of a Shipping Board steamer under the open shop plan with an untrained American crew. The steam line speaks for itself.

MARINE BORERS AT CROCKETT

By GEORGE M. ROLPH

General Manager California and Hawaiian Sugar Refining Corporation

In the course of an interesting address on sugar refining delivered before the San Francisco section of the American Society of Mechanical Engineers, Mr. George M. Rolph, general manager of the California & Hawaiian Sugar Refining Corporation, digressed to make some remarks on pile foundations and the danger from teredo invasion, which will be of great interest to the readers of Pacific Marine Review. We are therefore printing these remarks herewith as a separate article.

THE convenience of having both rail and water together in an industry while always quite expensive, sometimes has unexpected hazards. The old factory and warehouse were constructed out over the water supported upon green piling. The first piles for the support of the old Starr Flour Mill were driven in 1881. It was thirty-six years later that we began the reconstruction of the old plant in January, 1917. Precedent is sometimes a good thing to follow and at times very dangerous. It was so with us. We made a very careful examination of the foundations of the old structures and found the piling in good condition—green sticks—well preserved and there appeared no good reason for not continuing to use green piling since the old ones were sound at the end of thirty-six years.

However, we had not progressed far in the reconstruction program when in breaking off piles that interfered with the new work we discovered a few sickly teredos. On this meager information the type of construction to be used was immediately changed adding approximately $2,000,000 to the cost of the improvements. While a small matter at the time, subsequent events have proven to us that it was the most far reaching decision that had to be made and averted a near catastrophe. It has been much easier to explain why the cost ran far above the preliminary estimates than it would be now to explain the failure of the foundations while during the past year structures have failed all about us. Yet some of our neighbors stated as late as the spring of 1919 that their structures were not attacked by marine borers. Today green piling is destroyed within a year.

Many engineers yet do not seem to grasp the real significance of this sudden attack by marine borers in the upper waters of the San Francisco Bay. This subject alone is a very large one so without taking too much of your time I'll briefly sketch the situation as it is today. Following a talk given before the American Society of Civil Engineers last June a committee of engineers got together and organized what is now known as the San Francisco Bay Marine Piling Committee affiliated with the American Wood Preservers' Association to make a survey of the situation. The committee published its first preliminary report in January of this year. A great interest was evidenced in the work making it possible for the committee to raise the sum of $30,000 to continue the work over the next three years, the money being subscribed by those who are more or less interested in waterfront construction.

In undertaking the work the cooperation of the scientists of the University of California was enlisted and particularly that of Dr. Charles A. Kofoid, head of the Department of Zoology, who is probably the greatest authority in this country on the subject of marine borers. All available data and investigation that have ever been made have been brought together by the committee and they find that there has been very little research work on the subject ever undertaken, but a great deal has been accomplished in hashing and rehashing such meager information as exists at this time.

The committee has established observation posts throughout the entire bay region receiving samples and installing testing pieces at each place. In the investigation made they found that the borers which caused the tremendous damage in the upper regions of San Francisco Bay are newcomers to our shore, never having been reported at any former time. They have been proven to be the same species, namely, the teredo navalis, which has been causing great damage in the dikes of Holland for the past centuries, and readily adapt themselves to living in both brackish and salt water. Heretofore it has been generally supposed that marine borers would not be active in water containing less than 1 per cent of salt, but we find them living and thriving and breeding at Crockett when the water is practically fresh so that the former theories have had to be discarded and we have been forced to the conclusion that comparatively little is known authoritatively on the subject. It does seem, however, that from this time on the upper bay water will be infested by these borers.

Some of the creosote piling driven in the bay region in recent years is now subjected to attack by borers. This indicates that the creosote oil was in some way defective. A close study showed that the manufacturers were removing the "dye basis" portion of the oil, i. e., naphthalene, anthracene, pyridine, acridine, quinoline and aniline, all of which constitute the heavier oils, leaving the lighter oils which more readily leach out, or in reality the creosote oil now on the market is a by-product and not a whole oil. The committee is now revising specifications so as to insure the user that he is getting the best grade possible, not however without vociferous objections on the part of some of the producers.

Great interest has attached to the work being accomplished by the committee throughout the country. The National Research Council is cooperating, looking into conditions in Eastern harbors, notably New York, as the conditions there are analogous to those in the vicinity of Crockett and with the foreign species active in American waters it would seem possible that all of our coastal waters may ultimately be infested causing the loss of many millions of dollars.

The borers do their destructive work very rapidly as test timbers 6 inches by 8 inches dimension were completely destroyed between August and the latter part of November, so that any piling that may chance to be exposed for even a brief period of three or four months during the fall season would surely be destroyed.

SHIPPING INDUSTRY OF NORWAY

THE neutral country that probably suffered the heaviest material losses in the war was Norway. During the years of submarine warfare 829 Norwegian ships, with a total tonnage of 1,239,000 tons, were destroyed, while the number of Norwegian sailors killed amounted to 1162. This was a higher percentage of tonnage losses per capita and a higher number of sailors killed in proportion to the population than any other country, neutral or belligerent, suffered.

One of the most important problems facing Norway after the war was the rebuilding of her merchant marine and the last report of the Norwegian Shipowners' Association, just published and covering the period August 1, 1920, to May 1, 1921, gives a vivid picture of how the work has been carried on to accomplish this end.

According to the report, the tonnage of the Norwegian merchant marine (including sailing vessels) varied as follows for the period 1913-1920:

1913	1,771,137 tons
1914	1,891,468 tons
1915	2,083,409 tons
1916	2,085,542 tons
1917	3,294,978 tons
1918	1,778,076 tons
1919	1,939,459 tons
1920	2,195,855 tons

As this table shows the losses of the war, to some extent, were counterbalanced by the acquisition of new tonnage in 1919 and 1920, but naturally at a heavy economic sacrifice. New contracts were placed in England after the war, and the report states that the tonnage of the ships covered by these contracts amounted to about one million tons d. w. by July 1, 1920. On account of the increased cost of production and the unfavorable exchange situation the contracts became unexpectedly expensive to the owners and the Shipowners' Association opened negotiations with the English yards in order to have a number of the contracts cancelled. In most cases the yards were unwilling to cancel, however, and in the fall of 1920 the Norwegian government floated a loan of $20,000,000 in the United States in order to help the shipowners to pay the installments due on the contracts. Expensive as this new tonnage will be to Norway it has the enormous advantage of being fully modern equipment.

Norway is in some respects the greatest ship owning nation in the world, having usually in modern times the largest amount of tonnage per capita. During the war she suffered more from submarine activities and mines than any other neutral nation. The article herewith is the last annual report of the Norwegian Shipowners' Association and shows the amount of Norway's war losses and the efforts which Norway has made to replace the lost tonnage.

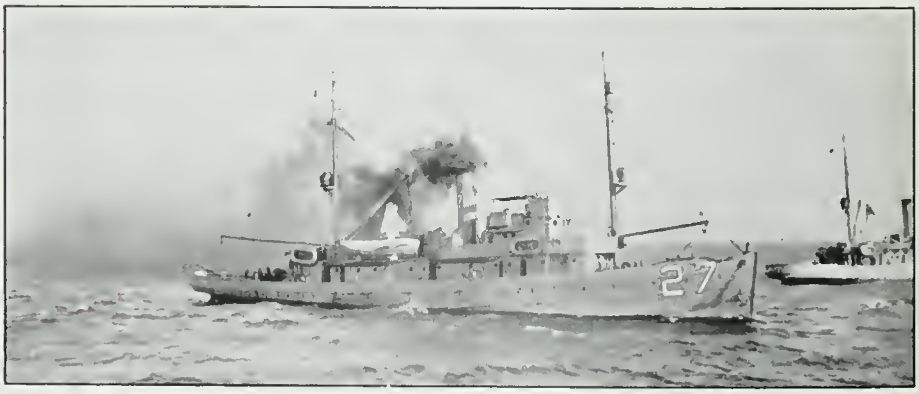
The Shipowners' Association has also carried on negotiations with Germany concerning compensation for ships sunk in the war and with the United States about compensation for new buildings requisitioned for war purposes. Much work has been spent on the liquidation of the government's interference with the merchant marine in regard to extraordinary taxes, maximum freights and similar measures and the association has succeeded in having some of the government measures restricting the shipping industry of the country abolished.

Owing to the enormous decline of the freight market, the Norwegian shipowners have been forced to lay up a large percentage of their tonnage. According to the report of the association, 344 Norwegian ships with a tonnage of 848,927 tons were lying idle by April 1, 1921, and it is believed that the amount laid up has grown by this time to about 1,000,000 tons d. w., i. e., about a fourth of the total merchant marine of Norway. According to reports from abroad this amount seems to correspond to the average number of ships laid up in other shipping countries.

This situation has brought about a large unemployment of sailors. The number of unemployed sailors was figured at between 3000 and 4000 men by February 1 of this year. Several shipowners have given large contributions for the help of the unemployed and various works have been started to meet the emergency.

The report gives some interesting information about the radio service aboard the Norwegian ships. It appears that 337 of the 446 ships over 1600 tons were equipped with wireless. Of ships below 1600 tons, 33 had a radio station and of new building 57 were planned with this equipment. The number of ships over 1600 tons having no radio service is rapidly decreasing. Negotiations have been carried on by Norway with the British foreign office in regard to the British radio law, aiming to obtain some modifications in the law's application to foreign vessels. These negotiations are still proceeding.

The decline of the freight market forced the shipowners to go to a reduction of wages which resulted in an extensive sailors' strike in the beginning of May. The shipowners claimed a reduction of wages of 33 per cent. The strike has just ended and by official arbitration a compromise was reached by which wages were reduced 12 per cent immediately and additionally 5 per cent for sailors and stokers, and 12 per cent for engineers, from December 1st of this year. This agreement refers to employes in the coast traffic only, while a somewhat similar agreement for employes in the foreign traffic is expected to be reached in the immediate future.



United States minesweeper Pelican. Had it not been for the activities during the war of this and similar boats, the maritime losses would undoubtedly have been much higher

NEW 6000-TON FLOATING DOCK

Sparrow's Point Plant, Bethlehem Shipbuilding Corporation

THE Bethlehem Shipbuilding Corporation, Ltd., completed in February of this year their second floating drydock at the Sparrow's Point Plant, Sparrow's Point, Maryland, the construction of which was a part of the original project for the operation of two docks at that point, within the Baltimore district. The first floating dock at Sparrow's Point was put in operation in March, 1919, and has a lifting capacity of 20,000 tons.

The new dock has a capacity of 6000 tons, is 418 feet in length by 100 feet in width and is suitable for taking a vessel of 20-foot draft. It is located alongside of the 20,000-ton dock, making use of the pier and bulkhead planned and constructed for this purpose when the concrete work for the larger dock was put in. The piers at either side of the two docks have pile foundations and extend out into the bay a distance of 1260 feet. Material in the new dock is handled by means of a locomotive crane.

In type of construction the new dock is similiar to the 20,000-ton dock, being of the pontoon type, with individual wooden pontoons and continuous side wings of steel. There are eleven pontoons, which are attached to the side wings in such a manner that the wings act as continuous girders extending the full length of the dock. Each pontoon is divided into two compartments by a watertight bulkhead passing through its center, lengthwise of the dock, and has a centrifugal pump located in each compartment for use in emptying the pontoons and raising the dock. The pumps are electrically driven, being direct-connected to motors vertically mounted in watertight casings on the docks of the side wings.

The 6000-ton floating drydock at Sparrow's Point plant of the Bethlehem Shipbuilding Corporation taken from the inshore end of the slip with the first vessel docked.

A double control house on shore, from which the motors are controlled, houses the electrical switching apparatus for both the 20,000-ton dock and the 6,000-ton dock. Electrical connections are such that by means of individual switches the pumps of any pontoon can be operated independently of those of the others, or by means of a master switch the pumps of all pontoons can be operated simultaneously. This feature provides means whereby the stresses in the vessel being docked may be equalized utilizing the individual control and bringing a decreased or increased upward pressure to bear on certain pontoons, as required.

For filling the pontoons and submerging the dock, a gate valve is located in each end of each pontoon so arranged that the water is allowed to enter through the pump ports but is by-passed into the dock to avoid passing through the pumps. Suitable screens are provided to prevent any material entering that would interfere with the operation of the pumps. Operation of the gate valves is by hand from handwheels located on the decks of the wings.

The wings are 30 feet high and 12 feet wide at the base. They are of watertight construction and communicate at the base with the compartments of the pontoons. The dock is moored to the pier and bulkhead by moorings of steel construction anchored in the concrete.

Three electrically driven gypsies are located on the deck of each side wing for the purpose of warping ships into the dock, a double bitt being installed at each gypsy for use as a fair lead. The electric motors for driving the gypsy heads are located in the wings below the decks and are direct-connected by shafting and gears to the gypsies.

William T. Donnelly, consulting engineer, of New York, prepared the plans for the dock and the construction work was done by the Sparrow's Point Plant of the Bethlehem Shipbuilding Corporation, Ltd. The first vessel docked was the Higho, on February 15. The operation of the dock has been very successful and its completion materially adds to the facilities of Sparrow's Point for the quick handling of marine repair jobs of any calibre.

View of the waterfront at Sparrow's Point plant showing the two floating drydocks

EUROPEAN MARINE NOTES

Exclusive Correspondence Pacific Marine Review

THERE is no trouble now to record in connection with maritime labor in Great Britian. It will be remembered that the ship owners a few months ago proposed wage reductions in all grades. These varied from a cut of £4/10/- per month for the ordinary seaman to proportionately larger sums upward. All grades of seafaring workers are organized in a trade union and they are federated by means of the Seafarers' Joint Council. The ship owners' demand for a cut was brought before the National Maritime Board upon which sit representatives of the maritime workers and the ship owners. Time was given for a discussion of the cut by the Seafarers' Joint Council and in the end every union agreed to a reduced cut to which the shipowners assented, every union, that is, except the Cooks' and Stewarts.' This union refused any compromise whatever and withdrew its labor from all ships which would not pay the old rates. That strike has now been called off. It was an utter and ignominious failure and the union has been wrecked by it. All grades therefore who can find work are now back and peace prevails in shipping so far as labor and capital are concerned.

The Coal Strike and Shipping

Only a day or two ago it was believed that the ballot which the British miners who are on strike were taking as to whether or not they would accept the coal owners' latest offer would result in an acceptance and an end to the strike. As a matter of fact the ballot has gone all the other way and even the miners' leaders are perplexed as to what to do next.

When hopes of peace ran high during the week preceding the ballot there was a strong demand in this country for ships to load coal in North America for our use. Prospective charters were, however, insistent that the vessels must be available for immediate or practically immediate loading. The supply of ships able to fulfill this stipulation was limited. Almost the only vessels which were in a position to accept such loading were those that were dispatched recently from Europe to North America by their owners in ballast. Even then it was feared that the ships would not be here before we resumed our own full coal production. Now, of course, there is no need for hurry and business of this sort is proceeding quietly and at good rates.

Sir Owen Philipps Speaks

The Royal Mail Company despite the depressed condition of the shipping trade has again declared a good dividend. Sir Owen Philipps at the shareholders' meeting had a good deal to say about the general shipping situation. Referring to the cost of working ships now as compared with before the war, he showed that in 1913 the average price paid for coal by his company was $4.60 per ton (that is, taking the present exchange at $4.00 to £1). The average price paid for the coal by the company last year was $24.00 per ton. This, of course, is only one item in the increased operating charges.

With regard to the outlook Sir Owen does not take a despondent view. Even the very large amount of tonnage now available, as compared with that which constituted the world's fleets in the immediate pre-war period, does not cause him any serious misgivings. It is a fact that the actual tonnage afloat today is probably 11,000,000 in excess of the tonnage in the water in 1914. Nor will there be disagreement with the statement that some millions of tons (the actual estimate is 8,000,000 tons) gross register is lying idle in the world's ports today. It might be imagined from these statistics that the outlook for the shipbuildings, as well as the shipping industries, was an exceedingly somber one. Certainly it is not bright.

It is necessary, however, to take into account the fact that if shipping is to be operated at a profit only the most modern and efficient vessels can be employed under competitive conditions. Merchant ships may not enter the obsolescent stage as rapidly as warships, but it is recognized that they age more rapidly from the economic standpoint than was formerly the case, and ships which are quite seaworthy have to be relegated to the scrap heap or sold because of the high operation cost in comparison with newer vessels. From the point of view of the excess of shipping over present or immediately prospective requirements it has to be noted, too, that the proportion of older vessels which has been retained in service, and are a legacy of the war, is considerably larger than would have been the case under normal conditions. It is quite obvious that a considerable percentage of these will have to be weeded out, and that when this process has been completed the amount of tonnage available will not be in excess of the needs of the shipping industry.

P. and O. Changes

Beginning with the Khyber, which has been lying in the Royal Albert Dock for some months past, the P. & O. Company are inaugurating a system which may meet some opposition on the part of their older officers. The engineers' quarters are being moved from their present very inconvenient position and brought up to the boat deck alongside the executives, so that the engineers do not have to make their way through long alley-ways in the third class passengers' quarters, but drop straight down without any difficulty. As soon as the new arrangement is thoroughly tried out, other P. & O. ships are to be altered in the same way.

Pilferage

Those shipping managements which are putting into practice the recommendations contained in the interim report on pilferage of a committee of the Chamber of Shipping are believed to be well pleased with the results. One of the main recommendations of the committee was that careful tallies of cargo should be taken on loading and discharging, under the supervision of the sips' officers. It was then pointed out that dock authorities are inclined to discourage tallies, urging that they involve delays to the ships. It appears according to the Times Trades Supplement, that the various dock authorities not only discourage the tallying of cargo on behalf of the ships, but that they are inclined to refuse to make any tallies themselves. This tends to nullify the work on behalf of the ships. Goods may be tallied on discharge and may then be put into warehouse. Before they are collected the ships may have left the port, and the representatives of the ships will have no official receipts for the safety of the goods. If the goods are then delivered short, the responsibility is attributed to the ships. Only when the principle of giving receipts for goods by the various parties has been generally accepted is mastery of the pilferage problem to be anticipated.

Grain in Bulk

Representations are understood

to have been made lately on the subject of the regulations issued by the government of New South Wales respecting shifting boards for steamers carrying grain in bulk. The matter arose in connection with a decision of the government to permit the shipment of grain in bulk. Naturally, there is no objection whatever on the part of shipping managers to fit with shifting boards steamers which are intended to carry grain in bulk. That is the universal practice. But it is held by shipping men to be unneccessary to require shifting boards for vessels carrying grain in bags. Such regulations are not enforced in other trades. It is argued that there is no more need for the use of shifting boards when grain is carried in bags than there is in the case of general cargo, and it is pointed out that, in the South American trade, the transport of a certain perecntage of grain in bags is considered to render unneccessary the requirements for shifting boards for the proportion of the cargo carried in bulk. The cost of fitting shifting boards in the case of a steamer of about 8,000 tons is put at about 2s.6d. (say 50 cents) per ton. In addition, there is the loss of freight due to the weight and space lost by the fitting of the shifting boards, and the loss of time to the steamer while the work is being carried out. These two additional items are estimated to cost a further 2s. 6d. per ton, so it is argued that the ports of New South Wales are placed at a disadvantage in the export trade, as compared with other Australian ports, of at least 5s. per ton, for which there is no return whatever in safety or other desirable result. Shipping managers point out that where shifting boards have to be fitted, they cannot afford to load wheat in the ports of New South Wales at similar rates to those accepted for the ports of other States. They urge, therefore, that regulations which are considered by shipping men to be quite unneccessary and hampering to trade should be withdrawn.

Ex-Enemy Ships

Large numbers of German ships have been handed over to this country in connection with the reparation agreement. The selling of these ships was put in the hands of Lord Inchcape who had special advantages for doing the work well. All these ships were advertised as being for sale to British nationals only. It came, therefore, as a great surprise to find that a number of the later vessels offered have been sold back to Germans. When called over the coals about this, Lord Inchcape said that this had been done and he would defend it. The statement reads as follows:

With the exception of the Herbert Horn, they were advertised for sale to British nationals only, but they were unavailable for some months, as they were doing work for the League of Nations repatriating refugees in the Baltic. They are running under the German flag, manned by German crews, and will be so engaged for some time to come. They have never been under the British flag. They have been sold to a German buyer without hull examination, or anything else, for an uncommonly good price—for far more than I could ever have hoped to get from British buyers. The purchaser only gets delivery when the League of Nations is done with them. Meantime they are entirely at his risk. Cash for the entire purchase-money will be paid on the 24th inst, and the payment has been guaranteed by one of the big five British banks. From my experience no British buyers would have looked at the ships on such terms, and with so many vessels still available to British nationals I consider I would have been extremely foolish to have rejected the offer. Needless to say, the arrangement was made with the full concurrence of the Reparation Commission, for whom I am selling the German ships.

We can't go on holding up vessels indefinitely, incurring serious laying-up expenditures, and it has now been decided that after June 30 the market will be thrown open to the world for those ships left unsold to British buyers. What with E. P. D., income-tax, corporation tax, etc., the liquid resources of British shipowners appear to be getting exhausted, to say nothing of shrinkage in trade, high costs of working, wages three times what they were before the war, ship-joiners out on strike for over seven months, necessitating vessels being sent to France, Germany, Belgium, and Holland for overhaul. During the last two years and a half I have sold altogether something like 600 craft for his Majesty's Government realizing about 60,000,000 sterling (say $240,000,000).

Passing a Tow Line

On the night of February 22, 1921, Captain Garland Rotch, of the American steamer Montana, picked up the British steamer Grelarlie with her propeller stripped, then towed her 1700 miles to Havre, France.

The high sea and darkness made the launching of a boat impossible.

Captain Rotch had had no experience in towing, and after various unsuccessful attempts to pass a line to the Grelarlie, including the use of the Lyle line-throwing gun, he took advantage of the fact that the vessels, lying in the trough of the sea with no way on them, drifted at different rates of speed.

Following briefly, is the interesting method which he twice used with perfect success:

The slower drifting vessel, the Grelarlie in this case, floated out from her weather bow a small line, 120 fathoms long, kept afloat by buoys spaced at intervals of about 100 feet. When signaled that the line was out full length, the faster drifting vessel (the Montana) took position well to windward, parallel with and about half a length ahead of the Grelarlie, then drifted down and picked up the buoyed line; a touch ahead on the engines would have put her ahead enough to drift clear had there been danger of collision.

Having secured the buoyed line the Montana steamed ahead to clear the Grelarlie, lines being passed meantime to get one strong enough to heave the heavy towing hawser, which was passed when the vessels were nearly in line.

The buoys carrying the floating line must not be so far apart that the line will sink between them and tend to draw them together, preventing it from floating out full length; at night the buoys should be white if possible so that they will show in the dark.

If the faster drifting vessel should be the disabled one, the other can take proper position to leeward and float out the line and when this is picked up by the disabled vessel, steam ahead to let her drift. (From U. S. Navy H. O. Pilot Chart for July, 1921.)

BOOK REVIEWS

The International Seamen's Code—174 pages bound in green paper with black stampings. Published by the International Labor Office, Geneva. Price 2 shillings sixpence.

This booklet is a note addressed to the governments of the states members of the International Labor Organization, and it embraces information as to the progress which has been made in the investigations entrusted to the International Labor Office with regard to the preparation of a draft for an international seamen's code, its purpose being to present to the various governments all the information collected up to the present time which might be useful to them in the codification of their national laws relating to seamen.

All the documents bearing on this question have been collected in this volume in chronological order. These include first, the questionnaire which was sent out to governments before the Genoa session of the International Labor Conference; second, the opinions expressed by various governments as to the possibility of drawing up an international seamen's code and as to the principles upon which such a code should be constructed; third, the report of the commission sent up by the Genoa Conference to study this question; fourth, the discussion which took place at the Genoa Conference and the text of the resolution and recommendation adopted; fifth, the record of the first session of the Joint Maritime Commission which discussed the procedure to be followed by the International Labor Office in preparing the draft for a code. To these records are added the report and draft of the code prepared by the Joint Maritime Commission, and a historical note on former maritime codes.

This book will of course be circulated in the proper channels to the various maritime governments of the world and will undoubtedly be of great influence in shaping legislation. It is, therefore, highly important that all shipowners, operators and shippers generally should obtain a copy of the book as promptly as possible and study for themselves at first hand its analysis of the situation and recommendations for future action. There will probably be many details in the proposed draft of code which will be objectionable to various shipowners, and now is the time to register the objection for soon may come the time when it will be a case of "forever after hold your peace."

A Text Book of Oceanography, by J. T. Jenkins, D. Sc., Ph. D.—200 pages with numerous diagrams and illustrations, bound in green buckram with black stampings. Published by E. P. Dutton & Company, New York. Price $6.

The preface calls attention to the fact that, in spite of the great interest that maritime questions have always had for English speaking nations, there is no modern text book in English on the subject of oceanography. This book was designed to fill this gap and to meet the requirements of a text book for higher forms of preparatory schools, for teachers in training, and for students specializing in geography at the universities. The book contains a very select bibliography of the more important publications in the English language on the subject. It is completely indexed and very condensed in style, compressing into a small compass a tremendous amount of information on the physical geography of all the oceans.

Chapter I is devoted to an introduction and to general physical features of the sea. Chapter II is on oceanic deposits and bottom fauna. Chapter III is on the temperature of the sea; Chapter IV on waves and tides; Chapter V on ocean currents. Under this simple plan of division the lover of the sea will find his favorite analyzed, bisected and displayed to his view in all of her varying moods.

The book should be upon the shelf of every man who is interested in sea information.

A Manual of Marine Engineering, by A. E. Seaton. 1000 pages bound in red buckram with gold stampings, with numerous illustrations, working drawings and tables. Published by D. Van Nostrand Company, New York.

This eighteenth edition of Seaton's well known standard manual of marine engineering has been thoroughly revised, greatly enlarged, and in large part rewritten to bring it up to date. The additional material is contained to a great extent in appendices on such subjects as the marine Diesel oil engine, turbines on shipboard, superheated steam and superheaters, and the rules of the various classification societies for materials and construction in marine power plant work. The chapters are all brought up to date as much as possible in showing the improvements made in the various fittings for reciprocating engines and turbines, in auxiliaries, in propeller design, in boiler design, and in materials used by marine engineers. The book forms a complete record of the progress of the art of marine engineering.

Elements of Map Projection, by Charles H. Deetz, Cartographer, and Oscar S. Adams, Geodetic Computer. Special Publication No. 68. U. S. Coast and Geodetic Survey, Government Printing Office, Washington, 163 pages, 74 figures, and 8 folded plates. Price 50 cents.

This volume is a comprehensive treatise on all the more useful projections, presenting them in as simple a form as possible in their general characteristics, mathematical development and actual construction.

The whole field of cartography, with its component parts of history and surveys, map projection, compilation, nomenclature and reproduction is so important to the advancement of scientific geography that the selection of suitable map projections is receiving far more attention than was formerly accorded to it. The exigencies of the problem at hand can generally be met by special study, and as a rule, that system of projection can be adopted which is ideal or most useful for the area under consideration.

An interesting feature of the book is given in the frontispiece where a study of a suitable map projection for the United States is presented both by graphical illustration and statistics, including errors of scale, area, and azimuth, in four different projections. It is shown that the projection usually employed for this purpose has a scaling error of as much as 7 per cent. By the use of Albers projection the maximum error of scale can be reduced to 1¼ per cent, and the projection has the additional asset of equivalence of area. The authors believe that the latter system will soon come into use on account of its desirable properties and the simplicity of construction. Full description, mathematical development of the formulas and tables for the United States on an Albers projection are included in this publication.

The Mercator projection, useful for nautical charts, is presented with detailed and all necessary description, including formulas and tables. The chapter should interest

SAN FRANCISCO PUBLIC LIBRARY

the mariner in a better understanding of the special properties of this projection concerning which there is much unnecessary abuse. This is followed by an approximate method for fixing positions at sea by wireless directional bearings.

On account of the extensive use of Mercator tables which have not been printed in sufficiently accurate form for 48 years, the book should meet a long-felt want. Nearly 15,000 nautical charts are prepared on this system of projection with a probable annual total of over 2,000,000. Under the subject "World Maps" the Mercator projection is again discussed for its usefulness in a continuous conformal mapping of the world, and its impossibilities when extended into the polar regions are explained by the statement that those localities are after all the best places to put the maximum distortion.

Generally our interests are centered between 65 degrees north latitude and 55 degrees south latitude, and it is in this belt that other projections present difficulties in spherical relations for world mapping that are not readily expressed in analytic terms. A better understanding of the border latitude scale of a Mercator map and the conformal property of the projection would obviate some of the criticism as to "misrepresentation of area."

All of the principal methods of projection largely used by cartographers are discussed and analyzed, but we are rather disappointed to see that no mention whatever is made of the system known as the Butterfly Projection, which has been attracting a large amount of attention on the Pacific Coast. The simplicity and the obvious usefulness of the latter method should recommend itself to all who are interested in obtaining a world map true to scale in a simple and very usable form.

The Marine Room of the Peabody Museum at Salem. By John Robinson, curator, 200 pages, and 65 pages of illustrations, bound in blue cloth with paper label, 7 by 10 inches. Edition of 1000 copies, of which 750 are for sale. Price $4, by mail $4.25. For sale by the museum, Salem, Massachusetts.

This is a handbook of the marine collections of the museum. Although the primary object of the publication was to describe the interesting and varied marine collections, there is a great deal of general information in which both the technician and casual reader will be interested. The subject matter deals with the development of the sailing vessel from the Revolution to the end of the clipper ship era. Among the many illustrations are paintings of ships, models, whaling, naval engagements, foreign ports, old nautical instruments, portraits, figureheads and scrimshaw. There is a bibliography and an index containing 1475 references, among which are the names of 522 vessels. The engravings are especially well executed and form the most valuable feature of the book.

Handbook of Standard Details for Engineers, Draftsmen and Students. By Charles H. Hughes. 312 pages with numerous illustrations, diagrams and tables. Bound in green buckram with red stampings. Published by D. Appleton & Company, New York. Price $6.

A very useful and handy volume by the author of the Handbook of Ship Calculations, Construction and Operation. The book is divided into eight sections, covering: I, Drawings; II, Fastenings; III, Power Transmission; IV, Pipe, Tubes and Fittings; V, Rope and Chain Fittings; VI, Miscellaneous Details; VII, Structural Details; VIII, Useful Tables.

This book should certainly find a very cordial welcome from mechanical and engineering draftsmen. It is very conveniently arranged, well indexed, and covers a sufficient variety of mechanical detail so that practically every problem coming to the designer of detail work would find either its exact equivalent or a comparable design with which to check the draftsman's work. The writer would have given a good deal for such a book when he himself was a draftsman.

ELECTRICAL SMELTING

THE Compania Electro Metallurgica Braziliera and the Batcheller-McConnel Company, New York, have recently acquired from Mr. Frank Hodson, president of the Electric Furnace Construction Company, 908 Chestnut street, Philadelphia, and his Swedish associates, the exclusive rights and licenses for the State of Brazil for the well-known Gronwall type "Electro-Metall" electric smelting furnace.

Two large furnaces, each of 3000-kilowatt capacity, are at present being installed by the Brazilian Company, and it is probable a number of others will follow the original installation.

These are the first really commercial electric smelters to be erected on the western hemisphere, and they undoubtedly mark a new development in the steel trade. In Europe this type of furnace has been in successful operation for some years, and of 27 furnaces installed in Sweden, Norway, Italy, Japan, etc., the total power capacity is no less than 99,700 kilowatts. Obviously it is time we investigated the possibilities here. Broadly speaking, the fundamentals which make such a plan feasible are: presence of fairly good ore and limestone near cheap electric power and the demand of steel and iron. Many parts of the Pacific Coast, some parts of the Adirondacks, and New Jersey have these fundamentals.

Mr. Frank Hodson, who is closely connected with the development of the "Electro-metall" smelting furnace, advises that a large western corporation will probably put in the first installation in the United States, and further states that several very large electric pig iron smelting installations will be proceeded with immediately when general business conditions improve.

ERRATA

On page 393 of the July issue of the Pacific Marine Review in the transcript of the abstract of the engineer's log of the Manulani the figures for draft were printed '28 feet 1 inch forward and 38 feet 2 inches aft." This should have read "28 feet 1 inch forward, 30 feet 2 inches aft."

In the same issue in the advertisement of the Bethlehem Shipbuilding Corporation the printer dropped a decimal point from the figures given for the average fuel oil consumption per I. H. P. of the tanker D. G. Scofield. This figure should have been "0.80."

We are glad to make this correction of these inadvertent errors.

PROPELLING MACHINERY OF THE U. S. S. TENNESSEE

The U. S. dreadnought Tennessee in the East River, New York

SINCE the U. S. S. Tennessee is the first battleship to be designed specifically for steam-electric propulsion (the New Mexico having been originally intended for turbine drive), her propelling equipment is of special interest. The general arrangement of her machinery is as follows:

Each turbine-generator unit with its exciters is located in a separate water-tight compartment, and its condensers, pumps, air ejectors and other auxiliaries in a compartment below. The four propeller motors occupy three water-tight compartments in the stern, the two inboard motors being in one, and an outboard motor in each of the other two. No other apparatus is in the motor compartments. The control room from which all of this machinery is controlled is also separate and water-tight, and is aft of the turbines and forward of the two inboard motors.

Turbine-Generators

Each turbine-generator unit consists of a single Westinghouse steam turbine directly connected to a 3-phase alternating-current generator, rated at 15,000 kv-a for continuous operation and delivering 3400-volt, 36-cycle current, at full speed.

The turbines are of the impulse-and-reaction type, and permit complete expansion of the steam in each casing. They are designed to take steam at 250 pounds gauge pressure at the throttle, 50 degrees superheat, and 28½ inches vacuum. The steam, on entering the turbine, is first expanded in a set of nozzles, and then passes through a 2-row impulse wheel and through a high-pressure reaction stage. It then divides, and the two parts pass through low pressure reaction blading on opposite ends of the rotor, and exhaust onto the condenser.

The speed of the turbine can be carried over a range of from 1500 to 2200 R. P. M. by means of a manually-operated governor. This governor is of the centrifugal type, but instead of being loaded by means of a spring, it is loaded by hydraulic pressure, the fluid being oil. The pressure of this oil is regulated by a valve in the control room, so that the turbine speed can be controlled at will from this point. The speed of the turbine depends upon the setting of this valve and will remain constant for a given setting regardless of the load.

The turbine has also an over-speed governor which will automatically shut it down in case of excessive speed. This governor can be manually operated at the turbine or by a wire pull from the control room.

Generators

The main generators, which are of Westinghouse make, are similar in design and construction to those used on land, except that special precautions have been taken to protect the windings from salt and moisture. The insulation is of the best known materials and is applied by thoroughly tried methods. Each coil was insulated by the vacuum-and-pressure method and then given several treatments of varnish and baked after each treatment. On completion, the entire winding was varnished and baked.

Ventilating air is blown through the stator coils by means of blowers mounted on the rotors, which provide sufficient air to keep the windings cool, under any condition. The air is drawn in at the bottom of the end bell, is forced axially through the machine, and is discharged radially through an opening in the top of the frame to ducts leading to the deck.

The rotor is of the totally closed type and is not ventilated internally. It is connected to the turbine by means of a flexible coupling which is enclosed in the bearing housing between the two machines.

The bearings of both the turbines and the generators are lubricated by oil under pressure from motor-driven rotary pumps. Should these pumps fail, similar pumps driven by steam turbines immediately start up automatically, so that no break will occur in the oil supply. Oil for the hydraulic governor is supplied from the same source.

(Continued on page 60, Industrial Section)

MARINE TERMINALS AND THE MOTOR DRAY

By H. McL. HARDING

Terminal Engineer of the City of New Haven, Connecticut

THE advent of the motor dray and tractors with trailers has resulted in modifications in marine terminal design.

These changes chiefly consist in there being greater widths of the waterfront spaces between the sheds and outside edge of the quay, between the sides of the sheds and the warehouses, and wider spaces between the ends of the adjoining sheds and the ends of the various warehouses, these increased areas being in addition to the present railway track spaces.

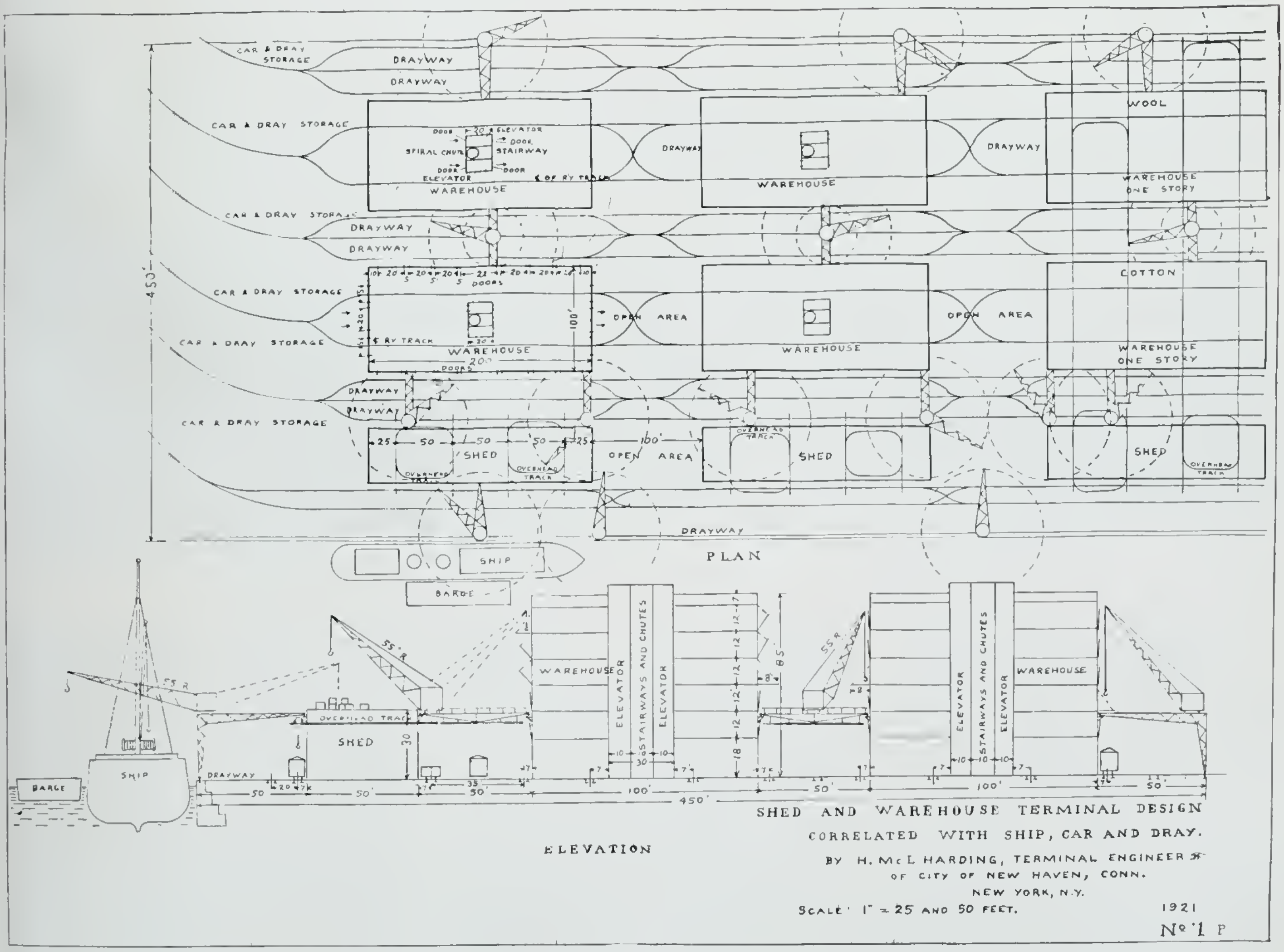
These changes, therefore, influence the location of sheds, warehouses and railway tracks and crossovers. There are also changes in the designs of the power machinery whereby there are more transferring and handling machines, but each of less lifting capacity. Instead of two-ton cranes, 1500 to 2000 pounds may be used, but more of them. The increase of space is to reduce the congestion which would otherwise occur, due to the increased area which would be required for these drays and trailers. The success of mechanical hoisting and conveying depends upon many small mechanical appliances instead of a few of large capacity.

At a marine terminal, there must be co-ordination between dray and vessel, especially as pertaining to outbound freight. For this outbound freight the ship may be considered an equivalent to the railway outbound freight platform but served by machinery.

As is well known, it is generally not necessary to assort the outbound freight according to marks and cross marks, and therefore the outbound cars and drays, where the nature of the material will permit, are unloaded directly into the ship. At certain ports more or less of the outbound freight is loaded directly between the barges and lighters and the ships, and not only into ocean ships, but also into coastwise and river vessels. From the large motor drays the outbound freight can be transferred directly into the ships as from the open platform cars. Inbound freight generally is placed in the shed for assorting and distribution. To do this, more space is necessary alongside ship, and more space should be reserved than usual for these drays.

Water Side Spaces

It is desirable as a general rule to limit the width between the quay edge and the shed to fifty feet, this dimension being usually controlled by the length of the jib of the traveling gantry crane. Where there have been within this width three parallel railway tracks, these may be reduced to two. This width of 50 feet may be divided for the two railway tracks and overhang of cars into 25 feet, and for the motor drays 25 feet.



SHED AND WAREHOUSE TERMINAL DESIGN
CORRELATED WITH SHIP, CAR AND DRAY.
BY H. McL HARDING, TERMINAL ENGINEER
OF CITY OF NEW HAVEN, CONN.
NEW YORK, N.Y.
SCALE: 1" = 25 AND 50 FEET.
1921
No. 1 P

There should be many access and egress drayways for the motor drays at the terminal with waiting areas and also drayways to the railway tracks in remote sections of the terminal. It should be possible for drays to encircle the sheds and warehouses. The dray approaches and drayways should be many and their locating as carefully studied as that of the railway tracks.

Drays should not enter the sheds but should be able to pass around the outside of the sheds. There should be waiting areas at both ends of sheds and warehouses. Between the sheds and warehouses, in the spaces served by the traveling gantry jib cranes or by the overhead bridge cranes supporting revolving jib cranes, there should be areas for dray loading and unloading. All parts of the quay except within the sheds should be accessible to the drays.

If the cargo be of coarse freight or freight similar to locomotive boilers, it can be stored in the open spaces between the ends of the sheds and warehouses.

One-story Warehouse

Where there is a large proportionate quantity of any one commodity, as wool, tea, rice, sugar, boxes of lemons, tierces of tobacco, boxes of tea, bales of cotton, barrels of liquids or boxes of dry goods, then such freight is stored in the special warehouses with all the space above one floor, and with no overhead floors. The height of the space may be fifty feet. This allows of high tiering by machinery, transferring and handling most economically and rapidly. At Manchester, England, freight is moved from these one-story warehouses to any part of the terminal for about 12 cents per ton. It may be that most of the future warehouses used exclusively as marine terminals may be in accordance with some such design or what may be called combined warehouses.

At such warehouses drays are loaded and unloaded entirely by machinery at the least expense. It generally is not necessary for the drays to enter the warehouses, as the loads are lifted by machinery from the dray outside the warehouses and transferred and tiered within the warehouse by the same machinery. Drays while not permitted within the sheds may, under restrictions, enter warehouses.

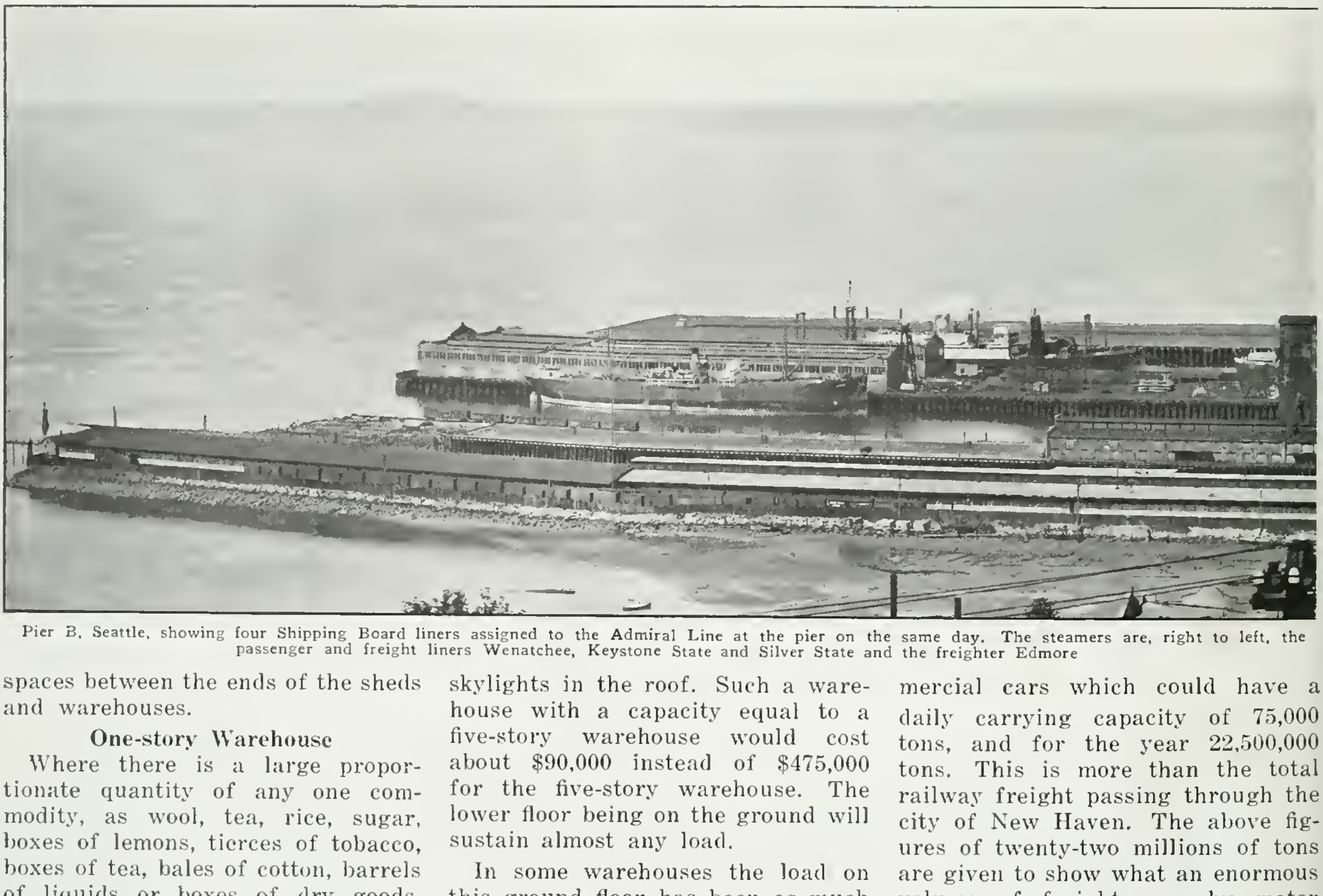
A warehouse thus designed is simple, rapidly constructed and of low initial cost. There are four nearly blank walls, few windows in the sides, the light being chiefly from skylights in the roof. Such a warehouse with a capacity equal to a five-story warehouse would cost about $90,000 instead of $475,000 for the five-story warehouse. The lower floor being on the ground will sustain almost any load.

In some warehouses the load on this ground floor has been as much as 30 tons per square foot. For certain classes of commodities, there are special racks or containers. It is plainly evident that a clear height of 40 feet storage greatly facilitates the operation of overhead mechanical appliances for which no floor space need be reserved. The delay to the dray at the terminal is far less than when the dray has to be lifted to floors or elevators and then often unloaded and the goods lifted and tiered by human labor.

Motor Dray Capacity

There are said to be at the present time no less than 1,100,000 commercial motor drays in use in the United States, having a combined carrying capacity of 990,000,000 tons annually. The number is daily being increased. Of dray fleet owners there are 31,000 of three or more commercial cars, 12,000 of three or more trucks and about 13,000 of 5 to 10 truck owners and truck fleets. In New York State there are over 125,000 commercial cars. Many passenger cars, of which there are 3,500,000 in the United States, often carry a number of light packages.

There are now being established motor dray terminals and sub or intermediate dray terminals. In Connecticut there are about 25,000 commercial cars which could have a daily carrying capacity of 75,000 tons, and for the year 22,500,000 tons. This is more than the total railway freight passing through the city of New Haven. The above figures of twenty-two millions of tons are given to show what an enormous volume of freight can, by motor drays, converge to the New Haven port terminals, and what extensive terminal facilities will be required along the curved waterfront of the harbor of New Haven Bay. The solution of the railway problem may



Pier B, Seattle, showing four Shipping Board liners assigned to the Admiral Line at the pier on the same day. The steamers are, right to left, the passenger and freight liners Wenatchee, Keystone State and Silver State and the freighter Edmore be the motor dray and trailers for freight transport for an average radius of fifty miles.

Conclusions

1.—More ground space is required at terminals due to the advent of the motor dray.

2.—Marine terminal mechanical appliances should be more in number but each of less hoisting capacity.

3.—By means of one-vertical-space warehouses there will be less delay and waiting for the drays at the terminals, and less human labor of lifting.

4.—When this vast army of motor drays, having a combined capacity approaching that of the railways, becomes consolidated into large corporations, and the time of transport between factory and dray is measured by one day for one course, and many new marine terminals are installed with this one day course in view, then the freight problem for all but the long hauls will be simplified and solved. The enormous motor dray tonnage, however, indicates future possibilities, rather than present probabilities.

ADMIRAL LINE EXPANSION

WHEN, early in July, four large United States Shipping Board vessels lay at one time at Pier B of the port of Seattle, the largest commercial wharf in the world, a graphic picture was presented of the rapid progress being made in the effort to win ascendancy for the American flag in the commerce of the North Pacific, via the Great Circle trade route to and from the Orient. The mammoth terminal, constructed by Seattle at a cost of more than $5,000,000, is justifying the faith of its builders by becoming the home berth of an increasing fleet of American ships engaged in trans-Pacific commerce.

Pier B of the great terminal is being used as the American terminus of the Admiral Line, which inaugurated the all-American passenger and freight service between Puget Sound and Oriental ports with the sailing of the Wenatchee April 9 followed by the Silver State July 9. The four ships which lay at Pier B were the passenger and freight liners Wenatchee, Keystone State and Silver State and the freighter Edmore, all Shipping Board vessels allocated to the Admiral Line for operation. They represent an investment by the people of the United States of $27,000,000; an investment which is being kept moving by the Admiral Line to bring in large dividends in the form of increased commerce with the Orient. The Keystone State will sail on July 30 and the Wenatchee will sail August 27, after an overhauling to correct minor defects developed in her first voyage.

It is expected that additional vessels will be allocated to the Admiral Line for this service, making the capacity for passengers and freight of the American Line far greater than that of any of its foreign competitors, which in the past have carried the great American commerce out of the Puget Sound gateway. The vessels which have so far sailed in the service have carried good cargoes, encouraging the belief of Admiral Line officials that American ships can gain control of the trans-Pacific passenger and freight business originating in the United States, which constitutes the bulk of the traffic.

Pier B, which can accommodate many more than the four large vessels shown in the picture, was recently completed at a cost of $2,500,000. It is 2500 feet long and 365 feet wide, larger in area than Pier A, the first constructed, which is 2540 feet long by 310 feet wide. The wharves are equipped with transit sheds and the most modern machinery, insuring rapid and economical handling of cargo and giving American ships a decided advantage in this respect over Canadian and British ships in British Columbia ports.

Pier B, Seattle, showing four Shipping Board liners assigned to the Admiral Line at the pier on the same day. The steamers are, right to left, the passenger and freight liners Wenatchee, Keystone State and Silver State and the freighter Edmore

With a splendid fleet, to be still further augmented, and the best terminal facilities in the world, the Admiral Line looks for rapid realization of its purpose to gain ascendancy for the American flag on the Great Circle trade route.

(Continued from page 467)

hours, using only three of the ship's hatches. It is costing the steamship company about thirty cents a ton to discharge these sugar cargoes at Crockett, and it is stated that this is much lower than present practice at any other dock.

The warehouses are designed to support a live load on the floor of one ton per square foot. The foundation is reinforced concrete piling on the outer portion adjacent to deep water, creosoted piles capped with concrete in the zone immediately back of the concrete piles, and on the inner side green piling capped with concrete. On the land side of this warehouse is direct railway connection with transcontinental lines. The conveyor system in the warehouse has a rated capacity for loading 35 cars a day, and in rush seasons as high as 50 cars have been shipped in a single day.

Refining

The sacks of raw sugar passing into the refinery on the fourth floor of the great melt house are opened as they come off the conveyors and their contents dumped through a grating into the raw sugar bin. Any lumps that may have been formed are run through a crusher. The empty raw sugar bags are turned and thrown onto a conveyor which carries them to the sack laundry. With a melt of 2000 tons a day run through, there remains in the empty bags approximately 10,000 pounds of raw sugar, which is entirely recovered from the laundry in the form of sweet water.

Quite a problem developed at Crockett in the drying of these sacks and a very ingenious chain conveyor was worked out for carying them through the upper portion of the boiler room of the power plant, thereby utilizing the waste heat of the boilers to dry the bags.

After drying, the bags are repaired, printed, fitted with a liner, and re-used for packing refined sugar.

Centrifugals

The raw sugar passes from openings in the bottom of the bin onto scraper conveyors and thence onto elevators to the top of the melt house where it is mixed with washed syrup in mills called minglers. This syrup softens the hard molasses coating around the sugar crystals and forms the sugar into a mushy mass called magma. The magma now passes to the centrifugal machine, and the syrup is spun off, carrying with it a small part of the impurities.

The centrifugals used at Crockett are of a modified and improved Watson-Laidlaw type, which is self-discharging and largely automatic in its whole action. These machines are motor-driven. They have a diameter of 48 inches and a vertical height of 24 inches. The bottom is open, the opening being 33½ inches in diameter. The lower 15½ inches of the basket tapers at an angle of 60 degrees, and the calculated capacity is 11.9 cubic feet with a magma wall thickness of 6 inches. The automatic regulation is arranged on a time schedule. Five seconds after the centrifugal is started the basket is running 250 revolutions per minute, and the charge of magma is admitted onto a distributing disk. The charge flows for 20 seconds, at the end of which time the basket is revolving at a speed of 650 revolutions per minute. While the calculated capacity is 11.9 cubic feet, the rapid acceleration during a charge is constantly throwing out the syrup through the basket, so that it has been found practicable to operate the centrifugal at an actual capacity of slightly more than 15 cubic feet. When the full charge is in, it requires about 45 seconds to spin off the syrup, during which time the basket comes to its full speed of 870 revolutions per minute.

The washing water is then applied for a period of 75 to 90 seconds, the quantity of the water being measured, amounting to approximately 34 pounds per charge. The water is applied through two nozzles so that a fine spray of cold water reaches every part of the sugar wall under a constant pressure of 40 pounds. After the water is shut off, spinning continues for 30 seconds to dry the sugar. The motor is then shut off and the brake applied, two minutes being required to bring the machine to a stop. Just before the centrifugal comes to a dead stop the sugar wall drops off through the bottom of the basket into the washed sugar bin, the entire load discharging in two seconds.

This automatic discharging and the other advantages of this new type enable it to handle 25 per cent more charges per 23-hour day than the old closed-bottom, belt-driven type. The charge of magma weighs approximately 1220 pounds, from which 710 pounds of washed sugar is recovered. Raw sugar entering the cut-in station has an average purity of 96½ per cent. Washed sugar leaving the centrifugals is approximately 99 per cent pure. The loss of weight through the washing process varies from 8 to 12 per cent. There are 22 centrifugals of this type operating at Crockett, each of which has a daily capacity of 100 tons of raw sugar. The old type had a capacity of 50 tons, and one man operates as many of the new type as of the old so that the labor cost is cut in half by the installation of these new machines, and at the same time much floor space is conserved.

Pre-melting

The sugar from the washed sugar bin passes to the pre-melters, where it is melted in hot water mixed with sweet water, a by-product of the filtering process to be described later. The melters are heated and the temperature regulated through open steam injectors, and it is of the utmost importance that the quantity of sugar and water should be so proportioned that the resulting mixture will be of a constant density and as nearly as possible of a constant temperature. The liquor then passes to the main melting tanks where a final adjustment of the density and temperature is made and the liquor screened to take out such impurities as burlap, etc. One gallon of this raw liquor at a density of 62 brix weighs 10.85 pounds and contains 6.73 pounds of solid.

Sweetland Filters

The liquor now passes to cast iron blow-up tanks 10 feet in diameter, 6 feet high, with a conical bottom where lime and kieselguhr are added and the mixture run into the Sweetland presses. The Sweetland press is a modern innovation in the sugar refinery, taking the place of the old bag filter system. All of the sugar liquors in refineries were formerly run through bags in the same way that the housewife clarifies her jelly. It was a slow, tedious and exceedingly disagreeable task.

The Sweetland filters are cylindrical metal casings, each having a capacity of 630 gallons. Each case contains a filtering area of 1044 square feet. This is arranged in 72 leaves, each with an area of 14½ square feet. These leaves are arranged in pairs with a hollow space between, each leaf having a filter cloth of light cotton twill stretched over a screen. As the liquor is admitted to the presses the kieselguhr forms a cake of filtercel on the cloth, and all of the insoluble impurities are removed as the liquor is forced through this filter medium. The presses will handle raw liquor equivalent to 100 tons of raw sugar per 24-hour

(Continued on page 62, Industrial Section)

MARINE INSURANCE

CHARLES F. HOWELL
Eastern Contributing Editor

Model Bill Amended

As a result of important conferences between advocates and critics of the so-called Model Bill for the District of Columbia, which is designed to better marine insurance conditions in this country, the skies have been cleared and the way smoothed for enthusiastic concerted action in furtherance of the passage of the measure. As it now stands it is a different bill, in several particulars, from the one originally introduced by Representative George W. Edmonds, and the alterations that have been made make it decidedly more acceptable to shipowners and marine insurance brokers in that several features objected to by the latter have been removed. The original bill was withdrawn in committee and a revamped one substituted. The altered measure has been favorably reported by the House committee on the District of Columbia and urged for passage, and the outlook for its success is extremely bright. A similar bill is being advocated in the Senate.

Four Fundamental Changes

Representative Focht submitted the report for the committee, and in it he stated that the following four fundamental changes in American marine insurance are anticipated from the application of the bill:

1. The substitution of a system of net profits taxation on marine insurance in place of the present system of taxation on gross premiums.
2. Establishment of the multiple insurance principles, so that American fire, marine and fire-marine companies may be permitted to transact all kinds of insurance except life insurance and fidelity and surety bonding.
3. Enlargement of reinsurance facilities.
4. Removal of existing limitations on the financial operations of companies which hamper their work in foreign fields.

The fight on the original measure was conducted by shipowners and marine insurance brokers on the ground that it would place an obstacle in the way of building up our desired merchant marine by adding a burden to the already heavy competitive overhead of the former, and worked a hardship to brokers in that it imposed upon them a tax of 2½ per cent on the gross premiums of all marine insurance shipped abroad and placed with unauthorized foreign companies; and also because it permitted the marine insurance companies to join combinations in rate-making that would bring them under construction as in violation of the anti-trust laws of several states. In more than one respect it was a drawn battle, as the critics secure what they wanted, and the underwriters feel that they themselves have sacrificed little that was essential. The principal changes were as regards Sections 20, 21 and 26. The first two were stricken out altogether to satisfy objections to alleged "monopoly" menaces. Section 20 read:

That any company organized or admitted to write marine insurance within the district may become a party to any association, syndicate, exchange, or bureau organized for concerted action with respect to any one or more for the following purposes: The supervision or performance of a maintenance, inspection, and loss survey service; the supervision or conduct of salvage operations; the formulation, adoption, or enforcement of policy forms and conditions; the application of correct and just principles; the formulation and enforcement of uniform, efficient, and economical practices; the recommendation, approval, or making of rates of premium; and the safeguarding and legitimate advancement of the business in the interest of the members.

May Join Syndicates

Section 21 was as follows:

That any company organized or admitted to write marine insurance or reinsurance within the district may become a party to any association, syndicate, exchange, or bureau whose membership consists of companies or associations authorized to write marine insurance or reinsurance under the laws of the United States or of any state, territory, district, or possession thereof, and which is organized for the following purposes: To transact a marine insurance and reinsurance business in the United States and/or in foreign countries and to reinsure or otherwise apportion among its membership the risks undertaken by such association or any of the component members.

Chapter IX treats of the prohibition of unauthorized insurance and the licensing of brokers in certain cities, and in this Section 22 (old Section 24) has the following added: "Provided that, for the purposes of this chapter, any office outside of the United States of an insurer organized under the laws of any foreign country, whether said insurer be licensed to do business in the United States or not, shall be deemed and held to be an insurer not authorized to transact the business of insurance in the district."

Sections Are Amended

The first part of Section 23 (old Section 25) was amended to read as follows:

That the superintendent, in consideration of the yearly payment of $100, shall issue to any person or corporation who is trustworthy and is competent to transact a marine insurance business in such manner as to safeguard the interests of the insured and who maintains in this district a regular office for the transaction of an insurance brokerage business, a license, revocable for cause by the superintendent, permitting the party named in such license to act within the district as an agent for the assured or broker to solicit or negotiate or place contracts of marine insurance with corporations, partnerships, associations, Lloyd's individual underwriters, and inter-insurers, which are not authorized to transact the business of insurance in this district, and shall renew the same annually, unless revoked for cause. Provided, that, with respect to insurers organized under the laws of any foreign country and duly licensed to transact the business of insurance in any state or territory of the United States and with respect to insurers organized under the laws of any state or territory of the United States, said license shall not issue unless the superintendent shall be satisfied that said insurers show within the United States the same standards of solvency as would be required if said insurers were licensed at the time of issue of said license to transact the business of marine insurance in the district."

Section 24 (old Section 26) was amended, after the word "district" in line 7, to read as follows, so that any licensed representative of an unauthorized insurer will come under these restrictions:

Shall maintain in good faith an office in the district, (2) keep in said

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

office a complete book of record of the marine insurance transacted by, through or with his or its assistants with unauthorized insurers, showing (a) a brief description for identification of the subject matter and kind of the insurance, (b) the voyage insured, or, if for time, the date of such insurance going into effect and the date of its termination, (c) the name of the beneficial insured, (d) the amount insured with unauthorized insurers, (e) the rate of premium, (f) the gross premium payable therefor. Such book of record shall also contain statements in the same details of all such insurances cancelled or on which premiums have been increased or reduced (including laying-up returns) and the amounts of additional or of return premiums thereon; (3) keep in said office such additional record of the insurance, including the names of the corporations, partnerships, associations, persons, Lloyd's underwriters, or inter-insurers, and the amount insured by each. The books of record and all supplementing records shall be open at all times to the inspection of and examination by the superintendent of insurance, or anyone appointed by him for said purpose. The data as herein outlined shall be furnished to the superintendent within one month following his request therefor and upon the form furnished by him.

Stowage of Grain

Not one man in a thousand understands the importance of fitting a ship for the carrying of grain in bulk, according to the recently expressed opinion of an experienced insurance surveyor. He says that once a grain cargo starts to shift it is beyond control, and that vessels should be loaded without a perceptible list of any kind. A ship should remain without a list for the first several days at sea, as in that time the cargo will settle down and any empty spaces left by bad trimming in the lower holds will draw from the feeders until the space is filled. Should a grain-laden vessel be exposed to a bunker list before the cargo has settled down it will be difficult to again get her in proper trim, as grain will move with a 12-degree list and will continue to increase until it is too late to do anything toward righting the ship. Bad trimming results from inferior labor and this latter economic condition is one of the greatest menaces to the welfare of our country today. It is necessary in order to get a grain ship trimmed and beam filled to keep a man in the holds continuously, as otherwise ignorant and indifferent laborers will merely build a wall of grain around the hatch combings, and, thus concealed from sight, slight their work and eventually dig their way out and report the compartment trimmed. On several occasions it has been found that sufficient empty space remained in the waists for the accommodation of all the grain in the feeders. The consequence of this is that as soon as a vessel experiences bad weather the grain in the feeders will find its way into the lee waists, causing the ship to list, and also causing the grain to move away from the longitudinal shifting board on one side, leaving the entire weight of the cargo pressing against the filling boards between the beams. These latter are rarely secured to stand any pressure, as they are merely pieces of boards fitted between the beams and driven into place with a hammer; they are only intended to keep the top of the cargo from shifting. As a matter of fact, this latter arrangement is a mistake; filling pieces should be provided when the ship is under course of construction, or at least provision made for their installation.

The "Vanishing" Ships

You could not get a marine underwriter to "fall" for the stuff that has been appearing in the daily press about the mysterious disappearance of large numbers of vessels of late, and the likelihood of their having been captured by pirates. Asked about it, he merely grins and pronounces the cryptic judgment, "bunk." In point of fact, the lists of vessel-disappearances that have been appearing in the newspapers include catastrophes that date back several years. Marine underwriters insist that, apart from the heavy total losses that resulted from the great storms of early February, the number of disappearances has been no more unusual this year than at any other time. It is the regular thing to learn of a foundering, about so often, but investigation generally proves conclusively that it resulted from defective stowage or unseaworthiness. The total disappearance of the Hewitt several weeks ago, to which so many references have been made, is accounted for by the underwriters in the eloquent fact that she carried a tremendous cargo of sulphur. She was the property of the Union Sulphur Company, and was lost while sailing along Atlantic Coast between Sabine and Boston. All the insurance money has been paid. In a word, shippers need have no apprehension about pirates or the soviets or whoever else is credited with stealing ships in these latter days. If they will just help in getting a proper loadline bill through Congress they will have started machinery that will reduce the number of "vanishing ships" automatically and effectively.

Anti-Pilferage Organization

Once again a concerted effort is being launched against the steady stream of losses from theft and pilferage. This time it is made up of marine underwriters and a set of powerful allies drafted from various commercial bodies, and the methods to be employed are considerably dif-

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING

F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

ferent from any tried in the past. A membership corporation has been formed under the laws of New Jersey, to be known as the Trade Protective Association, Inc., and its purpose is the improvement of conditions in transportation and the effecting of reforms calculated to minimize ocean freight thieving. The corporation will co-operate with the public authorities and with various transportation lines and, by centralizing the efforts of a number of insurance offices and trade bodies, it is believed that a powerful influence can be exerted in the correction of pilferage evils in connection with the transportation of merchandise to and from the port of New York. Among the trade organizations that have agreed to co-operate are the following: Merchants Association of New York; Importers and Exporters Association; Chamber of Commerce of the State of New York; Tanner's Council; Manufacturers' Export Association; and the National Association of Manufacturers. The funds for the support of the corporation are to be subscribed by underwriters of New York City, and the sum of $50,000 has been fixed as an initial levy for the purpose. This has already been assured by agreements entered into by leading underwriting offices of the city. Members of the corporation (other than the original incorporators) will be elected by vote of the board of directors, the latter body to consist of fifteen members or more as may seem advisable, the majority of which to consist of underwriters because of the fact that most of the theft and pilferage losses falls on them. Albert R. Lee has been appointed general manager and will have entire charge of the executive work of the organization. The various insurance offices subscribing to the corporation agree to report to the general manager all theft and pilferage losses in excess of a minimum sum to be agreed upon, and to pay a fee for the investigation and classification of such losses, reports being forthcoming to them in consideration of such fees. To secure a maximum of effectiveness the various subscribers agree to carry out the recommendations of the general manager and to co-operate among themselves in the correction of abuses by approximate differentials in rates or such other methods as may be decided upon. Special investigations will be made as requested, the requesting office to pay a fee for the work. It is expected that the current expenses of the corporation will be met by these fees for regular and special investigations and classifications. An effort will be made to place upon the carriers such legal and moral responsibility as is properly theirs.

Tonnage Values Reduced

Marine underwriters are gratified by the action of the new Shipping Board in marking off nearly $2,000,000,000 from the total value of that organization's vessels, as it carries an admission that these ships are not worth over 35 per cent of their construction cost. However, insurers much prefer, as a rule, increases in valuations, as they cannot afford to use present selling values as bases for issuing policies so long as repair costs remain as high as they are. To be sure, underwriters are not being called upon very often right now to insure newly sold Shipping Board vessels, but they have to bear in mind the effect of the board's reductions upon other shipowners who may feel they should have reduced valuations when they come to renew their insurances.

Premature Bills of Lading

The custom now in vogue of shippers giving shipowners indemnity against loss in return for a clean bill of lading is being seriously objected to by British marine underwriters. They insist that this is equivalent to a shipowner acknowledging the good condition of goods delivered to his vessel, for which he receives assurance of inviolability against damage that may arise should the merchandise prove unsound. The loss falls upon the underwriter, as the assumption is direct that the damage occurred in the course of the voyage, since, according to the bill of lading, it had not occurred prior to the delivery of the goods aboard the vessel. But in view of the fact that it is entirely possible that the damage may have occurred before the insurance attached, the underwriters can scarcely be blamed for objecting to any such arrangement between shipper and shipowner.

The Lay-up Return Clause

There is more or less misunderstanding with respect to the interpretation of the American Hull Underwriters' Association lay-up return clause, which involves the liability of the underwriter for return premium in event of a vessel being laid up for repairs—a claim under the policy. This clause does not specifically exclude lay-ups due to policy claims, and yet inferentially by the very nature of such a return they are excluded. Under an annual hull policy the premium is earned as soon as the insurance attaches, just as under a voyage policy, and the rate is based upon the knowledge that the vessel will be at sea a portion of the period and in port a portion, and that some time will probably be passed in repair yards in consequence of casualties. But lay-ups in port due to lack of freights or for like reasons can not be foreseen and are not taken into account in making the rates; they are, as a matter of fact, conditions foreign to the purpose of a vessel. If a vessel were to sustain serious damage on the first day of the attachment of the insurance she might, very possibly, be laid up for the balance of the policy term and, if the return clause applied, the underwriter would be out practically all of his premium and be further liable for heavy loss payments. It is being felt by underwriters that the most advisable thing to do is to insert a provision on their lay-up return clause to the effect that no return will be paid if the vessel is laid up under average.

Business Most Dull

If one could interview every underwriter of the Pacific Coast he probably would discover a large majority of the belief that marine business never was so dull in all their experience as it is today. Except for a slight quickening of exports to Japan there is little to record in the way of new business, and on the other hand, the Australian preferential tariff for imperial products has hurt trade with the commonwealth considerably.

Some feelers have been put out recently by brokers for Japanese manufactured silk insurance. Heretofore that has been placed largely in New York, where most of the large importers have their headquarters. One San Francisco underwriter inquired of his principals in the East regarding the silk and was advised that the company practically had withdrawn from the business. Stuffs such as fine kimonas can be stolen so easily, for their small bulk makes detection difficult, that the hazard is too great in these days of pilferage.

A Sermon on Exchange

As to Australian trade, we Americans well may ask ourselves what we expect. Can we hope to sell goods indefinitely without buying in return? No country can settle its trade balances in gold unless it produces, as does Alaska, gold as a commodity; goods and not gold buys other goods. One chief reason for the continued decline in Australian business is found in statistics for the first ten months of the fiscal year, cabled by Trade Commissioner Ferrin July 2. He reports that the value of imports for that period was £143,000,000, of which £29,000,000 was from America; whereas exports totaled £109,000,000, of which £7,000,000 was to America. That is, the unfavorable balance was £34,000,000; and almost two-thirds of that was incurred in trade with the United States. Mr. Ferrin does add, however, that the present tendency is toward a decrease in both imports and exports, which has been manifested, so far as tonnage is concerned, for some time, and which is a curious feature of Australian trade today.

It is quite true that the underwriter may plead "not guilty;" he does not buy and sell, and he has little occasion to concern himself with the volume and value of Australian exports, which are insured for the most part at the point of origin. But the underwriter and everyone else will find his business in better condition if he will endeavor to spread the gospel of the essential reciprocal nature of foreign trade. The preaching of that gospel is a task of the greatest magnitude, because many American business men who engaged extensively in foreign trade for the first time during the war, when the demand always was for exports, actually do not understand the simplest mechanics of exchange. They think they can sell without ever buying.

Cargo Insurance Better

An almost imperceptible improvement in trans-Pacific cargo insurance was to be observed in July. Some underwriters were inclined to attribute the change to Japan's better tone, but steamship men were not inclined to be optimistic. Having better opportunity to observe just what cargo was moving, they quickly discovered that increased offerings were not what could be described as general, but consisted largely of cotton, cedar logs, old newspapers, etc., and later in the month of gasoline.

Some of this cotton was placed in the Pacific market, although usually cotton goes to the two Eastern pools. Most of it moved by vessels of Struthers & Dixon from Los Angeles, which not only handles the Imperial Valley crop, but also is taking Gulf bales that in the old days would have gone to Seattle or San Francisco. It is worthy of note, too, that the large quantities loaded within the last few months by vessels of the Osaka Shosen Kaisha have moved through Los Angeles harbor.

The Prince of Monaco

Those who do not "believe in" mines as effective agencies in the sinking of vessels today—in short, those who fear that many a scuttled ship blames the Kaiser unjustly—doubtless have good reason for their belief. Sinkings by mines became too popular in the Mediterranean, with the result that the London market declined to insure any more Greek vessels, and rumors are abroad that other Mediterranean nations will find London deaf to their proffers. Nevertheless, it is worthy of note that a great authority, probably the greatest authority of the world, the Prince of Monaco, who came to the United States a few months ago to receive the Alexander Agassiz medal from the National Academy of Science for his work in oceanography, was quoted as saying that he believed that as many ships had been sunk by mines since the war as during its progress, but that he did not include submarine sinkings. Such a statement by a world-authority deserves attention.

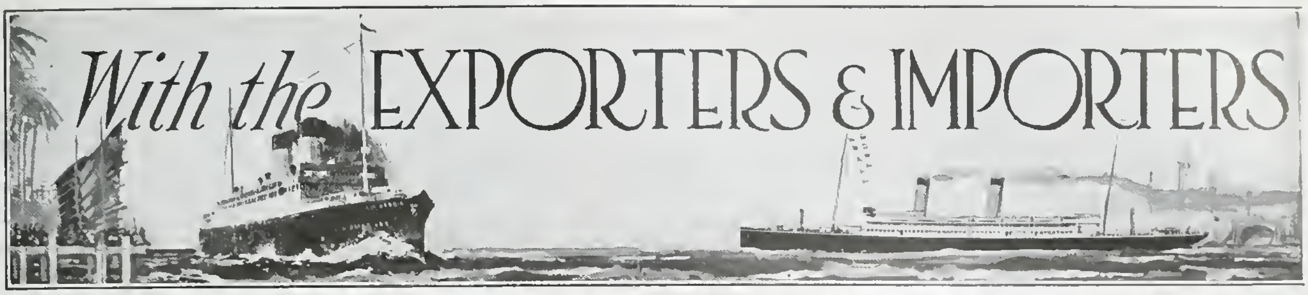
A $400,000 Fire

A loss estimated to be $400,000 was caused by a fire at the Harbor Island plant of the East Waterway Warehouse & Dock Company, Seattle, July 9. All property was fully covered by insurance. A 900-foot dock, part of a 600-foot transit shed, three freight cars and quantities of lumber and piling were destroyed. The Shipping Board freighter West Ison, operated by Struthers & Dixon, was lying at the wharf when the fire broke out, but she was cut loose and saved from any damage more serious than blistered paint.

After the failure of Rogers Brown & Company, which incorporated the dock company as a subsidiary, the properties passed into the hands of the First National Bank of San Francisco. Three hundred men of the U. S. S. Idaho assisted greatly in checking the fire.

$100,000 to West Jester

A settlement has been arrived at by the Toyo Kisen Kaisha and Captain M. S. Harloe, Shipping Board representative in Japan, and C. E. Harvey, vice-president of Frank Waterhouse & Company, operators of the Shipping Board freighter West Jester, whereby the T. K. K. pays yen 200,000, or approximately $100,000, to satisfy a salvage claim against the Kiyo Maru. About a year ago the Kiyo Maru, then on a voyage from Yokohama to Kobe, caught fire off Hommoku and her crew lost control when fire forced the engine-room men to the decks. The O. S. K. steamship Africa Maru rescued the passengers, who were trapped aboard the Kiyo owing to the life-boats having burned; and the West Jester, answering a call for help, went alongside the Kiyo and turned her fire-hose on the burning ship. All night long the West Jester fought the fire.



Import and Export Rates

The ten months' fight of the Pacific Coast for rectification of import and export railroad rates, which were thrown into confusion by the increases of last August, has been rewarded with a large measure of success. Announcement was made early in July by all railroads east of Chicago that they would make effective the Chicago rates on a long list of commodities. Steel alone has not been reduced, but in the case of this important commodity a Suez reduction has affected Panama, with a consequent reaction on overland business. As things stand today, the Pacific Coast has little opportunity to go into Pittsburgh, and the North Atlantic-Far East situation is too unstable to make prophecy attractive.

Clover Leaf the Lever

To the continued effort of the Western Pacific is to be attributed much of the success of the Pacific Coast in obtaining these reductions. In seeking to extend the Chicago rates to the east of that city, the Western Pacific found an outlet in the Clover Leaf Railroad. Despite the refusal of the New York Central to acquiesce and the fear of other lines to antagonize that group, the Clover Leaf, standing alone, made a rate of $3.65, as against $4.33½ quoted by the other railroads, on automobiles from Detroit. Although the Clover Leaf was interested primarily in motor cars, it nevertheless agreed to publish other rates as well. The reduction opened the way from Detroit to the Pacific Coast via the Missouri Pacific. In order to give the Northern lines an opening, the Chicago, Terre Haute and Southeastern closed the gap between the Clover Leaf and Chicago.

In the meantime an effort had been made to enter Pittsburgh over the Wheeling and Lake Erie and the Pittsburgh and West Virginia, the latter of which is the old Wabash Terminal. It was ready to make reductions, but the Wheeling and Lake Erie hung back, and Pittsburgh remained closed to Pacific Coast business.

But the Michigan Central found the Clover Leaf automobile rate something to reckon with, and finally, like one card falling against another, the railroads toppled, with the eventual result that rectification has been made.

Just what business the Pacific Coast may expect is problematical. There is general recognition that the opening of the Panama Canal has definitely diverted a large portion of Atlantic-Oriental business through the ports of the Eastern seaboard, especially New York. Much of the old traffic, therefore, cannot possibly be regained, barring an actual closing of the Panama Canal by slides, as happened in 1915 and 1916. But a considerable amount of tonnage legitimately belongs to ports of the Pacific, despite the severe competition of the direct all-water steamship lines, and this business, which the Pacific Coast was compelled to forego because of the attitude of the Eastern railroads, now may begin to flow back in its old channel.

Why They Hung Back

The Eastern railroads had refused to reduce the import and export rates because of more than one reason. The short haul to the Eastern seaboard at local rates was attractive. Besides that, the Eastern lines chose to make reductions conditional upon changes in division of revenue, whereas the transcontinental roads held that the two questions necessarily were separate and should be decided each upon its merits. In this case both foreign and domestic traffic were involved, and the competition of intercoastal steamship lines, which not only took business from the transcontinental companies but also supplied the large consuming markets of the East directly, taking Pacific products directly into New York, Philadelphia, Boston and Baltimore without giving Eastern railroads an opportunity to benefit from the business, aided materially in forcing all railroads to make common cause. Although the New York Central lines, for example, might handle California fruits from New York to Cleveland, they were losing the large volume of business destined immediately for New York; such roads as the Clover Leaf, on the other hand, instead of handling carload lots from St. Louis to the Lakes, were receiving no more than switching business in Cleveland itself.

That I. C. C. Puzzle

Reference was made to the case of steel. This requires a more detailed explanation. Due apparently to a Suez reduction, the New York-Far East lines have cut their rate to $13 a long ton, a reduction of $3. This is equivalent to $11.60 a short ton. The Pittsburgh-New York rate is $7.60, the total, Pittsburgh-Yokohama, being $19.20. For several weeks the Pacific Coast-Orient water rate has been $5.88, which is about the minimum that could be expected, and an additional reduction of $3, in order to meet the Atlantic cut, would be quite out of the question, even though a rate of $5 on knocked-down steel cars was recently published. In order for the old rate of $5.88 to be maintained, therefore, the railroads would be compelled to quote $13.32 transcontinental, or 66.6 cents a hundred, as against 71 cents Chicago and 80 cents Pittsburgh.

But some ruling or other of the Interstate Commerce Commission, the details of which appear obscure, holds that a differential of 9 cents shall be maintained, so that a reduction of the Pittsburgh rate to 66.6 cents would force Chicago down to 57.6, a cut of 13.4. In view of the effect that such a cut would have on the existing rate structure, it is probable that the Pacific Coast will be compelled to forego Pittsburgh business, but that the Western lines will be able to enter Chicago on equal terms with the Atlantic, provided that a rate of 66.6 cents be made.

It's a Weary World

Yet the general ocean freight situation is so uncertain that this discussion is scarcely more than guesswork. Panama hinges upon Suez, as several steamship lines have discovered to their chagrin, and transcontinental-Pacific business hinges upon Panama; the Pacific Westbound Conference, moreover, is sadly disrupted, and the North Atlantic-Far East is approximately as sedate as a herd of wild horses. In view of these facts, snow is expected over the Middle West in January.

By and large, the steel rate tangle is favorable to United States Steel. That corporation has mills in the Chicago, Pittsburgh and Birmingham districts; the independents, however, generally cluster about Pittsburgh, and they therefore have only the one route, Pittsburgh-Atlantic-Far East, as opposed to the corporation's Birmingham-Gulf-Far East or Chicago-Pacific-Far East or Pittsburgh-Atlantic. So long as a differential exists in favor of Chicago and Birmingham, the corporation will be in a position to command business that naturally wishes to move via a Gulf or Pacific port.

Faster and More Regular

There is some traffic that does prefer to go by one of those routes, especially by the latter. The frequency of sailings by fast steamships from the Pacific Coast and the dependability of schedules, which are maintained to the hour and minute, contribute to give the West a decided advantage in some respects. The Atlantic-Orient vessels are freighters pure and simple; on the Pacific, however, one finds, in addition to the usual cargo-carrier, such fast combination vessels as those of the Shipping Board, T. K. K., O. S. K., N. Y. K., and Canadian Pacific. And with few exceptions they sail at the precise hour of schedule, whereas there have been some marked failures in that respect on the Atlantic, one recent steamer having sailed twenty-one days behind time.

One important result of the import and export reductions will be the loss by Canadian railroads of the advantage they have had over American lines, for the Canadian companies applied their rates through to the Atlantic seaboard, while the American stopped at Chicago.

The Rate Changes

The following are the rate changes announced early in July, to be effective as soon as Tariff 29-H could be amended:

(Rate in cents a hundred pounds)

Item	Commodity	New Rate	Old
40	Agricultural implements	115	133½
47	Bottles	125	......
55	Canned goods	120	133½
60	Chocolate	165	200
65	Dry goods	145	160
70	Glass	110	146½
75	Glass	100	133½
85	Road machinery	115	133½
87	Ink	150	......
150	Lime	80	86½
155	Machinery	115	133½
160	Sewing machines	115	146½
172	Motorcycles	325	......
180	Oil well supplies	115	133½
185	Paint	80	93½
190	Paper	100	120
198	Pianos	340	......
200	Plumbers' goods	140	166½
205	Railway equipm't (axles, etc.)	87½	100
210	Cars and parts	87½	100
220	Locomotives and parts	87½	100
225	Roofing	100	120
235	Rope	85	93½
240	Soap	115	133½
255	Starch	110	120
260	Heating apparatus	140	166½
265	Tires	250	333½
270	Tobacco, mfd.	155	180
275	Tobacco, unmfd.	150	186½
280	Automobiles	365	433½
285	Automobiles	315	366½
290	Wagons, etc.	160	186½
292	Trailers, etc.	200	......
315	All commodity	200	233½

Other changes, too long to be given in detail, apply to poles, boilers for export, foil, culvert sheets, iron flooring, condensed milk, wood pulp and pulp-board, all exports; and hemp and other fibers for import. Those interested may obtain information of any railroad office.

Rail Rates Down

Announcement has been made of a reduction in the railroad rate on canned salmon for export, Seattle to Atlantic and Gulf ports, carload lots, from $1.16 to 87½ cents. Prior to the reduction the 87½-cent rate was effective to Chicago, but local rates from that city to the seaboard made the average cost $1.16. As a result much salmon was diverted to water shipment.

Through rates on Northwestern lumber to the Atlantic have been established by the railroads. Boston and New England generally receive a rate of 95 cents a hundred as against $1.06½; New York territory, 90 cents as against $1.06½. These reductions were forced by water competition. A through rate of 86 cents has been made to Central Association territory, applying in all cases when the present combination rate is not lower than the new. Savings will be effected approximately as follows: to New England, $2.87 a thousand feet; to New York, $4.12 a thousand; to Buffalo and Pittsburgh, $2 a thousand.

Robert B. Allen of Seattle, secretary and manager of the West Coast Lumbermen's Association, said: "It is a step in the right direction. We do not regard the reductions as sufficient, however, to restore the parity that formerly existed in rates from the Pacific Coast and from the southern pine districts to the common markets of the East. Nor do we believe the reductions sufficient to give back to the railroads much of the lumber business that is now going to the Atlantic Coast by water. It is progress, nevertheless, and our association has heard the news with deep interest."

Import Rates Reduced

Reduced rates on import shipments of fibers, oils, butter and poultry from Pacific Coast ports to points east of Chicago and north of the Ohio River have been announced by transcontinental railroads, effective August 3. In the following schedule the first item is the commodity, and the figures show the minimum carload weight, the old rate and the new:

Fibers, 40,000; $1; 85 cents. Oils, in packages, 40,000, or in tank cars, capacity of cars; $1.20; $1.05. Butter and dressed poultry, 24,000; $3.33½; $2.30.

Reduced rail rates announced last month on beans, canned goods, dried fruit, etc., California to Eastern territory, will become effective August 22.

Freight Report

San Francisco, July 13, 1921.

Since our last circular of June 14, there has been great activity in chartering for grain from the North and barley from San Francisco.

Northern Grain & Warehouse Company chartered about 6000 tons of space on the motorship George Washington from Portland to U. K.-continent at 57/6, with the option of loading barley at San Francisco at the same rate. Balfour, Guthrie & Company chartered a Japanese steamer, unnamed, at 55/—. Kerr, Gifford & Company chartered steamer Meiwu Maru also at 55/—. The Northern Grain & Warehouse Company chartered Japanese steamer Baltimore Maru, and one unnamed, as yet, at 55/—. Balfour, Guthrie & Company chartered British steamer Bengloe at 55/— for one port, and 56/3 for two ports, U. K.-Continent, and another Japanese steamer at 57/6. Pacific Grain Company chartered United States Shipping Board steamer at a reported rate of 60/—, although the Shipping Board official here gives the rate as having been 65/—. From San Francisco, Strauss & Company chartered French sailer L'Hermite to U. K.-Continent H. A. or D. at 55/—, and after the 15th of June several liners were arranging space at 60/—, and in two cases for special ports as high as 62/6 was paid. E. L. Eyre & Company chartered space for 6000 tons on the motorship Theodore Roosevelt at 60/—, followed a few days later by a chartering of Japanese steamer Tokufuku Maru at 57/6 for one port and 60/— for two ports by Strauss & Company, and yesterday this same firm chartered a British steamer, not yet named, at a reported rate of 65/— for two ports U. K.-Continent.

The English barley market has become stronger, having moved up from 47/— a quarter to 50/—, which allowed the regular liners to quickly fill up space for U. K. ports at 62/6; and 65/— is now the working rate for parcels.

Our belief is that there will be active chartering from this time on, especially from here, and also from Portland as soon as the new crop wheat is rushed in.

The banks evidently are not going to advance money to farmers to hold their grain for speculative purposes, which means that the farmers will have to sell as soon as it is ready for the market.

We fully expect 65/— to be the regular rate, and it might be even higher if the United States Shipping Board should eventually make up its mind to change its charter rates, which are 65/— to one port U. K.-Continent and 67/6 for two ports.

We regret that lumber freights are still ruling so low that we have barely a few charters to report, with the exception of a demand for sailing vessels for lumber from the North to San Pedro caused by the tie-up of our steam schooners on account of the prevailing strike of engineers.

Japanese steamers Aden Maru and Denmark Maru were chartered by the American Trading Company for lumber to China or Japan at $12 a thousand feet. The rates are now supposed to be about $11.50, as the rates for wheat from Portland to Japan have been lowered to $6 instead of $7 as before. For West Coast, South America, schooner Resolute was chartered at $18 to Callao by Mohns Commercial Company and Mr. Comyn's schooner Rosamond, which had been laid up for a while at Sausalito, succeeded in getting $20 a thousand also to Callao to fill a special order by Mr. Seaborn of Seattle. American steamer Honolulu has been chartered to load lumber from Grays Harbor and Puget Sound to New York at $17.50 a thousand feet. The business could no doubt be repeated.

We have heard of no sales or time charters since our last report, although we hear from Europe that steamers and sailors are being sold at very low prices.

PAGE BROTHERS,
BROKERS.

In Oriental Yards

Japanese Building

"While Japan was able last year to maintain third place in the list of the world's tonnage producers, and although there is still a large volume of work in hand, it is reported by leading exponents of the industry that competition from other countries in the future may result in the Japanese shipbuilding output being placed in the fifth or sixth position," says the bulletin of the Atlantic Coast Shipbuilders' Association in reviewing conditions abroad. "This is largely due to her unfavorable situation with respect to material, and is also aggravated by the lowering of the differential in wages, which have risen to three or four times the pre-war rates, while general labor efficiency has been largely reduced as a result of the reduction in working hours. With these conditions to face, competition with foreign rivals will be extremely difficult. There is also a tendency among Japanese shipowners to place orders abroad, and it is a significant fact that several well-known companies have ordered ships from foreign yards during the past year. In order to meet foreign competition it will be necessary to have the cost of materials reduced to the utmost, while on the other hand, the efficiency of workers must be increased or wages will have to be reduced. At the present time there are under Japanese registry a total of 2933 vessels, representing 3,012,447 gross tons. These figures include ships of twenty or more tons. Seven hundred and fifty of these vessels are over 1000 tons, aggregating 2,553,542 tons, while 114 ships of between 5000 and 8000 tons aggregate 648,902 tons." (More recent figures compiled by the Japanese Department of Communications give the totals as 792 vessels each exceeding 1000 gross of 2,699,464 tons.)

"The eight-hour day has been abandoned for one of nine or ten hours by five of the largest shipbuilding companies in the Bay of Tokio, who had previously been compelled to concede to their men the privilege of an eight-hour day. It is further reported that the Yokohama Dockyard, which recently dismissed 2000 men, will probably discharge an additional 1000 men."

At the middle of June, 52 vessels of 283,780 tons were under construction or were to be laid down, but 85 per cent of the tonnage was for builder's account. The slump in shipbuilding has led yards to undertake more general work, the Osaka Iron Works and Yokohama Dock Company, for example, having gone into the manufacture of electrical machinery, bridge materials, etc., and Kawasaki having arranged to build airplanes.

According to a report prepared by the Far Eastern Division of the Department of Commerce, the increasing cost of labor in Japan will modify her ability to compete with other nations. Approximately 60 per cent of the workers in Japan have been women up to recent times, and their lack of organization and assertiveness has tended to minimize labor disturbances. The recent increase, however, in the variety and growth of industries, such as iron and steel manufacture, in which female labor cannot be profitably utilized, will have a strong tendency to modify this advantage. A new and significant factor is the formation of labor unions and the growth in influence of such organizations.

Current Work

Five vessels exceeding 1000 tons gross were launched during May, as follows: Mitsubishi, one for the O. S. K.; Asano, one for the T. K. K.; Nitta, one for builder's account; Osaka Iron Works, one for Harata; Kawasaki, one for builder's account. The five aggregated 25,580 tons gross. Up to the end of May 25 vessels of 1000 gross tons or more, aggregating 135,150 tons gross, had been launched since January 1, as compared with 93 vessels of 433,265 for the first five months of 1920. At the first of June the Asano yard was leading with 48,200 gross tons of shipping under construction; Mitsubishi, Nagasaki was second with 45,220, and Kawasaki third with 32,000.

Duties on shipbuilding materials

have been abolished from June 1. As summarized by the authorities, the regulations drafted under the law exempt the following: Iron and steel materials; new inventions; special articles for fitting up vessels which it is difficult to manufacture in Japan and parts of such articles; engines and parts of engines; all to be used for the construction or repairing of iron and steel vessels.

Yokohama Dock Dividend

The Yokohama Dock Company's dividend for the last six months is at the rate of 15 per cent a year. Net profits were yen 1,033,192, to which is to be added yen 293,528 carried forward from the preceding term. Disposition was made as follows: legal reserve, yen 55,000; special reserve, yen 100,000; workmen's relief fund, yen 25,000; bonuses, yen 100,000; dividends, yen 750,000; leaving yen 296,721 to be carried forward. The capitalization is yen 10,000,000, divided into 100,000 shares, of which 68,250 are owned by the Nippon Yusen Kaisha.

Uchida Yard Sold

After considerable rumor had been set winging regarding the Uchida yard of Yokohama, the destiny of the plant has been settled definitely by the announcement that the Osaka Iron Works had taken over the equipment and a contract with the Japanese Navy for the construction of a special-service vessel, the last work on hand in the yard. The Uchida plant, which was described under the title of "Japan's Oldest Engine Works" in the October, 1919, issue of Pacific Marine Review, was founded in the '70's and was known for years as the Yokohama Engine & Iron Works. Nobuya Uchida, president of the Uchida Kisen Kaisha, bought the plant in April, 1917, capitalizing it at yen 3,000,000, paid up, and lending it yen 1,500,000. During the war the yard prospered, building several vessels, among which were the Eastern Glade and Eastern Glen for the Shipping Board; but up to the present business term it is reported to have incurred a large debt. More than 1200 workmen were discharged June 20, the last day of the Uchida yard. It will be known hereafter as the Yokohama Iron Works.

Reports from Japan say that a strike of employes of the Osaka Iron Works has been settled by the company recognizing the union. This may be regarded as quite important, because employers of Japan have been extremely loath to recognize any unions except those sponsored by themselves. The Fujinagata yard strike still continued in late June.

Russian Ships and Docks

According to a statement appearing in a recent number of the Soviet journal, Pravda, a translation of which was forwarded by Trade Commissioner H. Lawrence Groves of Riga, Latvia, May 26, the number of commercial steamships of all kinds in possession of the Soviet Russian government on March 1, 1921, was as follows: in Baltic Sea ports, 78; in the Caspian Sea, 238; in the White Sea, 329; in the Black Sea, 222; on the Caucasian coast, 58; in Crimean ports, 69; in the Sea of Azov, 62; total, 1056. The article further states that the Soviet government possesses 946 sailing vessels, of which five are in the Baltic.

Of 732 steam vessels in use at present, only 566 are in fit condition. Owing to lack of materials and facilities, as well as fuel, Soviet docks are unable to handle the situation, and the government is therefore greatly interested in contracting for repair work in different ports, especially those of the Baltic Sea—Reval, Riga, Libau, Copenhagen and Kiel.

From an official Soviet source it is learned that as late as May 14 steamships lying in the ports of the Black Sea were in an especially poor condition, almost all their engines being completely destroyed.

In a report of May 5 to the Soviet Institution for Economic Research (a translation of which was forwarded May 9 by W. S. Howell, secretary to the American Legation at Prague, Czechoslovakia), Professor Rafalovich states that the Soviet government has a total of 98 ships for coast traffic, and that the industry shows a general decrease in skilled workmen, lack of laborers, and lessened efficiency.

In anticipation of trade following the commercial agreement with Great Britain, the Soviet government has been making efforts to put a few ports into condition for entrance of foreign shipping.

On May 1, Golos Rossii (Berlin) reported the situation not up to expectation. The port of Petrograd was in very bad condition, with mechanical equipment not working, the technical personnel lacking and auxiliary vessels disappeared. Mine sweeping, according to Krasnaya Gazeta, was not expected to begin until May 15. By May 31, according to Latest News (Paris), only one steamer had sailed from the port.

In the Black Sea port of Odessa, the elevated "estokada" for car-to-ship loading was taken down by the Bolsheviki and used for fuel. Early in the year the Soviet government declared Nikolaev and Novorossiisk to be first and second ports, respectively, for entrance of foreign vessels.

With Far East Operators

N. Y. K. Report

"The net profits of the company for the last business term amounted to yen 5,540,000, showing a decrease of yen 3,840,000 compared with the previous term and of no less than yen 11,450,000 in comparison with the net profits of the corresponding period of last year," said Yonejiroh Ito, president of the Nippon Yusen Kaisha, in addressing the stockholders at the annual meeting in Tokyo May 30. "About 1914 it was generally recognized that there was a suitable balance between tonnage and cargo. At that time the world's freight space amounted to 45,000,000 tons, while the amount of sea-borne cargo, according to our investigations, was about 330,000,000 tons. The world's shipbuilding capacity was 3,000,000 tons a year. The prices of ships were yen 100 per ton. Wages were 35 shillings in England, and bunker coal at Port Said was available at 26s. 6d. The freight rate on coal from Moji to Yokohama, a standard for coasting freight rates in Japan, stood at 60 sen per ton, while the Port Said-Cardiff coal freight, the barometer of the freight market in the West, was quoted at only 7s.

33 Per Cent Cargo Reduction

"Owing to the effects and dangers of war, the world's tonnage available decreased to 25,000,000 tons. . . . While the world's total tonnage has since increased to about 60,000,000 tons, there has been a marked decline in movements of cargo. . . . Last year's movements of cargo in the world amounted to 220,000,000 tons. This shows an increase of 100 per cent in value over the figure for the normal year, but it shows a decrease of 33 per cent in quantity.

"In Japan there were 3,100,000 tons of vessels at the end of last year, showing an increase of 1,400,000 tons, or 83 per cent, compared with the figure before the war. Last year's foreign trade of Japan amounted to 13,400,000 tons, which shows an increase over the pre-war figure of only 2,000,000 tons, or 18 per cent. The excess of tonnage works out at 37 per cent, and this fact should be carefully noted by all shipping men.

Half Shipping Needed

"While the world's tonnage shows an increase of 33 per cent over the pre-war figure, movements of cargo show a decrease of the same percentage, and the ratio of the excess of freight space works out at 50 per cent. The present total tonnage of the world being 60,000,000, the actual tonnage required is only 30,000,000 tons.

"In these circumstances, it is but natural that the shipping situation should be depressed with a great decline in freight rates. The present rate from Moji to Yokohama is yen 1.90, while the Cardiff-Port Said rate stands at 16s. 6 d. The price of ships is only yen 150 or yen 160 per ton, but the price of coal is still quite high, being 82s. 6d., and British wages are 61s. 6d. Prices of all commodities are still about three times the normal figures. Owing to the depression of trade, increased expenses, and the excess of tonnage, all shipping services are unremunerative at the present moment.

"About 10,000,000 tons of ships are tied up in various countries, including more than 300,000 tons in Japan."

The company declared a dividend of 25 per cent, as against 30 per cent for the preceding six months.

Subsidies and the O. S. K.

In "Past and Present," a booklet issued by the Osaka Shosen Kaisha in connection with its report for the business term ending December 31, 1920, appear some interesting statistics relating to the company's growth since its formation forty years ago. The O. S. K. takes justifiable pride in detailing the steps of its progress to its present commanding position in the world of shipping, and as an epitome of modern industrial Japan the booklet is well worth a more thorough review than can be given here. One portion, however, calls for the careful attention of the American shipowner and a more thorough analysis than the casual reader is likely to accord.

This section deals with the importance of Japanese government subsidies. In the period 1894-1898, as we read on page 23, subsidies aggregated yen 189,532; they grew to a maximum of yen 2,470,712 in 1914 and fluctuated within relatively narrow limits until they had declined to yen 1,390,480 in 1920. But to a company of the rapid growth and present size of the O. S. K., any statement of subsidies in terms of yen alone is not completely accurate, and accordingly the company has compiled the percentage of total revenue represented by subsidies for different years. For the four-year period 1894-1898, subsidies, although small in terms of yen, made up no less than 8.1 per cent of revenues; they rose to 17.3 per cent in 1899-1903; declined to 12.7 in 1914; to 1 per cent in 1918; and rose to 1.4 in 1919 and 1.5 in 1920. It may be seen, therefore, that to the O. S. K., at least, subsidies are comparatively unimportant.

That is true, on the other hand, only so long as the company is able to command a volume of business

Year	Number of steamers	Tonnage	Average tonnage each vessel	Value of steamers	Average value per ton
				Yen	Yen
1909	108	122,446	1,131	14,819,931	121.33
1910	108	135,325	1,253	16,678,282	123.25
1911	108	149,937	1,388	17,400,942	116.11
1912	108	169,081	1,566	18 305,394	108.26
1913	109	176,913	1,632	17,805,749	100.65
1914	109	191,204	1,753	18,575,436	97.15
1915	106	210,346	1,984	22,377,277	106.39
1916	109	213,150	1,956	20,276,014	90.89
1917	117	249,802	2,135	36,104,708	144.53
1918	124	302,439	2,439	34,998,157	115.71
1919	126	331,843	2,634	41,424,213	124.83
1920	133	400,702	3,013	65 657,734	163.86

Growth of the O. S. K. fleet since 1909

Year	Freight	Passage money	Government Navigation Subsides	Percentage to total revenue			
				Freight	Passage money	Subsidies	Other receipts
	Yen	Yen	Yen	Per cent	Per cent	Per cent	Per cent
1884 — 88	353,796	454,927	—	41.8	54.0	—	4.2
1889 — 93	435,488	413,308	—	45.5	43.2	—	11.3
1894 — 98	851,257	725,958	189,532	36.2	30.9	8.1	24.8
1899 - 1903	2,440,711	1,414,185	928,259	45.5	26.3	17.3	10.9
1904 — 08	5,358,251	2,601,499	1,119,333	48.2	23.4	10.1	18.3
1909 — 13	9,053,623	3,552.742	2,276,746	56.1	22.3	14.0	7.6
1914	11,151,509	3,790,004	2,470,712	57.6	19.6	12.7	10.1
1915	16,846,724	3,594,797	1,700,294	71.4	15.3	7.2	6.1
1916	35,964,381	4,119,278	1,739,479	82.3	9.5	4.0	4.2
1917	62,224,643	4,931,720	1,716,949	85.9	6.8	2.4	4.9
1918	149,019,698	6,522,936	1,687,579	88.0	3.9	1.0	6.3
1919	106,577,981	8,130,189	1,718,317	83.8	6.4	1.4	8.4
1920	70,889,094	10,143,305	1,390,480	79.0	11.3	1.5	8.1

Sources of O. S. K. revenues, 1884-1920

Year	Revenue	Expenditure		Net profit	Rate of dividend Per annum	Increase in the Reserve and the Amount carried forward
		Working Expenditure	Cost of maintenance of steamers			
	Yen	Yen	Yen	Yen	Per cent	Yen
1914	19,346,155	13,770,885	3,116.000	2,459,270	10.0	846,850
1915	23,603,626	15,795.874	3,787,000	4,020,752	11.0	2,348,305
1916	43,674,063	23,127,564	9,431,000	15,115.500	24.0	6,240,555
1917	72,457,210	36,342,656	11,075,000	29,039,555	45.0	27,532,712
1918	167,871,440	80,663,627	36,829.000	42,208,812	60.0	21,163,000
1919	127,168,897	82,584.562	21,210,000	20,824,335	40.0	6,332,248
1920	89,716,444	67,243.554	11,420,000	11,052,890	20.0	12,610,970 (decrease)

O. S. K. revenues and expenditures, 1914-1920 commensurate with that of the past. Let us consider subsidies in their relation to capitalization. The paid up capital in 1920 was yen 62,500,000, although the total assets were yen 169,125,149.22. If from the latter be deducted the bookkeeping entry of yen 37,500,000, unpaid capital, the net is yen 131,625,149.22. This is, of course, altogether out of proportion to the capitalization and it explains why such companies as the O. S. K. and N. Y. K. pay dividends apparently enormous but actually modest enough when the assets are considered. However, the fact does remain that the paid up capital is only yen 62,500,000, on which the subsidy of 1920 would suffice to pay a dividend of 2.2 per cent. Well, in times such as these 2.2 per cent is something.

For the last six months of 1920 the O. S. K. dividend was at the rate of 15 per cent a year. For the first six months of 1921, say recent advices from Japan, the rate will be 10 per cent a year, or 5 per cent for the six months. Net profits were yen 5,040,000, as against yen 10,120,000 for the preceding term. Yen 2,000,000 had to be drawn from dividend reserves to make possible the 10 per cent declaration, and the amount carried forward was yen 390,000, quite a decrease from the yen 1,425,000 of December 31.

Australian Coasting

The Osaka Shosen Kaisha and Nippon Yusen Kaisha are adversely affected by the new Australian act closing the coastwise trade to vessels that do not pay Australian wages and maintain similar equipment. The act evidently was aimed at Japanese shipping. The two companies named are said to take the view that the trade is not important enough to justify raising their standards. Rates are reported to be advancing as a result of the law, which became effective July 1.

Liner for N. Y. K.

The marked improvement in trans-Pacific passenger services consequent upon the dispatch of Shipping Board 535's to that ocean, to which attention was drawn last month, still continues. In addition to the purchase of ex-German liners by the Canadian Pacific and the charter of the Taiyo Maru (Cap Finisterre) by the T. K. K., the Nippon Yusen Kaisha is about to build a 15,000 gross ton vessel in the United Kingdom, according to reports current in Japan. The new vessel will be completed by the end of 1922 and probably will be used between Puget Sound and the Orient. The construction of a vessel of this nature, after the N. Y. K. had abandoned its great building plan and after it had refused to operate the Taiyo Maru for the Japanese government, comes as a surprise. Perhaps Shipping Board competition, as conjectured, has been responsible.

Oil for Japan

The Asiatic Petroleum Company (British) has recently completed a contract, through the Rising Sun Petroleum Company, to furnish the Japanese government with 200,000 tons of fuel oil. When this contract is fulfilled the existing tanks of the Japanese government will be filled to capacity. New tanks, however, are being constructed. The efforts on the part of the Japanese government to buy out the oil interests of some subsidiary companies in the Dutch East Indies were not successful. Also the efforts of the government to develop the oil fields in Saghalien are meeting with little success, not because of the lack of oil, but chiefly on account of the remoteness of the oil fields and the severity of the climate which permits operations during not more than three months of each year.

Flock to Atlantic

Data compiled by the Department of Communications of Japan indicate that Japanese vessels flocked to the Atlantic Coast immediately after the American marine strike began May 1. At the end of May tonnage engaged in the North Atlantic - Far East service was 212,889, an increase of 66,305 as compared with April tonnage. Other changes from April were: Vladivostok, increase of 28,000 tons; North China, increase of 52,000; East Coast of South America, increase of 15,351; Straits, decrease of 38,000; Europe, decrease of 66,000; in addition to a few minor changes.

Amalgamation Again

More amalgamation talk is in the air, although it is relatively subdued and does not deal with millions of deadweight tons. The latest gossip is that the Taiyo Kaiun Kaisha (Ocean Transport Company) will take over vessels of the Nippon Kisen Kaisha and the Osaka Iron Works, and that an individual connected with the Osaka Iron Works will help out the Uchida Kisen Kaisha and that the Osaka Shosen Kaisha, which is closely connected with the Osaka Iron Works, will take over the Uchida shipyard.

New Chinese Line

Reports from Shanghai say that the Peking government has approved a $4,000,000 all-Chinese steamship company, which will operate a passenger and freight service between Hongkong and Chile via Shanghai, Honolulu, Mexico, Panama and Peru and between Hongkong and New York via Shanghai, Honolulu, Panama and Cuba. It is reported that the Hwah-ping, ex-German, has been chartered. The new company is known as the China Steamship Company.

Insurance Firms May Unite

Depression of foreign trade and competition among themselves have made difficult the position of marine insurance companies in this country, and there is talk of amalgamation as a means of tiding over the difficulty, says the Japan Advertiser of Tokyo. At present there are twenty-nine marine insurance companies here. Of these, thirteen are engaged exclusively in marine insurance, eight carry on marine in addition to fire and other insurance, and another eight are marine re-insurance concerns. . . .

The Japan-London rate for general cargo was yen 3 per yen 100 during the height of the war boom, but the present premium is only yen 0.50, or just the same as before the war. In some other cases the present rates show a decline of between 10 and 20 per cent as compared with the pre-war quotations. The standard rates from Japan now charged are 22 sen for Shanghai; 25 sen for Dairen or Tsingtao; 30 sen for Tientsin, Hankow, Yinkow, Hongkong, or Canton; 45 sen for Vladivostok; 30 sen for Singapore, Cuba or Manila; 35 sen for Calcutta or Bombay; 50 sen for Antwerp, Hamburg or Havre; 40 sen for Marseilles; 50 sen for Cape of Good Hope; 50 sen for Melbourne; 30 sen for Seattle or San Francisco; 40 sen for New York (direct), 50 sen (via Panama).

As the seaworthiness of vessels built during the war is generally worse than others, insurance premiums should be higher, but just the reverse is the case. The rates charged are even lower than before the war. Thus before the war the rate for a round - the - world vessel was yen 4.50, but the present quotation is yen 3.50, or a decline of 20 per cent. Premiums for ships in the coasting and the near-sea trade vary, but on the whole the present rates show a decline of 10 to 20 per cent on those of a year ago and of 30 or 40 per cent compared with the rates during the war.

SAN FRANCISCO LIBRARY

FULL SPEED AHEAD

Steamship Operations

The Marine Strike

To Pacific Coast shipowners the strike situation was increasingly satisfactory during July. Offshore vessels were operated without difficulty, although coastwise steam schooners were not run to any great extent until about the middle of the month, when negotiations with the sailors fell flat and the owners decided to go ahead. Signs of a split in the Marine Engineers' Beneficial Association multiplied; separate organizations were being formed in San Francisco and New York, but whether the movement would take the form of a national organization was not clear.

The chief interest of the month centered upon the steam schooners, the owners of which are represented by the Shipowners' Association of the Pacific Coast. That organization drafted a set of working rules for submission to the sailors. The more conservative leaders accepted the rules and submitted them to the men, who rejected them at the instance of the radicals, whereupon the association began a more vigorous attempt to operate. In these negotiations the association stood firmly upon the wage reductions of May 1 and against signing of an agreement, but it did wish to come to an informal understanding with the sailors, who are much more important in the coastwise lumber trade than in offshore business. One point at which the unions balked was the open-shop provision of the rules.

Immediately after the sailors had declined to accept working conditions outlined by the Shipowners' Association of the Pacific Coast, San Francisco local of the marine engineers decided to return to work, so that the steam schooners found conditions altogether favorable. An employment office was opened at 41 Drumm street, San Francisco, at which both the shipowners and Pacific American Steamship Association hired men; and plans were under way for extending the service to Los Angeles, the Columbia River and Puget Sound. A condition laid down by the Shipowners' Association was that all members of the Marine Engineers' Beneficial Association and the Masters, Mates and Pilots must resign, as a result of which numerous resignations were received. All in all, indications were that the idle steam schooners, of which there had been about 125, would be returned to duty as rapidly as needed.

Although the American Steamship Owners' Association, representing in this case the Atlantic owners, moved to reduce salaries of deck officers August 1, when the agreement with the unions expired, nothing of the sort was necessary on the Pacific, inasmuch as the old agreement had been abrogated on thirty days' notice and wages reduced May 1.

The Pacific-American Steamship Association is interested in the resumption of the training service of the Shipping Board, which was in good trim a year ago when the steamship Hollywood was accepting cadets, but which has gone to pieces since. Captain Irving L. Evans has advised the association that there is no intention of resuming Hollywood training at this time; he offered, however, to submit to the board any reasons that the association might advance as to the desirability of resumption.

Steamship operators have regarded the training given on such vessels as the Hollywood as very valuable in assuring a supply of young men of American birth. Too many "American" seamen today are aliens.

French Line Coming

The Compagnie Generale Transatlantique has decided to open a service between the Pacific Coast of the United States and Europe, according to announcement made by Louis Prudhon, an official of the line, who was in Mexico and on the Pacific Coast in July arranging for representation. R. J. Ringwood, a well-known shipping man of the Pacific, has been appointed Pacific Coast agent, with headquarters in the Merchants Exchange, San Francisco. Sub-agents at the other ports of the Pacific have not been announced.

"To begin with," said M. Prudhon, "we consider that a service of one steamer a month will be sufficient. Our company, of course, has a large fleet at its command and can increase this at any time. Our European ports of call for the present will be Hamburg, Antwerp, Havre and Bordeaux. On the Pacific Coast our steamers will call at the principal Central American and Mexican ports, San Pedro, San Francisco and probably Portland and Puget Sound."

Many Lines Engaged

The decision of the French Line to enter this service is an acknowledgment of the shifting of trade-routes due to the opening of the Panama Canal. If the Atlantic has been placed next door to the Orient, to the detriment of the Pacific Coast, the Pacific, on the other hand, has been placed next door to Europe, to the detriment of the Atlantic; and both developments have injured the business of the American railroads, which formerly transported the manufactured products of the Eastern states to the Pacific for transshipment to the Far East and also took the agricultural products of the West to the Atlantic for loading on European vessels. The foreign lines especially have been quick to see the trend, for services are being maintained by the Holland-America and Royal Mail Steam Packet (joint), Harrison Line, Norway-Pacific, Johnson Line, East Asiatic; by the Societe Generale de Transports Maritimes a Vapeur to the Mediterranean; and by two American lines, the European - Pacific, operated by Williams, Dimond & Company with Shipping Board vessels to the United Kingdom and Continent, and by the Isthmian Line to the United Kingdom.

Lindvig Returns

R. S. Silva, traffic manager of C. Henry Smith, A. O. Lindvig and the General Steamship Corporation in their successive steamship lines to the West Coast of South America, announces that he has become agent for the Lindvig interests, which will again operate between the Pacific Coast and West Coast under the name of the Latin-American Line.

Ports of Mexico and Central America as far as Balboa will be served by the 2750-ton steamships Baja California and Sinaloa. South of Panama will ply the new steamships Romulus, Remus and Regulus, of 7300, 7000 and 6000 deadweight tons. San Francisco will be headquarters, but cargo will be taken at British Columbia ports, Puget Sound, Columbia River and Los Angeles. The Romulus, the first vessel of the line, will arrive at San Francisco about August 25 from Christiania and will be followed by the others at intervals of about thirty days. San Francisco offices will be maintained at 101 Front Street.

"The Lindvig interests," said Mr. Silva, "were a big factor during the war and at a time when cargo space was at a premium our ships gave the exporters of this coast the best service and attention and helped to move a considerable lot of American products to the South American markets, to the entire satisfaction of the shippers here, who at all times were much pleased with the record of the Lindvig ships. We are back again on this coast to stay, and will again give our friends on California Street the best we have. We are not here to engage in a shipping warfare, but to get our share of the present and future business."

Sorrows of Conferences

Hic canit errantem lunam, solisque labores.

That passage is suggested as a suitable epitaph for the individual who attempts to chronicle the vicissitudes of ocean freight conferences. It is especially apt at this time because anyone who follows the ins and outs of things is quite likely to perish by the way, and accordingly be in need of a fitting hic jacet.

The California Pacific Westbound Conference is having (as the idle rich of Hawaii are wont to say) its pilikia these days. The China Mail served notice that it would not bind itself to abide by conference rates, as it agreed to do when it withdrew from the organization; and to cap this break on the Pacific the North Atlantic-Far East Conference, which necessarily has a large bearing on trans-Pacific operations, has been eating loco weed. After juggling the Oriental steel rate for several months and managing to keep that tariff in the air as skillfully as a Japanese juggler does a knife, the conference has come out with a cut of $3, or from $16 to $13, and there are not lacking those who assert that steel might be booked for $12 if there were any shipper so unprincipled as to go in quest of that rate.

Influenced by Wheat Cut

These two troubles of the California Pacific Westbound are closely connected. In the formal letter announcing its action, the China Mail stated that the inability of different conferences and even of members of the same conference to get along smoothly had led the company to decide to abrogate its agreement to uphold rates, so that it might be in a position to look out for itself. But the China Mail also was affected, it appears, by a reduction in the trans-Pacific wheat rate from $7 to $6, which was made effective July 6 and of which the company, through a slip, did not hear until the next day. Officials of the China Mail said, however, that they had no intention of initiating general rate-cutting, and in view of this and the fact that the company's vessels are small and do not carry large lots, its independent policy would not be regarded as grave were New York not likely to be influenced.

Speculation About Steel

Trans-Pacific operators clearly see now that the North Atlantic intends to permit no Pittsburgh steel to pass through ports of the Pacific Coast. The ocean rate of $13 a long ton, or $11.61 a short ton, practically closes all steel production centers east of Chicago. Something might be done, however, if the railroads would grant an overland rate from Pittsburgh of 71 cents as against 80 in force today (although such a reduction would force Chicago down to 62 because of the 9-cent differential of the I. C. C.). With a 71-cent rate in effect, the transcontinental haul would cost $14.20 a short ton. Then the trans-Pacific operators could reduce their rate to $5, this to include the 15-cent state tolls in San Francisco, and have an advantage of just 1 cent over the Atlantic. Whether the railroads would cut the Pittsburgh rate to 71 cents appears doubtful. And if that were done, the Atlantic easily might counter with a cut of another dollar, which would force the trans-Pacific rate to $4, or approximately the actual cost of handling a ton of steel. All this brings home the fact that in times such as these the transcontinental or intercoastal rate is too large to leave the trans-Pacific lines sufficient margin.

Seattle Having Difficulty

The North Atlantic-Far East Conference is taking a leaf out of Seattle's book and is preparing to post bonds guaranteeing the upholding of rates by the different member-companies. San Francisco rejected the suggestion several weeks ago. At the time this is written, Seattle appears to be having much difficulty in organizing, or rather in reorganizing, its conference, although no rate-cutting has been reported.

At a meeting July 8 the California Pacific Westbound Conference reduced the potato rate from $12 to $10, weight; rice from $9 to $7, weight; petroleum products from $8 to $6, weight or measurement; and flour from $7 to $6, weight. That last reduction followed a cut in wheat from $7 to $6; and the petroleum reduction was in conformity with one of $2, from $8 to $6, made July 2 on gasoline, which equalizes the Pacific and Gulf.

Tea Rate Broken

Pacific eastbound rates are holding no better than westbound. Advices from Japan say that the conference tea rate has broken from $8 to $6, the latter figure being $4 less than the 1920 tariff. Shipments of tea were dispatched in vessels of the O. S. K. and N. Y. K. in June at $8, which at that time was the conference rate; but the Mitsui Bussan Kaisha, a disturbing factor in the Northwestern United States last year, entered the market and collected cargo at Shidzuoka, offering to ship from Yokohama at $4. In view of Shimidzu-Yokohama costs of $1.50, the total rate to the Pacific Coast was only $5.50. To meet this the conference has cut its Shimidzu tariff to $6, but even this is 50 cents more than the Mitsui offer.

Trade Commissioner H. A. Butts of Tokyo reported to the Department of Commerce May 3 that the tea crop of the year will be 25 or 30 per cent below normal due to the American financial depression and resultant restricted market of last year. Japanese exports to the United States last year were 22,791,000 pounds, a decrease of 4,900,000 from those of 1919 and about one-half of the average of several years. Exports of 1921 are estimated at not more than 15,000,000 pounds, a great falling-off, indeed.

Elsewhere in the Far East rates are sagging or are about to break under pressure of shippers. For example, hosiery manufacturers have sought a reduced rate to India, with the result that the N. Y. K. and O. S. K. are represented as having agreed to cut from yen 50 to yen 30, the latter being the cotton goods rate. Match manufacturers say that they must pay yen 27 to Bombay, whereas Swedish makers pay only half as much, or 27 shillings, both quotations being with a 10 per cent rebate.

Other cuts apparently have had the effect of increasing business to such an extent that increases actually are being made. The Dairen-Europe wheat tariff has moved from 35 shillings to 50, and other tariffs also are firmer. Coasting and near-sea rates of Japan remained practically unchanged during June.

On the Scent of Copper

After a series of highly diverting maneuvers, the Pacific Coast-North Atlantic Eastbound Conference yielded on July 18 to the importunity of the copper producers of Utah and granted a reduction in the rate of that commodity from $8 to $6. Arizona recently was granted a railroad rate reduction, in which Utah did not participate, and the miners of the latter state immediately began to besiege the intercoastal steamship lines with requests for a $2 cut.

Like their predecessors at Troy, they came bearing gifts. First one steamship company and then another was offered a fair bit of tonnage at $6, and one line even went so far as to demand 3000 tons at $8 before it would consent to a reduction of $2. But almost as rapidly as one company saw the light from over Utah, another closed its ears to the jingle of the guinea, until the whole situation bore a close resemblance to the see-saw of childhood.

Some suspicious individuals were inclined to believe that the copper miners merely wished to use the steamship lines as a club with which to smite the railroads; that if a steamship reduction of $2 were made the miners would be able to go to the transcontinental lines and demand a like cut; and that, if this were given, the intercoastal companies would be roughly comparable to the neophyte snipe-hunter—that is, holding the bag. This suspicion was buttressed by figures that seemed to prove that steamship transportation could not hope to compete with railroads because of the costs of shipping from the Atlantic seaboard to the interior, and because liberal milling and transit privileges were granted by the railroads. But in order for the miners to go to the Interstate Commerce Commission with a request for a lower rate based on steamship tariffs, they would have to show that the water charge actually was in being and not merely on paper, so that shipping men were inclined to believe that a fair copper tonnage would move for a few months.

Whatever the truth, the spectacle, in the midst of a dull theatrical season, was not without its merits.

Australasian Paper

The first vessel of the newly-announced Orient-Pacific Coast-Australia service of the Yamashita Kisen Kaisha will arrive at Pacific Coast ports in August and September, sailing from San Francisco about September 15.

Yamashita and the other companies engaged in Australasian trade are keenly interested in this year's newsprint contract. The newspapers of Australia and New Zealand import about 50,000 tons annually from Canada and heretofore have awarded the contract for transportation to one line, the Canadian-Australasian (Union Steamship Company of New Zealand) holding it for the current year. All cards were placed on the table when the new conference was organized, however, and this fact and the keener competition of such new lines as General Steamship, Canadian Government Merchant Marine and Yamashita, causes operators to look forward to October, when the contract expires.

Opens Portland Office

A. P. Hammond, Pacific Coast manager of the Luckenbach Line, announces the establishment of an office in Portland, Ore., and the appointment of J. G. Euson as agent, with offices in the Railway Exchange building. Mr. Euson formerly was manager for the General Steamship Corporation, which acted as Luckenbach agent at Portland.

A Government Alaska Line

Edwin H. Duff makes the following pertinent comment upon S. 2203 providing for a government steamship line to Alaska:

"As an instance of how much talk of co-ordination exists in the matter of government operation of ships one has but to read the bill . . . introduced on the 5th instant (July) by Senator Cummins. While the administration is calling upon the Shipping Board to get the government out of shipping, and the House committee on merchant marine and fisheries is considering a bill to concentrate Army transport and Panama Railroad Steamship Company's operations under the Shipping Board, a senator, at the instance of a cabinet officer (the secretary of the interior), introduces a measure to start the Interior Department in the shipping business for the purpose of competing with private shipping now engaged in the Alaskan trade. And this provision, it will be noted, is carefully hidden in a bill the title of which would never disclose its existence. And in addition the bill is sent to the committee on territories for consideration."

Panama Tolls Bill

Senator Borah has introduced a bill providing that Panama Canal tonnage shall be determined by rules of the canal and that rates shall be assessed and paid according to such determination. The gist of the bill is this: although the Panama Canal follows its own measurement rules, tolls collected are limited by the net registered tonnage of each individual vessel, so that, while the rate now charged is $1.20 a net registered ton, the canal may collect tolls based on canal measurements so long as the toll does not exceed $1.25 a ton of the ship's regular certificate; the canal authorities wish to collect on their own measurement only and thereby increase revenues and at the same time equalize the charges to American and foreign shipping, inasmuch as foreign vessels are measured under rules that frequently give them a decided advantage over American. Vessels of American registry, however, might possibly be charged for deck-loads, the space occupied by which may not be measured into the ship's net if the total should exceed the ship's registered net.

New Services

A new service between Seattle and Hawaiian ports has been opened by the Alaska Steamship Company, which announced that the steamship Cordova would sail from Puget Sound and the Columbia River in July. She will maintain thirty-day sailings. The steamships Valdez and Juneau will be placed in the service should business warrant.

The transports Great Northern and Northern Pacific continue to be discussed for the Hawaiian service, this time for a Los Angeles-Honolulu run. Whether they actually will be bought, reconditioned and employed in that trade is quite doubtful, but the rumors do add to the interest of life in the dog-days.

Grace Service Resumed

W. R. Grace & Company have resumed steamship service between Seattle, San Francisco and Western South American ports as far south as Valparaiso, Chile, with the sailing of the freight and passenger steamer Colusa from Puget Sound

July 8. The Colusa loaded at Grays Harbor, Tacoma and Seattle, before starting for South America via San Francisco. The company operated on this run until war operations interfered.

A record of 12¾ days, New York to San Francisco, was recently made by the steamship Silver State, a Shipping Board 535 allotted to the Pacific Steamship Company. She also made a record of 45 hours, San Francisco to Seattle, reducing the record of the liner President by 2 hours and 50 minutes. The Keystone State set a Los Angeles-Seattle record of 70 hours. To these vessels and the Wenatchee, the first of the 535's allotted to the Pacific Steamship Company, will be added the Bay State, now under construction at the yard of the New York Shipbuilding Corporation.

Colombia in Canal Trade

With the Colombia sailing from San Francisco July 20 the Pacific Mail will have two of the three steamers assigned to the San Francisco-Baltimore service on the run. The third steamer, the Ecuador, will join her sister ships in September. Leaving San Francisco the steamers first call at Los Angeles harbor, then at Manzanillo, Mexico; San Jose, Guatemala; La Libertad, Salvador; Corinto, Nicaragua; Balboa and Cristobal in the Canal Zone; Kingston, Jamaica, and Havana, Cuba, arriving at Baltimore in thirty days. Sailing from Baltimore the steamers make the same calls only in reverse order, certain of the steamers, however, omitting Kingston. The voyage is made in twenty-six days.

Vessels in the Panama service of the Pacific Mail hereafter will call at Ensenada, Magdalena, San Jose de Cabo and La Paz in addition to the former ports of call.

An Unusual Affair

The Toyo Kisen Kaisha made good its promise to give "something different" to several hundred invited guests aboard the new liner Taiyo Maru, formerly the Cap Finisterre, July 1. So many new steamships had arrived at ports of the Pacific during the last few months that the management of the Japanese line decided that no ordinary reception and inspection of the vessel would satisfy, and, accordingly, arrangements were made for a cruise outside San Francisco Bay, beginning at 12:30 o'clock.

Luncheon was served to 450 guests at 1:30. With that and a little speech-making ended, the swimming tank, in which a number of bathing girls were to be seen, was the center of attraction; and thereafter there was dancing and an orchestra concert. Deck golf, a Japanese comedy, Japanese juggling and magic were other features of the entertainment. The vessel berthed again at 6 o'clock. On the voyage out the Taiyo Maru met three dreadnoughts and several cruisers and destroyers of the Pacific fleet.

On the day preceding 16,000 persons had visited the vessel at her dock. She sailed on her first westbound voyage to the Orient July 2.

The T. K. K. steamship Rakuyo Maru, the first of the new intermediate liners for the Orient-South America service, sailed from Yokohama the first of July for Honolulu, Hilo, San Francisco and West Coast ports. She is of especial interest because she is one of the first Japanese-built vessels to be equipped with geared turbine engines. She was built by the Mitsubishi yard, Nagasaki.

Briefs

The Matson Navigation Company has placed the combination vessel Lurline and the new 14,000-ton freighter Manukai in a triangular service between San Francisco, Puget Sound ports and Honolulu, Port Allen, Kahului and Hilo, and return to San Francisco. The Manukai is the largest vessel yet employed in this trade. During the last few years the demand of Hawaii for Northwestern products, particularly lumber, lumber products, and feed, has grown greatly.

* * *

Panama traffic of May was the smallest since June, 1920. Commercial vessels passing through the canal were 210; they carried 792,735 long tons of cargo. In April, 1921, 227 vessels passed through, carrying 907,613 tons; and in May, 1920, the number of vessels was 214 and the cargo 974,919 tons.

* * *

The Panama Canal announces that vessels may be supplied with bunker oil without restriction. Oil purchased of the canal itself costs $2.75 a barrel of 42 gallons, either at Cristobal or Balboa; but private companies, says the Panama Canal Record, are offering fuel at $2.10. Diesel oil at Balboa is quoted at $3.50.

* * *

The Los Angeles bond issue of $4,800,000, approved by the voters of the city recently, will be expended as follows: Municipal Pier No. 1, $1,000,000; west basin development, $400,000; fish harbor improvements, $500,000; belt line railroad, $300,000; Harbor Boulevard, $600,000; new sheds, etc., on east side of main channel, $500,000; ferry and terminals, $200,000; Terminal Island sea walls, $200,000; wharves on west side of the main channel, $800,000; equipment, $300,000; total, $4,800,000. The equipment appropriation will be of the greatest general interest to manufacturers. Just what will be purchased has not yet been announced.

* * *

The Standard Oil Company of California now has the largest privately-owned American-flag fleet on the Pacific Coast, says the Standard Oil Bulletin. When the three 15,000-ton tankers building by Bethlehem and the 4750-ton motorship building by Moore have been added to the fleet, it will comprise forty-one vessels of a deadweight tonnage of 165,000.

* * *

Judge Robert W. Jennings, United States district judge, Juneau, Alaska, has denied the application of the territory and the Juneau Hardware Company for an order restraining the customs from forfeiting merchandise transported in violation of Section 27, Merchant Marine Act, which forbids the diversion of goods to Canadian ports for shipment to Alaska, the intent being to prevent evasion of the coastwise laws. Attorney General John Rustgaard said that he would carry the case to the Supreme Court.

* * *

The receivership of the Pacific Motorship Company and the Pacific Freighters Company, both of San Francisco, has been removed by agreement. The Ocean Motorship Company, recently organized, will take over the fleet and assume the obligations of the Pacific Motorship Company.

* * *

Puget Sound-California freight rates were reduced, effective July 1, by the Pacific Steamship and San Francisco and Portland lines.

* * *

The 285 wooden vessels offered for sale by the Shipping Board, sealed bids to be opened July 30, are as follows: Daugherty type, 9; Ballin, 15; Peninsula, 10; Pacific American Fisheries, 7; Allen, 1; McClelland, 15; Ferris, 180; Hough, 28; Lake & Ocean Navigation, 1; Grays Harbor, 11; Standifer, 1. "Wherever consistent with diplomatic relations" vessels may be transferred to foreign registry.

Shipbuilding

World Construction

According to Lloyd's Register, shipbuilding of the world fell off nearly 900,000 tons from March 31 to June 30, the decline being the sharpest of all three-month periods since the peak of construction was reached in the fall of 1919. American construction dropped nearly 400,000 tons and British 270,000. Germany did not report. On June 30 the total tonnage building was 6,199,000, of which the United States had 717,000 and the United Kingdom 3,530,000, but the British figures included 736,000 tons of which work had been suspended and 444,000 tons delayed by strikes. The margin of British yards over American on June 30, 1920, was 1,472,000; this almost doubled in the last fiscal year, while work in American yards has declined 66 per cent.

American Figures

The American Bureau of Shipping reports that on July 1 there were 100 ocean-going vessels under construction in American shipyards, the tonnage aggregating 762,854. For private account there were 78 vessels of 567,838 tons and for the Shipping Board 22 of 195,016. River and harbor craft numbered 99 of 54,646 tons in addition to those listed above. Seventy-five of the 100 ocean-going vessels were tankers or combination vessels, all oil-burning, and 10 of 25 cargo-carriers were to burn either coal or oil.

Compared with the figures of June 1, a decline of 100,000 tons is noted. Twenty-six American shipyards were engaged on new construction July 1.

On July 1 there were under construction in yards of the Pacific Coast of the United States twenty-three steel merchant vessels of 259,890 deadweight tons, according to statistics compiled by Pacific Marine Review. These figures represent a decline of five vessels of 50,900 deadweight tons from those of June 1, no contracts having been awarded to offset deliveries. Vessels completed in June were: two freighters of 20,900 tons for the United States Shipping Board; one tanker of 10,100 tons for the board; one tanker of 8400 tons for foreign private account. No vessels for private American owners were delivered.

In Canadian yards no deliveries were made, the status of June 1 remaining unchanged.

The following table shows construction of July 1:

American Yards	No. Vessels	Agg'te. D.W.
Freighters, USSB	4	44,000
Tankers, USSB	5	50,200
Tankers, private	7	83,690
Freighters, private	2	40,000
Tankers, foreign	5	42,000
Totals	23	259,890
Canadian Yards		
Freighters, Gov't	4	33,480
Freighters, private	1	600
Totals	5	34,080

At the beginning of May, reports the Atlantic Coast Shipbuilders' Association, 163 vessels of 581,631 gross tons, exclusive of government work, were under construction in the country. Fourteen vessels were delivered during that month and one new contract, that awarded the New York Shipbuilding Corporation by the Japanese Navy for a fuel vessel, was executed. New York Shipbuilding Corporation leads the country in volume of work.

2,000,000 Increase in Year

A tonnage increase of more than 131 per cent in documented American merchant shipping since the be-

AMERICAN SHIPBUILDING FOR THE FISCAL YEAR ENDED JUNE 30, 1921.

Ships built in the United States and officially numbered by the Bureau of Navigation, Department of Commerce, during the year ended June 30, 1921, totaled 1,429 of 2,210,221 gross tons, not including 33 vessels, of 66,038 gross tons, built for foreign owners, making a grand total of 1,462 vessels of 2,276,259 gross tons. The details of this construction are as follows:

Kinds.	Atlantic and Gulf.		Pacific.		Great Lakes.		Western rivers.		Total.	
	Number.	Gross tons.	Number.	Gross tons.	Number.	Gross tons.	Number.	Gross tons.	Number.	Gross tons.
WOOD.										
Sailing	62	71,207	7	10,853	.....	.....	.....	.....	69	82,060
Steam	28	9,560	17	15,491	15	1,476	11	1,721	71	28,248
Gas	326	9,681	149	10,111	53	1,190	63	1,119	591	22,101
Unrigged	168	50,615	17	3,772	31	6,323	28	272	247	61,012
Total	584	141,093	190	40,227	102	8,989	102	3,112	978	193,421
METAL.										
Sailing	1	1,189	.....	.....	.....	.....	.....	.....	1	1,189
Steam	a228	1,328,484	b 84	537,539	32	86,712	8	5,898	352	1,958,633
Gas	c 16	16,766	5	6,064	2	2,080	7	2,181	30	27,091
Unrigged	53	27,005	.....	.....	5	2,047	10	835	68	29,887
Total	298	1,373,444	89	543,603	39	90,839	25	8,914	451	2,016,800
TOTALS.										
Sailing	63	72,396	7	10,853	.....	.....	.....	.....	70	83,249
Steam	256	1,338,044	101	553,030	47	88,188	19	7,619	423	1,986,881
Gas	342	26,447	154	16,175	55	3,270	70	3,300	621	49,192
Unrigged	221	77,650	17	3,772	36	8,370	38	1,107	315	90,899
Grand total	882	1,514,537	279	583,830	141	99,828	127	12,026	1,429	2,210,221

a Includes 2 vessels of 12,283 gross tons built of reinforced concrete.
b Includes 2 vessels of 12,293 gross tons built of reinforced concrete.
c Includes 1 vessel of 1,433 gross tons built of reinforced concrete.

The monthly output during the past fiscal year has been as follows:

Months.	Seagoing.						Nonseagoing.		Grand total.	
	Steel.		Wood.		Total.					
	Number.	Gross tons.	Number.	Gross tons.	Number.	Gross tons.	Number.	Gross tons.	Number.	Gross tons.
1920										
July	34	185,731	6	10,908	40	196,639	133	20,600	173	217,239
August	a 46	224,310	6	8,318	52	232,628	126	26,582	178	259,210
September	41	228,018	9	12,283	50	240,301	85	21,661	135	261,962
October	39	191,501	9	16,621	48	208,122	72	19,040	120	227,162
November	b 36	187,199	11	18,690	47	205,889	72	7,777	119	213,666
December	c 24	155,025	7	10,729	31	165,754	56	11,149	87	176,903
1921										
January	d 30	196,482	8	10,635	38	207,117	56	9,163	94	216,280
February	18	108,179	1	2,190	19	110,369	76	11,035	95	121,404
March	23	140,374	4	5,382	27	145,756	59	9,198	86	154,864
April	15	111,162	3	2,510	18	113,672	81	7,090	99	120,762
May	15	115,312	4	4,237	19	119,549	97	13,073	116	132,622
June	22	144,525	9	10,766	31	155,291	129	18,594	160	173,885
Total	343	1,988,115	77	113,272	420	2,101,387	1,042	174,872	1,462	2,276,259

a Includes 1 concrete vessel of 6,144 gross tons.
b Includes 1 concrete vessel of 6,144 gross tons.
c Includes 1 concrete vessel of 6,144 gross tons.
d Includes 2 concrete vessels of 7,582 gross tons.

ginning of the war is shown by an official statement of the bureau of navigation of the Department of Commerce.

The total documented American merchant shipping at the close of the fiscal year on June 30, 1921, was 28,500 vessels of 18,350,000 gross tons, as compared with 28,183 vessels of 16,324,024 gross tons in 1920 and 26,943 vessels of 7,928,688 gross tons in 1914. Final returns from collectors of customs not due for several weeks probably will not alter the 1921 total more than 35,000 tons, involving only small vessels.

Sea-going vessels of 500 gross tons or over numbered 3723 of 13,234,401 gross tons, of which 238 of 1,271,079 gross tons are ocean passenger steamers. The United States Shipping Board owns 1798 ships of 7,993,771 gross tons. The Great Lakes tonnage aggregates 2850 vessels of 2,625,000 gross tons, and the remainder consists of sea-going vessels under 500 tons, river steamers, and smaller miscellaneous craft.

Vessels of 500 tons or over registered for foreign trade numbered 2559 of 10,620,717 gross tons, of which 2272 were steamers aggregating 10,244,746 gross tons.

The total increase in the American merchant marine during the year was a trifle over 2,020,000 gross tons, of which 1,090,643 gross tons were Shipping Board ships.

For comparison the tonnage of ships of 100 gross tons or over of the United Kingdom on June 30, 1920, aggregated 8561 of 18,330,424 gross tons, according to Lloyd's Register; the totals for June, 1921, are not yet available.

Some New Work

Although new contracts are scarce some have been reported. The Bath Iron Works has a contract for five lightships, and the Atlantic Refining Company has ordered a small 2000-ton tanker of Bethlehem. The latter vessel will be built at Sparrows Point. The Red D Line received bids up to July 15 for two 14-knot combination vessels of about 4300 tons deadweight capacity and accommodations for 190 passengers. Theodore Ferris designed the vessels. They will be oil-burners, geared-turbine drive. At the time this is written no announcement of the awarding of the contract has been made.

Refrigerator Vessels

The Clyde-Mallory Line is reported to have started plans for the construction of a coastwise steamer for the Florida service. The bulletin of the Atlantic Coast Shipbuilders' Association thus outlines other work in prospect:

"It is reported that the United Fruit Company is seriously considering the construction of four fruit steamers in American shipyards. It is interesting to note that nearly all of the company's ships heretofore have been built in British shipyards, but it is understood that the United Fruit Company recently cancelled a contract for four ships abroad. One of the factors in the decision of the United Fruit to build in American yards is the exemption of excess profits taxes as provided for in the Merchant Marine Act of 1920. Good news also comes from abroad in the case of the Compagnie Generale Transatlantique, the Swedish-American Line, and other Scandinavian companies, which are understood to have given assurance to American shipbuilding companies that they desire to have them figure upon the next passenger liners projected by them. The speed with which the leading American plants can complete and deliver tonnage is one of the factors which have led the foreign lines to seek estimates from American yards.

"According to listings of April, 1921, the United States has only eighteen straight refrigerator ships, with a total of 3,500,000 cubic feet of storage capacity. Most of this tonnage consists of refrigerator ships ordered by the government during the war. While this amount of refrigerator space is entirely disproportionate to the greatly increased tonnage of the United States, there are in addition to these vessels a number of ships engaged in the transportation of fruit, of which the outstanding example is the Great White Fleet of the United Fruit Company, whose refrigerator spaces aggregate about 5,000,000 cubic feet. Practically all of these fruit vessels were built in England. It is gratifying to note an awakening interest in this type of tonnage."

Matson Plans

Reports that the Matson Navigation Company was making inquiries for two fast combination vessels for the San Francisco-Hawaii service, although founded on fact, are misleading. An official of the line said that he recently discussed construction of two such vessels with representatives of a shipbuilding company, but only in a general manner, and that the Matson Line "certainly had no intention" of building them at this time. Execution of the plan is for the more remote future.

The Matson Line has just received from the Moore Shipbuilding Company two 14,000-ton freighters, Manulani and Manukai, and began the operation of two Shipping Board combination 535's a few months ago. Although the latter are in the Baltimore - Pacific Coast - Hawaii service, and therefore do not make so many sailings as the company's own liners, they do increase the passenger accommodations to and from Honolulu to a material degree. In view of such additions to the fleet and the depression in sugar, the present would appear an unlikely time for the placing of contracts for two large steamships.

U. S. S. B. Deliveries

Six steel vessels were delivered to the Shipping Board in June, one of which, the motorship William Penn, was the last of all requisitioned vessels. She was built by Pusey & Jones and the Cramp yard installed a Diesel engine purchased abroad by Mr. Hurley. With her delivery both yards completed their board work. Including vessels still to be delivered, the Shipping Board's fleet totals 11,602,416 deadweight tons.

San Francisco Wage Cut

A long-expected wage-reduction in metal trades industries of the San Francisco Bay district was announced by the California Metal Trades Association July 14, effective August 1. Although the Atlantic Coast and the Northwest Pacific Coast announced reductions several months ago, the San Francisco district had remained on the old wage-scale. The new scale will be approximately that of the Atlantic.

Statement of Association

The following statement was issued by the California Metal Trades Association:

On and after August 1, 1921, the basic and hiring wage-scale paid in the San Francisco Bay district by members of the California Metal Trades Association will be in general the same as that paid by the Atlantic Coast shipyards, which is about 10 per cent lower than the basic scale adopted by this association November 24, 1919.

In reducing the basic wage scale we are taking the step that the Atlantic Coast shipyards took last April.

This wage reduction has been postponed as long as possible. It is now an absolute necessity on account of the keen and growing outside competition which must be overcome before there can be any general industrial activity in this district.

Great manufacturing plants established throughout the country during the war are fighting now to maintain themselves permanently. Their principal weapon is low production costs. They are seeking business wherever it offers and wherever it can be developed. Their agents make aggressive efforts to secure every substantial contract. This active competition, aided by the fact that the San Francisco Bay district metal trades industry which has to pay transcontinental freight on most of its raw material, is paying the highest wages in the country, has practically barred this district from participation in the activity derived from new business.

This competitive condition exists in all lines. It is just as active in the field of ship repairs as in the manufacture of metal trade products.

To secure outside business which once was regarded as ours if we wanted it, we must now meet and overcome with lower bids the active competition of northern and southern neighbors and eastern and foreign rivals—all of them paying lower wages than we do. The same competitors have invaded the San Francisco Bay district and jobs that were ours geographically are being done by the workers of other districts because they have gone ahead of us in the march back to lower costs.

The employers of this district have investigated this competition. They have made careful studies of the social, economic and climatic conditions prevailing in other centers. They find that while our natural advantages—climate and better living conditions—are offset in an industrial way by our distance from raw material and other essential supplies and equipment, they believe we are still in a position to get for the San Francisco Bay district enough work to make this the great industrial center it should be if we keep down our costs of production.

The only way we can keep payrolls alive and growing is to get new business.

The only way we can get new business is to meet our competitors' figures and give better service.

A supplementary notice to employes of 115 shops was issued as follows:

Effective August 1, 1921, the basic and hiring rate in this plant will be that given below. This wage reduction has been postponed as long as possible. It is now an absolute necessity on account of the keen and growing outside competition which must be overcome before there can be any general industrial activity in this district.

The new rates conform in general to those of competing districts, including the Atlantic Coast Shipbuilders' scale (which became effective April 1, 1921).

Classification and wages: acetylene burners, 68 cents; angle and frame setters, 72 cents; anglesmiths, 72 cents; apprentices, — cents; bending rollers, 72 cents; blacksmiths, 72 cents; boat builders, 78 cents; boilermakers, 72 cents; boltmakers (bolt and rivet headers), 72 cents; calkers (wood), 78 cents; carpenters, ship, 78 cents; chippers and calkers, 72 cents; coppersmiths, 78 cents; countersinkers, 58 cents; cupola tenders (melters), 72 cents; dockmen, 56 cents; drillers, pneumatic, 62 cents; electrical workers, 72 cents; firemen, 52 cents; flange turners (shop), 78 cents; foundry carpenters, 62 cents; heat, frost and asbestos workers, 72 cents; heaters (rivet), 42 cents; helpers, 48 cents; holders-on, 58 cents; joiners, ship, 78 cents; laborers, 42 cents; machinists, 72 cents; mangle rollers, 58 cents; millmen, 78 cents; molders, 72 cents; operators of aerial hoists, single and double cable ways, hoisting donkeys and winches, hoisting cranes and derricks, carrying capacity over three tons, 68 cents; painters, 66 cents; painters, bitumistic, 72 cents; passer boys (rivet), 32 cents; patternmakers, 85 cents; pipefitters, 72 cents; planermen, 58 cents; plate hangers, 64 cents; pressmen, 72 cents; punch and shear men, 58 cents; riggers, ship, 72 cents; riggers, yard, 62 cents; riveters, 72 cents; rivet testers, 72 cents; scarfers, 58 cents; sheet metal workers, 78 cents; shipfitters, 72 cents; shipwrights (ship carpenters), 78 cents; specialists, 56 cents; welders, 72 cents.

The following supplementary statement was issued by F. C. Metcalf, commissioner of the California Metal Trades Association, July 15:

The decision to reduce wages, even slightly, was taken by the members of the California Metal Trades Association only after general reductions and reorganizations in other directions were found to leave them still handicapped by prohibitive costs of production in their effort to secure new business for this district.

For more than two years they have considered and tried out plans to meet the steadily growing competition without reducing wages. The increased production, absence of strife and development of a spirit of co-operation, which followed the adoption of the American plan nearly two years ago, were the principal factors in enabling employers in the shipbuilding and metal industries of this district to postpone wage reductions until long after they had been put into effect elsewhere.

Until now we have been paying wages on a scale that was fixed to meet the high war-time living costs. Those costs have decreased and the consequent increased buying power of the dollar is considerably greater than the announced reduction in wages. If this district would benefit by the industrial revival that must come soon, local production costs will have to be cut to a minimum. Wages must stand their share of the pruning if the present efforts to keep local industrial payrolls alive are to bear any fruit at all.

Atlanta Reduction

Preliminary to another wage reduction, which several Atlantic Coast shipyards are agreed is essential in the immediate future if we are to keep the shipbuilding industry in its proper relation to other industries in the transition from war-time to normal conditions, a complete reclassification of rates and crafts will be established August 1, 1921, in shipyards signatory to the agreement with the metal trades department, the Atlantic Coast Shipbuilders' Association announces.

The pending reclassification should not be confused with the further wage reduction, which is expected to be made shortly after the new schedule becomes effective. The changes planned for August 1 are for the purpose of establishing a more equitable relationship between the compensation paid various kinds of mechanics with due regard to the skill and ability required in each craft.

Macy Increase Dropped

The Los Angeles Shipbuilding & Drydock Company has been directed by the Shipping Board to disregard the wage increase of August 1, 1918, and to revert therefore to the wage scale effective when its contract with the Shipping Board was signed July 10, 1918. Under date of May 9, 1921, Admiral Benson had issued a general order, following upon the board's resolution of January 17, advising shipyards that they would not be required to observe the wage scales and working conditions of the Macy award, but that they might change both to meet general conditions. No action was taken by the company under this letter, and the board accordingly stated that no consideration would be given to claims for wage reimbursements on work done after July 1, 1921. Formerly the government had paid the difference between the old scale and the Macy award.

The Federal Trade Commission has cited the Kelly Dry Dock & Shipbuilding Company, Mobile, in complaint of unfair competition in the ship-repair and drydocking business. Cash commissions, the complaint alleges, are given by this concern to the ship officers without the knowledge of the owners.

News of Eastern Yards

American Bridge

Six coal barges built by the American Bridge Company, Pittsburgh, for the War Department, have been delivered. Two of twenty-five coal barges for the Carnegie Steel were launched in June, the total launched being brought up to fourteen. Keels of three car-floats were laid in the same month.

Baltimore

The 10,250-ton tanker Lio, built by the Baltimore Drydocks & Shipbuilding Company for the Shipping Board, was delivered July 15. This was the last Shipping Board vessel under construction at the yard. S. O. Co. No. 7, a barge for the Standard Oil of New Jersey, was delivered July 15, and the keel of the firefloat Torrent for the City of Baltimore was laid the same day.

Anchor

A double-ended ferry for the Hudson & Athens Ferry Company was delivered in July by the Anchor Shipbuilding Company, Hudson, Wisconsin. She was the last vessel under construction in the yard.

Bath

Contracts have recently been signed with the government by the Bath Iron Works for the construction of five lightships. Material is expected to arrive at the plant for the building operations some time in the early fall. It is reported that all work now in hand will be completed by August 1, when the yard will shut down for a brief period.

Bethlehem

A contract has been awarded for the construction of a 2000-ton tanker for the Atlantic Refining Company by the Bethlehem Shipbuilding Corporation and preparations have been made for the laying down of the keel at the Sparrows Point plant. The tanker has been specially designed to serve shallow-water ports.

The car-building section of the Harlan plant will soon be in operation, as the company expects soon to begin construction work on a number of steel cars.

The Fore River plant delivered the 12,620-ton tanker Agwibay to the Atlantic-Gulf & West Indies June 25; and launched the 10,600-ton tanker William Boyce Thompson for Sinclair in July.

Canadian Vickers

The 6400-ton tanker Topdalsfjord was to be delivered to the Norwegian-American Line by Canadian Vickers in July, following her sister Idefjord, which was completed in June. These were the last new vessels under construction.

Chickasaw

The Chickasaw Shipbuilding & Car Company, Mobile, completed its first repair job recently on the Steel Trader of the Isthmian Line. The ship's machinery was overhauled and other inside work done. Other ships operated by the Isthmian Line, which is a subsidiary of the United States Steel Corporation, as is the Chickasaw yard, are expected to come here in future for repairs which do not require dry docking.

Consolidated

The second 160-foot lighthouse tender, building for the lighthouse bureau, was launched at the yards of the Consolidated Shipbuilding Corporation, Morris Heights, New York City, June 28, and was christened Hawthorn.

Cramp

The motorship William Penn, built by Pusey & Jones, but engined at the Cramp yard, was delivered to the Shipping Board June 25. She has been allocated to the United American Lines and will sail to the Dutch East Indies via Suez on her maiden voyage.

The efficiency of the workers at the Cramp yard is now fully 30 per cent greater than it was before the strike, according to a press statement credited to J. H. Mull, president of the company. Some of the men who left the employ of the company were well up in years, and not a few would soon have been eligible for pensions had they remained at work. They have been replaced by younger men, many of them war veterans. As a result, the average age of employes has been reduced from 55 to 35 years. About 5400 employes are now on the payroll.

Estimated launching dates of five scout-cruisers under construction at the Cramp yard are as follows: Richmond, Navy No. 9, Cramp hull 448, August 15; Concord, Navy No. 10, Cramp hull 449, October 1; Trenton, Navy No. 11, Cramp hull 501, November 1; Marblehead, Navy No. 12, Cramp hull 502, December 1; Memphis, Navy No. 13, Cramp hull 503, February 1. These vessels are of the same class as three building at the Todd yard, Tacoma, being listed as light cruisers, first line. Ten are under construction, the remaining two being at the Fore River yard, Bethlehem.

Davie

An 8350-ton freighter for the Canadian Government Merchant Marine, christened Canadian Challenger, was launched by the Davie Shipbuilding & Repairing Company on July 7.

Federal

The new 9000-ton floating drydock that has just been completed by the Federal Shipbuilding Corporation at Kearny, New Jersey, was put into commission June 25, when one of the 5350 deadweight ton cargo-carriers of the Submarine Boat type was lifted. The dock measures 446 feet over-all. Dredging was started in November, 1920, and work on the pontoons was begun January 3, 1921. The dock was completed and ready for operation June 15. It has steel wing walls, with wooden pontoons. There are eighteen centrifugal pumps operated by eighteen 30-horsepower motors. The pumps are located at the outside end of each pontoon directly under the wing walls. The dock will be able to accommodate ships up to 460 feet in length. William T. Donnelly was designer.

The Federal yard launched the 15,000-ton tanker J. A. Moffett Jr. for the Standard Oil of New Jersey July 14.

Globe

Globe of Maryland launched the Eagle Oil tanker San Leopoldo, 8600 tons deadweight, and the sister San Leonardo July 8. Both are scheduled for August delivery. They are the last vessels under construction at the yard.

Hog Island

It is reported that Ellis A. Gimbel, representing a number of wealthy Philadelphia business men, is negotiating with the government for the purchase of the Hog Island shipyard, with the intention of converting it into a mammoth terminal similar to the Bush Terminal in New York. At a recent dinner Frank A. Zeller, a terminal engineer, said that plans for the erection of terminal piers and warehouses on the site of Hog Island had already been approved by leading engineers of the United States and Europe. They provide, he says, for close co-operation between ship and railroad lines, and would make Hog Island of inestimable value to Philadelphia and the country as a whole.

Johnson

Maurice P. Davidson and Frank E. Stripe have been appointed receivers in equity for the Johnson Shipyards Corporation, Port Richmond. It is stated that the liabilities are about $175,000 with assets of $750,000. Numerous suits are said to be pending against the corporation and, owing to shortage of liquid assets, it is said that a receivership is necessary to conserve the property. The company is incorporated at $100,000, of which $80,000 is preferred stock.

Lake Torpedo

The submarine S-50, U. S. N., was launched by the Lake Torpedo Boat Company, Bridgeport, June 18, following her sisters S-48 and S-49, which were launched in February and April. The S-51 remains on the ways.

Merchant

The activity of the Merchant Shipbuilding Corporation in the general engineering field is evidenced again by the consummation of two contracts running into large sums of money. One contract calls for the construction of two structural steel radio towers at Annapolis and for the remodeling of four existing towers. The towers contemplated are 600 feet in height. The other contract provides for the construction of sixteen movable steel platforms for the construction firm of Snare & Triest of New York. The latter firm is at present building some docks at Stapleton, Staten Island, and it is in connection with this work that the platforms are needed. The Merchant Shipbuilding Corporation has filed bids for some fifty-five different kinds of construction work.

Murnan

Two barges, built of wood, each having a capacity of 7500 barrels of oil, were recently completed for the Mexican Oil Company by the Murnan Shipbuilding Company of Mobile. This delivery completes a contract for twelve.

Nashville

Considerable activity in shipbuilding of small tonnage is indicated in recent reports received from the Nashville Bridge Company, Nashville. This company has delivered a derrick boat to New Orleans for the government and has launched a 600-ton barge, and three others were to be launched soon. The company also was completing equipment of a steel twin-screw tug. During the war the Nashville Bridge Company built a number of 1800-ton oil barges for delivery at New Orleans. The company has a plant well-equipped for barge construction, with space for four barges at a time and can move to tide water boats as large as 260 by 50 by 8 feet draft. The plant also has the distinction of holding the record for riveting in the Southern district during the war.

National

The plant of the National Shipbuilding Company of Goderich, Ontario, which was recently destroyed by fire, will be rebuilt at a cost of $100,000. New equipment will be installed.

Navy Yard, Boston

The Boston Navy Yard expects to deliver the fuel ship Pecos to the United States Navy in August instead of October as previously estimated.

Newport News

The superdreadnought Maryland put to sea June 21 from Newport News for a series of tests preliminary to being turned over to the Navy Department. The Maryland, as soon as commissioned, will be transferred to the West Coast as one of the units of the reorganized Pacific fleet, to which force also will be assigned, on completion, her sister ship, the California. Carrying eight 16-inch rifles in four turrets, the Maryland is said to combine the longest range with the heaviest broadside of any naval vessel afloat. She is electrically equipped. In addition to the two electric drive dreadnoughts, the reorganized Pacific fleet as announced by Secretary Denby will comprise the New Mexico, Idaho, Tennessee, Mississippi, Arizona, Oklahoma and Nevada, the announced intention of the Navy Department being to concentrate in those waters the oil-burning units of the first line.

The Newport News yard is engaged largely on naval work, having the battleship West Virginia, a sister to the Maryland; the battle-cruisers Constellation, and Ranger, and the 43,200-ton battleship Iowa. Two tankers, John D. Archbold and William Rockefeller, are under construction for the Standard Oil of New Jersey.

New York

The 535 combination American Legion, built by the New York Shipbuilding Corporation for the Shipping Board, was given her trial trip in July. She developed a speed of 20.92 knots, although her contract called for only 17½. Officers of the American Legion were guests on the run. The Blue Hen State, the last of seven 522-foot liners, was delivered by the Camden yard early in July.

Port Arthur

W. E. Decker has been appointed purchasing agent of the Port Arthur Shipbuilding Company, Port Arthur, Ontario, succeeding N. S. Thrasher, who died recently. The Cleveland office, at which Mr. Thrasher was stationed, has been closed. The Port Arthur has no new work on hand, its last vessel, the Canadian Harvester, having been delivered May 17.

Submarine Boat

The Submarine Boat Corporation has completed the last vessel building at the yard, the motorship Suphenco, 5350 tons, for its own account.

Sun

The new 10,000-ton drydock at the plant of the Sun Shipbuilding Company, Chester, is now in operation. The first vessel to go in the dock was the Joseph M. Cudahy, owned by the Sinclair Oil Company, which docked June 11.

The Sun yard expected to deliver the Sun Oil tanker J. N. Pew and the Agwi tanker Agwiharve in July and to launch the Agwimex the same month. The Tidewater Oil tanker David McKelvey was delivered on June 30.

Texas

The Texas Steamship tanker Illinois, built at its own yard at Bath, was completed July 2. One other vessel, a sister, is under construction.

Union

A standard Crandall railway drydock of 4000 tons' lifting capacity will be installed by the Crandall Engineering Company of Boston at the plant of the Union Shipbuilding Company, Baltimore. This new dock will measure 360 feet over the keel blocks and will be 70 feet wide, with 15 feet of water forward and 20 feet aft over the blocks. The railway will be capable of docking vessels up to and including the 8800-ton class of ships. A large quantity of material is now on the ground and construction will be started as soon as the dredging is completed.

Capitalized at $10,000, the Astoria Shipping Company has incorporated for the purpose of conducting a general shipping business in Astoria.

The Merchants' Exchange of Vancouver reports having received a radio message from the Canadian-Australasian liner Makura when she was one day out of Auckland, or 6000 miles from Vancouver. This probably is a Pacific ship-to-shore record.

Pacifiic Coast Notes

Bethlehem

Two 10,100-ton tankers for the Shipping Board, Hamer and Hammac, were delivered by Bethlehem in July, government work, except naval, being brought to an end. The first of three sisters, the Hambro, was completed in June. The 15,000-ton tanker F. H. Hillman, the first of three for the Standard Oil of California, was scheduled to be launched in late July.

Craig

The plant of the Craig Shipbuilding Company at Long Beach, California, is being advertised for sale. It is situated on seventeen acres of land owned by the company and has a waterfrontage of 1600 feet. Connection with the Los Angeles harbor is by a twenty-foot channel. The equipment and buildings include: machine shop and foundry, the former building being of brick and concrete, 450 by 125 feet; tools of the machine and plate shops, woodworking machines, forge shop equipment, 3000-ton floating drydock, 90-ton stiff-leg derrick, locomotive and traveling cranes, air compressors, plates and shapes, etc.

Los Angeles

The 11,000-ton Shipping Board freighter West Prospect, fourth of five sisters building for the Shipping Board, was scheduled to be launched by Los Angeles in July, and the West Faralon, the second of the program, was scheduled for delivery.

The bureau of light and power of the city of Los Angeles has completed the installation of a 600-foot, 33,000-volt power-line from the main city line to the new transformer house alongside the company's floating drydock. This three-phase power-cable has been provided to meet the expansion plans of the company. At the transformer house the power is transformed to operate twelve 100-horsepower, 400-volt motors turning 750 r. p. m. and directly connected to twelve centrifugal 15-inch pumps.

The floating drydock comprises six pontoons. In the center of each pontoon is placed a motor directly connected with a pump below. The two pumps on each of the six pontoons can be operated as a single unit from a center station alongside the big dock or can be operated individually. This convenient and high-powered equipment permits the raising of a ship up to 540 feet in length and weighing 12,000 tons by the entire six pontoons, or the six pontoons can be split into units of one, two, three or more, or grouped into three units of two, or two units of three for the raising of smaller vessels. While at times big freighters and tankers up to 11,000 or 12,000 tons have been raised, frequently passenger ships like the steamship Yale or United States destroyers have been raised on two to four pontoons, and a government oil-barge, steam schooner or private yacht raised on the remaining one or two pontoons. Recently on this dock there was the United States Oil Barge No. 23 on two forward pontoons, followed by the Cabrillo and the Hermosa of the Wrigley fleet of Catalina Island boats on the remaining four.

Mare Island

After work was suspended at the Mare Island Navy Yard because of lack of appropriations, authority was given by Washington to proceed. The superdreadnought California is approaching completion rapidly and probably will be commissioned in August.

Moore

The Moore Shipbuilding Company launched the last vessel under construction, the 10,100-ton tanker Birkenhead, for the Vacuum Oil Company, July 9. Since the beginning of the war the Moore yard has launched sixty-two vessels, forty-eight of which were for the Shipping Board. A week before the launching of the Birkenhead the 16,340-ton tanker Tamiahua, the largest merchant vessel yet laid down on the Pacific Coast, took the water. She is for the Atlantic Line of the Southern Pacific. The 10,000-ton tanker Bohemian Club was delivered to the Shipping Board July 6. The 4750-ton motorship H. T. Harper was to be delivered to the Standard Oil of California in late July.

Pacific Diesel

The Skandia Pacific Oil Engine Company, Oakland, announces that after July 1 it will operate under the name of Pacific Diesel Engine Company and that it will devote its entire plant to the manufacture of marine and stationary Diesel engines. This means that the hot-bulb Skandia will be discontinued. The company's Diesels are of the Werkspoor design.

Patterson McDonald

Claims of the Patterson-McDonald Shipbuilding Company, Seattle, against the Commonwealth of Australia have been allowed by a board of arbitration to the extent of $1,028,458.66 of a total of $1,114,944.40 asked. The claims arose out of the construction of nine 9400-ton wooden vessels. In addition to this large award by the arbitrators (Frank Walker, appointed by the Commonwealth, F. E. Burns, appointed by the company, and W. C. Dawson, selected by the others), the company recently was awarded $74,000 in ship store claims against Australia and has settled with the Shipping Board for $354,000. A. M. McDonald, president, said that liabilities did not exceed $50,000 and that the concern therefore, would pay its stockholders dollar for dollar of their investment plus a large profit. The company's affairs will be wound up.

Southwestern

Southwestern scheduled the 8400-ton tanker Silvanus for delivery to Dutch Shell in July, following her sister ship Scopas, which was completed in June. The last of the three, Semiramis, probably will be launched in late July and delivered in August; and La Purisima, a 7500 ton tanker for Union Oil, is scheduled for August launching and September delivery. La Purisima is the last vessel under construction.

Union Construction

The Coast Guard cutter Tampa probably will be delivered by Union Construction about August 1 and her sister, Haida, two weeks later. The Mojave and Modoc will be launched about September 1, as will the tug Shawnee, also for the Coast Guard. The 8400-ton tanker Achatina was delivered to Anglo-Saxon Petroleum in July; her sister, Ampullaria, was launched July 2 and will be delivered about the middle of August; and the Amalthus is scheduled to be launched August 13.

Eastern Building Returns

Atlantic and Gulf

AMERICAN BRIDGE COMPANY, PITTSBURGH, PENN.

Purchasing Agent: W. G. A. Millar.

Twenty-five coal barges Carnegie Steel Co; 175 LBP; 26 beam; 8 loaded draft; 4 launch Mar/21; 5 launch Apr/21; 3 launch May/21; 2 launch June/21.

Six coal barges US War Dept; 145 LBP; 24 beam; 9 loaded draft; keel Mar/21; 3 launch May/21; 3 launch June/21; all delivered.

Three car floats undisclosed interests; 285 LBP; 38 beam; 8 loaded draft; keel June/21; launch Aug/21, est; deliver Sept/21, est.

Two coal barges W. G. Coyle & Co, New Orleans; 175x26x8 loaded draft; launch and deliver July/21.

Two tow boat hulls Carnegie Steel Co; 149-2x34 4-5 loaded draft; launch and deliver Aug/21.

BALTIMORE DRYDOCKS & SHIPBUILDING CO., BALTIMORE

Purchasing Agent: J. G. Miller.

Lio, hull 117, tanker USSB; 430 LBP; 59 beam; 25-4½ loaded draft; 10 loaded speed; 10,250 DWT; turb eng, 3000 IHP; 3 Scotch boilers, 15-3; keel Dec23/20; launch June4/21; **deliver July15/21.**

Elsie Jean, hull 125, tanker builder's account; 340 LBP; 49 beam; 23-6 loaded draft; 10 loaded speed; 6000 DWT; rec eng, 2000 IHP; 2 Scotch boilers, 15-3; keel Nov24/20.

J. Macy Willis, hull 126, tanker builder's account; 430 LBP; 59 beam; 25-4½ loaded draft; 10 loaded speed; 10,250 DWT; turb eng, 3000 IHP; 3 Scotch boilers, 15-3; keel Sept 27/20.

S. O. Co. No. 7, hull 127, oil barge Standard Oil NJ; 140 LBP; 28 beam; 6 loaded draft; 8 loaded speed; 265 DWT; 2 Winton engs, 200 BHP each; keel Mar15/21; launch July9/21; **deliver July15/21.**

Torrent, hull 128, fireboat City of Baltimore; 115-6 LBP; 28 beam; 9-6 loaded draft; 12 loaded speed; rec eng, 1000 IHP; 2 B&W WT boilers; **keel July15/21.**

BATH IRON WORKS, BATH, MAINE

Purchasing Agent: J. L. P. Burke.

Thomas P. Beal, hull 86, freighter Crowell & Thurlow; 395-6 LBP; 55 beam; 27-1 loaded draft; 10 loaded speed; 9600 DWT; Parsons geared turbine, 2100 SHP; 3 Scotch boilers, 15-6x11-6; keel Nov/20; launch June 16/21; deliver Aug/21, est.

BETHLEHEM SHIPBUILDING CORP., FORE RIVER PLANT, QUINCY, MASS.

Lexington, hull 1300, battle-cruiser U S N.

Raleigh, hull 1382, scout cruiser U S N.

Detroit, hull 1383, scout cruiser U S N.

Massachusetts, hull 1400, battleship USN.

And the following nineteen submarines USN: AA-2, hull 1270; hulls 1309 to 1320 inc, submarines S-18 to S-29 inc; hulls 1389 to 1394 inc; submarines S-42 to S-47 inc.

Agwibay, hull 1395, tanker At-Gulf & W I SS Co; 468-6 LBP; 62-6 beam; 27 loaded draft; 11 loaded speed; 12,620 DWT; rec eng, 3200 IHP; 3 Scotch boilers, 15-3x11-6; keel Aug 27/20; launch May24/21; **deliver June25/21.**

J. Fletcher Farrell, hull 1496, tanker Sinclair Nav Co; 430 LBP; 59 beam; 25-5 loaded draft; 11 loaded speed; 10,600 DWT; rec eng, 3200 IHP; 3 Scotch boilers, 15x11-9; launch June10/21.

William Boyce Thompson, tanker Sinclair Nav Co; sister to above; keel Nov11/20; **launch July /21.**

BETHLEHEM SHIPBLDG. CORP., SPARROWS POINT PLANT, SPARROWS POINT, MD.

Pine Tree State, hull 4195, combination USSB; 518 LBP; 72 beam; 30-7 loaded draft; 16 loaded speed; turb eng, 10,000 IHP; 8 Yarrows boilers; keel Feb15/19; launch Mar 19/21.

Palmetto State, hull 4196; combination USSB; sister to above; keel Feb19/19; launch June4/21.

Nutmeg State, hull 4197, combination USSB; sister to above; keel July29/20.

International, hull 4210, ore and oil International Pet Co; 550 LBP; 72 beam; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; rec eng 4600 IHP; 3 Scotch boilers, 17-6x12; keel July22/20.

Bethore, hull 4211, ore and oil Ore SS Co; sister to above; keel Feb24/21.

Marore, hull 4212, ore and oil Ore SS Co; sister to above, except turb eng; keel May2/21.

Steelore, hull 4213, ore and oil Ore SS Co; sister to above; keel not laid.

CONSOLIDATED SHIPBUILDING CORPORATION, MORRIS HEIGHTS, N. Y.

Purchasing Agent: Wm. Rayner.

Oak, hull 251, US lighthouse tender; 160 LOA; 30 beam; 9-6 loaded draft; 875 DWT; TE eng, 700 IHP; 1 Scotch boiler, 14 diam; keel Nov 22/20; launch June18/21.

Hawthorn, hull 252, US lighthouse tender; sister to above; keel Nov 22/20; **launch June28/21.**

No name, hull 246, US lightship; 146-3 LOA; 30 beam; 12-7 loaded draft; 825 DWT; comp eng, 400 IHP; 2 Scotch boilers, 10-6 diam; keel Mar4/21.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO., PHILADELPHIA

Purchasing Agent: Ed. C. Geehr.

Richmond, hull 448, scout cruiser USN; keel Feb16/20; launch Aug15/21, est.

Concord, hull 449, scout cruiser USN; keel Mar29/20; launch Oct1/21, est.

Trenton, hull 501, scout cruiser USN; keel Aug18/20; launch Nov1/21, est.

Marblehead, hull 502, scout cruiser USN; keel Aug4/20; launch Dec 1/21, est.

Memphis, hull 503, scout cruiser USN; keel Oct14/20; launch Feb1/22, est.

OSCAR DANIELS COMPANY, TAMPA, FLORIDA

B. D. Benson, hull 11, Isherwood tanker Standard Oil; 466 LBP; 60 beam; 26-7 loaded draft; 10½ loaded speed; 11,900 DWT; QE eng, 2800 IHP; 3 Scotch boilers, 15x11-6; keel June29/20; launch Apr15/21.

T. J. Williams, hull 12, Isherwood tanker Standard Oil; sister to above; keel Aug11/20; launch May3/21; deliver Aug15/21 est.

FEDERAL SHIPBUILDING CO., KEARNY, N. J.

Purchasing Agent: J. L. Hastings.

Victolite, hull 49, tanker for Standard Oil of NJ; 500 LBP; 68 beam; 27-6 loaded draft; 11 loaded speed; 15,000 DWT; rec engs, 3500 IHP; 3 Scotch boilers, 16 diam; keel July22/20; launch June 14/21.

J. A. Moffett Jr, tanker Standard Oil of NJ; sister to above; keel July 23/20; **launch July 14 / 21;** deliver July/21, est.

Steel Seafarer, hull 43, freighter US Steel Products Co; 425 LBP; 56 beam; 25-10 loaded draft; 12 loaded speed; 9400 DWT; turb engs, 3100 IHP; 3 Scotch boilers, 15 diam; keel May25/21; launch Oct15/21, est; deliver Nov5/21, est.

Steel Pathfinder, hull 44, freighter US Steel Products Co; sister to the above; keel June1/21; launch Nov 12/21, est; deliver Dec3/21, est.

Steel Pioneer, hull 45, freighter US Steel Products Co; sister to the above; keel July5/21, est; launch Dec10/21, est; deliver Dec31/21, est.

GLOBE SHIPBUILDING & DRYDOCK CO. OF MARYLAND, BALTIMORE

Purchasing Agent: H. B. McCauley.

San Leopoldo, hull 101, oil carrier Eagle Oil Transport Co; 401 LBP; 54 beam; 25-1 loaded draft; 10½ loaded speed; 8600 DWT; TE engs, 2800 IHP; 3 Scotch boilers, 15-3x11-6; keel Sept/20; **launch June25/21;** deliver Aug15/21, est.

San Leonardo, hull 102, oil carrier Eagle Oil Transport Co; sister to above; keel Sept/20; **launch July8/21;** deliver Aug/21, est.

LAKE TORPEDO BOAT CO., BRIDGEPORT, CONN.

Purchasing Agent: H. C. Stevens.

S-48, hull 48, submarine U S N; launch Feb26/21.

S-49, hull 49, submarine U S N; launch Apr23/21.

S-50, hull 50, submarine U S N; launch June18/21.

S-51, hull 51, submarine U S N.

MERCHANT SHIPBUILDING CORPORATION, CHESTER, PENN.

Purchasing Agent: G. Coit.

Playa, hull 382, tanker Union Oil Co; 424 LBP; 58 beam; 25-5 loaded draft; 10½ loaded speed; 10,000 DWT; TE engs; 3 Scotch boilers, 15-3x11-7; keel July 22/20; launch June 4/21.

Robert E. Hopkins, hull 383, tanker Tidewater Oil Co; sister to above; keel Aug30/20.

Samuel Q. Brown, hull 384, tanker Tidewater Oil Co; sister to above; keel Oct1/20.

No name, hull 385, freighter American-Hawaiian SS Co; 445 LBP; 59-8 beam; 28-6 loaded draft; 11½ speed; 11,000 DWT; 2 6cyl, 4-cycle Diesel engs, 4500 metric; 1 vertical donkey, 400 sq ft HS; keel Feb5/21.

No name, hull 386, freighter American-Hawaiian SS Co; sister to above; keel Feb10/21; launch July/21, est.

NAVY YARD, BOSTON

Pecos, fuel ship No. 18, USN; 455 LBP; 56-2 beam; 26-8 loaded draft; 14 loaded speed; 14,800 disp; rec eng, 5200 IHP; 4 Ward WT boilers; keel June2/20; launch Apr23/21; deliver Aug/21, est.

Whitney, destroyer tender No. 4 USN; 460 LBP; 60-11 beam; 21 loaded draft; 16 loaded speed; 10,600 disp; geared Parsons turbs, 7000 IHP; 2 WT exp small tube boilers; keel Apr23/21; launch Apr/22, est; deliver Oct/22, est.

NAVY YARD, PHILADELPHIA

Dobbin, hull 7, destroyer tender USN; 460 LBP; 60-10 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp; Parsons geared turb single screw engs, 7000 SHP; 2 WT boilers; keel Dec23/19; launch May 5/21; deliver date not determined.

Constitution, hull 8, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive, 180,000SHP; 16 WT boilers; keel Sept 25 / 20; launch and deliver dates not determined.

United States, hull 9, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive, 180,000 SHP; 16 WT boilers; keel Sept25/20; launch and deliver dates not determined.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY, NEWPORT NEWS

Purchasing Agent: James Plummer, 233 Broadway, New York City.

Maryland, hull 210, battleship USN; 600 LBP; 97-3½ beam; 30-6 mean draft; 32,600 normal disp; 21 speed; GE turbo-elec drive, 28900 SHP; 8 B&W WT boilers, oil, 41,768 sq ft plus 4168 superheat; keel Apr25/17; launch Mar20/20; deliver July/21.

West Virginia, hull 211, battleship USN; 600 LBP; 97-3½ beam; 30-6 mean draft; 32,600 normal disp; 21 speed; GE turbo-elec drive, 28,900 SHP; 8 B&W WT boilers, oil, 41,768 sq ft plus 4168 superheat; keel Apr 12/20; launch Nov/21, est; deliver Dec/22, est.

Constellation, hull 215, battle-cruiser USN; 850 LBP; 101-8¼ beam; 31 mean draft; 43,500 normal disp; 33¼ speed, est; Westinghouse turbo-elec drive, 180,000 SHP; 16 WT boilers, oil, 198,000 sq ft plus 18,000 superheat; keel Aug18/20; launch and deliver dates not est.

Ranger, hull 215, battle-cruiser USN; sister to above; keel June23/21; launch and deliver dates not est.

Iowa, hull 258, battleship USN; 660 LBP; 105 beam; 33 mean draft; 43,200 normal disp; 23 speed; GE turbo-elec drive, 60,000 SHP; 12 White-Forster WT boilers, oil, 82,800 sq ft plus 8940 superheat; keel May17/20; launch and deliver dates not est.

John D. Archbold, hull 261, tanker Standard Oil NJ; keel Dec15/20; launch Aug/21, est; deliver Oct/21, estimated.

William Rockefeller, hull 262, tanker Standard Oil NJ; sister to above; keel Dec15/20; launch Oct/21, est; deliver Dec/21, est.

NEW YORK SHIPBUILDING CORPORATION, CAMDEN, N. J.

Purchasing Agent: L. G. Buckwalter.

Southern Cross, hull 241, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs, 12,000 SHP; 8 WT boilers; keel Aug/18; launch July20/19; deliver fall/21, est.

American Legion, hull 242, combination USSB; sister to above; keel Jan21/19; launch Oct11/20; deliver July/21.

Blue Hen State, hull 250, combination USSB; sister to above; keel Mar 4 / 20; launch Feb 23 / 21; deliver July/21.

Bay State, hull 251, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs, 12,000 SHP; 8 WT boilers; keel Oct15/19; launch July17/20; deliver winter/21, est.

Peninsula State, hull 252, combination USSB; sister to above; keel July20/20; launch July6/21; deliver spring/22, est.

Lone Star State, hull 255, combination USSB; sister to above; keel May 13/19; launch Oct23/20; deliver summer/21, est.

Hoosier State, hull 256, combination USSB; sister to above; keel May20/19; launch Oct23/20; deliver fall/21, est.

Yankee Arrow, hull 260, bulk oil Standard Trans Co of NY; 468 LBP; 62-6 beam, 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs, 3200 SHP; 3 SE Scotch boilers, 15-2x11-6; keel Aug17/20; launch Apr10/21; deliver summer/21 est.

Empire Arrow, hull 261, bulk oil Standard Trans of NY; sister to above; keel Sept14/20; launch May 24/21; deliver summer/21.

Levant Arrow, hull 262, bulk oil Standard Trans Co of NY; sister to above; keel Nov4/20; launch fall/21, est; deliver winter/21, est.

No name, hull 263, combination Munson SS Co; 414 LBP; 57-6 beam; 23 loaded draft; 15½ loaded speed; 4950 DWT; geared turbs, 5800 SHP; 5 SE Scotch boilers, 16-4x12-3; keel Sept30/20; launch summer/21, est; deliver winter/21, est.

No name, hull 264, bulk oil stock; 419-3 LBP; 56-3 beam; 25-9¼ loaded draft; 10¾ loaded speed; 9870 DWT; 3 cyl TE engs, 3000 SHP; 3 SE Scotch boilers, 15-10x11-4; keel Jan17/21; launch fall/21, est; deliver winter/21.

No name, hull 265, bulk oil stock; sister to above.

Dixie Arrow, hull 266, bulk oil Standard Trans Co of NY; 468 LBP; 62-6 beam; 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs, 3200 SHP; 3 SE Scotch boilers, 15-3 x 11-6; keel Aug11/20; launch fall/21, est; deliver winter/21, est.

Saratoga, hull 199, battle cruiser USN; 874 LOA; 850 LBP; 105-5¼ extreme beam; 31 mean draft; 43,500 normal disp; 33¼ loaded speed; GE turbo-electric drive; 180,000 SHP; 16 WT boilers, 198,000 sq ft plus 18,000 superheat; keel Sept25/20.

Colorado, hull 200, battleship USN; 624 LOA; 600 LBP; 97-3½ beam waterline; 30-6 mean draft; 32,600 normal disp; 21 loaded speed; Westinghouse turbo-electric drive, 28,900 SHP; 8 B&W WT boilers, 41,678 sq ft plus 4169 superheat; keel Mar29/19; launch Mar22/21.

Washington, hull 201, battleship USN, sister to above; keel June30/19; launch Sept/21, est.

Hull 267, fuel ship Japanese Navy; 497-8 LOA; 67 beam; 28 designed draft; 15 loaded speed; 13,000 DWT; elec drive, 8000 SHP; 4 B&W boilers; keel fall/21, est.

STANDARD SHIPBLDG. CORP'N, SHOOTERS ISLAND, MARINERS HARBOR, N. Y.

Purchasing Agent: Jamie Cortada.

Hull 32, fireboat City of New York; 121 LBP; 27 beam; 14-9 deep; 12 loaded speed; comp eng, 900 IHP; 2 B & W WT boilers, oil burning; keel Mar31/21; deliver Sept1/21, est.

STATEN ISLAND SHIPBUILDING COMPANY, STATEN ISLAND, NEW YORK

Purchasing Agent: R. C. Miller.

Dixiano, hull 726, sugar ship Am Sug Ref Co; 360 LBP; 50 beam; 23 loaded draft; 10 loaded speed; 6300 DWT; TE eng, 2000 IHP; 2 Scotch boilers, 15x11; keel Sept9/20; launch May21/21.

Hell Gate, hull 728, dredge C. R. Browning; 140 LBP; 48 beam; 15 loaded draft; keel Aug28/20; launch Feb23/21.

Socony 114, hull 734, barge Stand Oil of NY; sister to above; keel Jan 10/21; deliver July9/21, est.

Socony 115, hull 735, barge Stand Oil of NY; sister to above; keel Feb 26/21; deliver July30/21, est.

Hull 736, tugboat Staples Trans Co; 136½ LBP; 27 beam; 16½ loaded draft; 10 loaded speed; 1 TE eng 700 HP; 1 Scotch boiler, 16x11½; keel May16/21; launch July30/21, est; deliver Sept15/21, est.

Hull 737, ferryboat City of New York; 247 LBP; 66 beam; 19½ loaded draft; 15 loaded speed; 1 F&A comp eng, 3500 HP; 4 B&W WT boilers, 13,000 sq ft; keel May 23/21;

launch Aug15/21, est; deliver Oct 17/21, est.

Northwestern, tanker Am Pet Co; 242 LBP; 42 beam; 23 loaded draft; 10 loaded speed; TE eng; 2 Scotch boilers; lengthening job, additional 56 ft, making 2 new cargo tanks, 1000 DWT additional capacity. Vessel considered total loss by fire; raised; and now undergoing general repairs and at the same time lengthening. Job started May31/21; estimated time 4 months.

SUBMARINE BOAT CORP., PORT NEWARK, N. J.

Purchasing Agent: W. C. Lawrence.

Suphenco, hull 150, motorship Submarine Boat Corp; 324 LBP; 46-2 beam; 23 loaded draft; 11 loaded speed; 5350 DWT; keel May29/20; launch Apr12/21; **delivered.**

SUN SHIPBUILDING COMPANY, CHESTER, PENN.

Purchasing Agent: H. W. Scott.

J. N. Pew, hull 39, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs, 4300 IHP; 3 SE Scotch boilers, 15-10x 11-11¼; keel Nov5/20; launch Apr 23/21; deliver July/21, est.

Agwiharve, hull 40, tanker A. G. W. I. S. Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 12 loaded speed; 12,500 DWT; single screw QE engs, 4300 IHP; 4 SE Scotch boilers, 15-10 x11-11¼; keel Nov26/20; launch Apr 2/21; deliver July/21, est.

Agwimex, hull 41, tanker A. G. W. I. S. Co; sister to above; keel Dec8/ 20; launch July18/21, est.

Agwiscot, hull 42, tanker A. G. W. I. S. Co; sister to above; keel Dec23/ 20; launch July2/21, est; deliver July 30/21, est.

Agwistates, hull 43, tanker A. G. W. I. S. Co; sister to above; keel Jan3/21; launch July16/21, est; deliver Aug15/21, est.

David McKelvey, hull 45, tanker Tidewater Oil Co; 430 LBP; 59 beam; 25-7 loaded draft; 11 loaded speed; 10,600 DWT; TE engs, 2600 IHP, est; 3 SE Scotch boilers, 15-10x11-11¼; keel Feb 23/21; launch June 4/21; **deliver June30/21.**

No name, hull 46, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs, 4300 IHP; 3 SE Scotch boilers, 15x11-11¾; keel Apr/21; launch Aug30/ 21, est; deliver Sept30/21, est.

No name, hull 47, tanker Sun Oil Co; sister to above; keel Apr/21; launch Sept3/21, est; deliver Oct 3/21, est.

TERRY SHIPBUILDING CORP., SAVANNAH

Purchasing Agent: H. A. Bittner.

Hull 69, oil-barge builders' acct; 285 LBP; 44 beam; 21 loaded draft; 3500 DWT.

Hulls 70, 71, 72; sisters to above; work suspended.

TEXAS STEAMSHIP COMPANY, BATH, MAINE

Purchasing Agent: A. R. Weber.

Illinois, hull 31, tanker Texas S S Co; 415-10 LBP; 56 beam; 25-7¾ loaded draft; 11½ loaded speed; 9600 DWT; TE engs, 3000 IHP; 3 Scotch boilers, 15-3x11; keel Oct 19/ 20; launch June11/21; deliver July 2/21.

No name, hull 32, tanker Texas SS Co; sister to above; keel Nov10/20.

American Lakes

ANCHOR SHIPBUILDING CO., WASHBURN, WIS.

Purchasing Agent: Geo. F. Morgan.

Double ended ferry, Hudson & Athens Co; 113 LBP; 33 beam; 7 loaded draft; 8 loaded speed; Ingersoll-Rand Diesel engs, 300 IHP; keel Feb / 21; launch May / 21; **deliver July/21.**

Canadian

CANADIAN VICKERS, LTD., MONTREAL

Topdalsfjord, hull 82, single - screw steel 2-deck cargo Norwegian-America Line; 365 LBP; 49½ beam; 29 loaded draft; 11½ loaded speed; 6400 DWT; TE engs, 2600 IHP; 3 Scotch boilers, 14-9 with superheaters; keel July29/20; launch May5/ 21; deliver July16/21, est.

DAVIE SHIPBUILDING & REPAIRING COMPANY, LTD., LAUZON LEVIS, P. Q., CANADA

Purchasing Agent: N. W. Van Wyck.

Canadian Challenger, hull 476, single - screw cargo Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 D WT; TE surface cond engs, 3000 I HP; 3 Scotch marine boilers, 15-6x 11-6; keel May 14/20; **launch July 7/21.**

On the Pacific Coast

United States

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Purchasing Agent: O. W. Street.

Hammac, hull 5274, tanker USSB; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec engs, 2600 IHP; 3 Scotch marine boilers, 15x11-9; launch May25/21; **deliver July/21.**

Submarines USN: S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145; launch Jan5/21; S-41, hull 146.

Alameda Works

Hamer, hull 5273, tanker USSB; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec engs, 2700 IHP; 3 Scotch marine boilers, 15x11-9; keel Nov120; launch May21/21; **deliver July/21.**

Chilore, hull 5309, combination ore and coal carrier Ore Steamship Co; 571-6 LOA; 550-1 LBP; 72 molded beam; 44 molded depth; 32-4 loaded draft; 11½ loaded speed; 20,000 D WT; Curtis turbines with Falk reduction gears, 5000 SHP; 3 Scotch SE boilers, 17-6x12, each 4287 sq ft; oil burners.

Lebore, hull 5310, combination ore and coal carrier Ore Steamship Co; sister to above.

F. H. Hillman, hull 5311, tanker Stand Oil Co of Cal; 500 LBP; 68 beam; 25-11 loaded draft; 11 loaded speed; 15,000 DWT; rec engs, 4000 IHP; 3 Scotch marine boilers, 16x 12-9; keel Jan10/21; launch July/21, est; deliver Nov1/21, est.

H. M. Storey, hull 5312, tanker Stand Oil Co of Cal; sister to F. H. Hillman; keel Jan19/21.

W. S. Rheem, hull 5313, tanker Stand Oil Co of Cal; sister to F. H. Hillman; keel Mar1/21.

HANLON DRYDOCK & SHIPBUILDING CO., OAKLAND

Purchasing Agent: R. Barker.

Dan F. Hanlon, hull 89, steam schr. D. J. Hanlon; 2500 DWT; 1400 IHP engines; 2 B&W boilers.

LOS ANGELES SHIPBUILDING & DRYDOCK CO., SAN PEDRO

West Faralon, hull 32, steel cargo USSB; 430 LBP; 54 beam; 28-2 loaded draft; 10½ loaded speed; 11,000 DWT; TE engs, 3500 IHP; 3 Scotch single end, 15-9; keel Sept 27 / 20; launch Apr19/21; deliver July/21, estimated.

West Greylock, hull 33, steel cargo USSB; sister to above; keel Nov10/ 20; launch June / 21; deliver Aug 9/ 21 est.

West Prospect, hull 34, steel cargo USSB; sister to above; keel Dec31/ 20; launch July/21, est; deliver Sept 14/21, est.

West Chopaka, hull 35, steel cargo USSB; sister to above; keel Feb24/ 21; launch Sept6/21, est; deliver Nov25/21, est.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: W. E. Hostetter.

Bohemian Club, hull 2862, tanker USSB; 425 LBP; 57 beam; 26 loaded draft; 10,000 DWT; rec eng; three Scotch boilers, 15-2x11; keel Oct23/ 20; launch May14/21; **deliver July 6/21.**

Tustem, hull 2863, tanker USSB; sister to the above; keel Nov24/20; launch June15/21; deliver Aug15/21, estimated.

Lubrico, hull 2864, tanker USSB; sister to above; keel Jan/21; launch June15/21; deliver Aug30/21, est.

H. T. Harper, hull 163, tanker Standard Oil Co of California; 330

LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engs; keel Oct/20; launch June16/21; deliver July/21, est.

Tamiahua, hull 165, tanker S. P.-Atlantic S S Co; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; rec engs; 3 Scotch boilers, 15-9x12; keel Feb28/21; **launch July2/21**; deliver Aug6/21, est.

Birkenhead, hull 166, tanker for Vacuum Oil Co; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec engs; 3 Scotch marine boilers, 15-2x 12; keel Dec9/20; **launch July9/21**; deliver Aug20/21, est.

NAVY YARD, PUGET SOUND

Medusa, repair ship for government; 460 LBP; 70 beam; about 19 loaded draft; 17-5 loaded speed; turbine eng, 7000 IHP; 2 WT express type boilers; 10,000 tons disp; keel Jan2/20; launch and deliver dates not set.

Holland, submarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K loaded speed; turbine eng, 7000 IHP; two WT express type boilers; 10,000 tons disp; keel Apr11/21.

NAVY YARD, MARE ISLAND

California, battleship USN; 600 L BP; 97-3½ beam; 30-3 loaded draft; 21 loaded speed; 32,300 disp; turbo-electric engs, 26,800 SHP; 8 Bu's express boilers, 50,984 sq ft; keel Oct 25/16; launch Nov 20/19; deliver Aug/21.

Montana, battleship USN; 660 LB P; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 disp; turbo-electric engs, 60,000 SHP; 12 Bu's express boilers, 74,040 sq ft; keel Sept 1/20.

Wasmuth, destroyer USN; 310 LB P; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 disp; geared turbine eng, 26,000 SHP; 4 Normand boilers, 27,000 sq ft; keel Aug12/19; launch Sept15/20.

Trever, destroyer USN; sister to above; keel Aug12/19; launch Sept 15/20.

Perry, destroyer U S N; sister to above; keel Sept15/20.

Decatur, destroyer USN; sister to above; keel Sept15/20.

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

La Purisima, hull 23, Isherwood tanker Union Oil Co; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engs, 2800 IHP; 3 Scotch boilers, 14x12; keel Dec22/20; launch Aug/21, est; deliver Sept/21, est.

Silvanus, hull 25, Isherwood tanker Nederlandsch - Indische Tankstoomboot Maatschappij; 412 L B P; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engs, 2700 IHP; 3 Scotch boilers, 15-6 x 11-7; keel Oct20/20; **launch June30/21**; deliver July/21, est.

Semiramis, hull 26, Isherwood tanker Nederlandsch-Indische Tankstoomboot Maatschappij; same as above; keel Nov5/20; launch July/21,est. deliver Aug1/21, est.

TODD DRYDOCK & CONSTRUCTION CORP., TACOMA

Purchasing Agent: C. L. Bankson.

Omaha, hull 100, scout cruiser US N; 555-6 LOA; 550 LBP; extreme beam 55-4; molded beam 54-9; depth molded 26; mean loaded draft 13-6; disp 7100 tons; Westinghouse Parsons turbines and reduction gear, 105,000 IHP; designated speed 34; 12 Yarrows WT boilers; keel Dec6/18; launch Dec14/20.

Milwaukee, hull 106, scout cruiser USN; sister to above; keel Dec13/18; launch Mar24/21.

Cincinnati, hull 107, scout cruiser USN; sister to above; keel May15/20; launch May23/21.

UNION CONSTRUCTION CO., OAKLAND

Tampa, hull 16, cutter USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engs, 2600 IHP; 2 WT boilers; keel Sept27/20; launch Apr16/21; deliver Aug1/21, est.

Haida, hull 17, cutter for USCG; same as the above; keel Sept27/20; launch Apr19/21; deliver Aug15/21, estimated.

Mojave, hull 18, cutter U S C G; same as the above; keel Apr16/21; launch Sept1/21, est.

Modoc, hull 19, cutter USCG; same as above; keel Apr19/21; launch Sept1/21, est.

Shawnee, hull 20, cutter USCG; 150 L O A; 30 beam; 13 - 6 loaded draft; 12½ loaded speed; 1000 DW T; rec engs, 1000 IHP; 2 WT boilers; keel June1/21; launch Sept1/21, est.

Achatina, hull 21, oil tanker Anglo-Saxon Pet Corp, Ltd; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec engs, 2600 IHP; 3 Scotch marine boilers, 15 - 6 x 11-7; keel Dec15/20; launch May21/21; **deliver July/21.**

Ampullaria, hull 22, oil tanker Anglo-Saxon Pet Corp, Ltd; sister to Achatina; keel Feb5/21; launch July 2/21; deliver Aug13/21, est.

Amalthus, hull 23, oil tanker Anglo-Saxon Pet Corp, Ltd; sister to Achatina; keel Mar 12 / 21; launch Aug13/21, est.

All cutters on transverse system; others on Isherwood system.

Canadian

CHOLBERG SHIPYARD, VANCOUVER, B. C.

Purchasing Agent: W. Meed.

Sir Henry Drayton, hull 5, 4-masted barkentine Victoria Shipowners, Ltd; 250 LOA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel; shaft logs fitted for auxiliary but no machinery installed; keel May 15/20; launch Aug1/21, est.

No name, hull 6, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel June4/20; launch Oct 1/21, est.

No name, hull 7, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel Feb/21.

J. COUGHLAN & SONS, LTD. VANCOUVER, B. C.

Purchasing Agent: J. Joseph.

Canadian Transporter, hull 20, steel freighter Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE eng, 3000 IHP; 3 Scotch boilers, 15-6 x11-6; keel Jan6/21.

Canadian Freighter, hull 21, steel freighter Canadian government; sister to above; keel Jan6/21.

PRINCE RUPERT DRYDOCK & ENGINEERING COMPANY PRINCE RUPERT

Canadian Scottish, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Sept27/19; launch May17/21.

Canadian Thrasher, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Oct20/19; launch Aug 15/21, est.

These vessels are being completed by the Wallace Shipbuilding & Drydock Co, North Vancouver. The terms are time and material plus 8 per cent.

WALLACE SHIPBUILDING & DRYDOCK CO., VANCOUVER, B. C.

Coastwise steamship Canadian Pacific; 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel Oct/20; launch July /21, est.

Miscellaneous Construction

COLUMBIA STEEL COMPANY, PITTSBURG, CALIF.

Steel castings for many steel vessels now under construction in the Pacific Coast yards, including the dreadnought Montana and the sister ships 49, 50, 52; also for Coast Guard cutters under construction in the Union Const. Co. yard.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO., PHILADELPHIA

Twelve Parsons manganese bronze propellers for scout cruisers 4, 5 and 6 building by Todd Drydock & Const. Corp., Tacoma. Two right-hand and two left-hand propellers for each vessel. Weight of propellers 13,200 pounds each; diameter 11-3; pitch 11-10.

ALLAN CUNNINGHAM COMPANY, SEATTLE

On order and under construction: 6 steam and electric steering gears; 13 steam and electric anchor windlasses; 18 steam and electric and hydro-electric and hand capstans; 37 steam and electric winches.

DOW PUMP & DIESEL ENGINE COMPANY, ALAMEDA

H. T. Harper, motorship Standard Oil Co; one 200 IHP, two 267 IHP Diesel auxiliary electric drive engs.

JAMES C. H. FERGUSON, SALES AGENT, MONADNOCK BLDG., SAN FRANCISCO

American Engineering Co.: Four steering engines, ferries Newark and Piedmont; electric capstans drydock Moore; hydraulic telemotor, hull 2077, Moore; 3 towing machines, 4 steering engines, Shipowners & Merchants' Tugboat Co.

Pneumercator Co.: 116 pneumercators USS California, Mare Island; 40 for 4 Coast Guard cutters, Union Construction; 8 for West Faralon; West Greylock, West Prospect, West Chopaka, Los Angeles; 60 for 12 submarines USN, Bethlehem.

Rostand Mfg. Co.: air ports and lenses complete 4 Coast Guard cutters and 4 Anglo-Saxon tankers, Union Construction Co.

FORD & GEIRRINE, AGENTS, SAN FRANCISCO

National stockless anchors, Upson Walton Co., for hull 165 at Moore's; Dean feed pumps, Dean Bros' Steam Pump Works, for 166 at Moore's; Reliance forced draft equipment, Jno Reid & Co., for hulls 165, 166 at Moore's; National stockless anchors Upson Walton Co., hull 166, Moore's; Dean feed pumps, Dean Bros' Steam Pump Works, hull 23, Southwestern; Willett Bruce whistle control, McNab Co., hulls 16, 17, 18, 19, Union Construction; McNab direction indicators, McNab Co., hulls 16, 17, 18, 19, Union Construction; Reliance forced draft equipment, John Reid & Co., hull 23, Southwestern; Anchor chain, Lebanon Chain Co., hull 23, Southwestern; windlass, gypsy and steering gear, Hyde Windlass Co., hull 20, Union Construction; Welin davits, American Balsa Co., hulls 5311-2-3, Bethlehem, hull 163, Moore; Reliance furnace fronts, John Reid & Co, hulls 2862-3-4, Moore; Willett-Bruce whistle control, McNab Co., hulls 5311-2-3, Bethlehem; McNab direction indicator, hulls 31-2-3-4-5, Los Angeles; Balsa wood for cold storage, American Balsa Co, hulls 5311-2-3, Bethlehem; Welin davits, American Balsa Co., hulls 2862-3-4 and hull 165, Moore; White fuel oil burners, Todd Dry Docks, hull 165, Moore; Mills releasing gear, hulls 24-5-6, Southwestern; Broady releasing gear, hull 165, Moore; balsa wood cold storage, American Balsa Co, hull 23, Southwestern; ash hoist, Hyde Windlass Co, hull 165, Moore.

PACIFIC DIESEL ENGINE COMPANY, OAKLAND

(Formerly Skandia Pacific Oil Engine Company)

Purchasing Agent: A. Bolander.

Ten 850 BHP Werkspoor Diesel engs building for USSB; 6 cyl, 135 RPM; 8 delivered.

One 150 BHP Werkspoor Diesel marine engine.

STEWARD DAVIT & EQUIPMENT CORP., NEW YORK, SAN FRANCISCO, SEATTLE

Steward davits are being installed in the following: At Union Const Co: Coast Guard cutters, hulls 16, 17, 18, 19; Canadian Pacific lines, Wallace yard, Vancouver.

Drydocking and Repairs

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Miscellaneous repairs, drydocking, painting: P. C. Dredging Co. Barge No. 4; W. S. Miller, Venetia, Papeete, David Scannell, Dennis Sullivan, Madrona, El Aquador, Oronite, Kern, Mohican, Lotus, Standard No. 2, Governor Markham, Dredge No. 3, Willpolo. Repairs to winches: Pomona. Condenser repairs: Sherman. Miscellaneous repairs: Steel Age, Govontalo, Ventura, Lewis Luckenbach, Lyman Stewart, Harry Luckenbach, Mexican, Johanna Smith (also drydocking), Cuba, Steel Worker, Washington, Tancred, Rose City. Work on paddle wheel: San Pedro. Engine, boiler, hull repairs, drydocking, painting: Tahiti, Stockton, West Calera. New tailshaft: Atlas. Engine, boiler, hull repairs: Maui, Wairuna, Santa Rita. New propeller: Wm. H. Doheny (complete), Santa Fe Tug El Dorado. Repairs to crankshaft: West Caddoa. Remetal turbine bearing: Andrea Luckenbach. New air pump: Alaskan. Fire damage repairs: E. P. Ripley. Boiler repairs: Steel Worker. Bottom repairs, drydocking, painting: Scopas. Installing Foamite system: Bradford. Fuel pump repairs: Lansing.

Alameda Works

Miscellaneous repairs: Stanwood, Tiverton (also new foremast), Idaho, Katherine, K. R. Kingsbury, D. G. Scofield. Miscellaneous repairs, docking, painting: Sampson, Chas. Van Damme, Alumna, Nome City, Phyllis (repairs to donkey boiler). Installing tailshaft, bearing, propeller: F. S. Loop. New propeller: Fort Bragg.

LOS ANGELES SHIPBUILDING & DRYDOCK CO., SAN PEDRO

Cleaning and painting: Avalon, Bedford, Vaquero; Destroyers Farquhar No. 304, Thompson No. 305, Wickes 75, Evans 78, Aaron Ward, Zellin 313, Bruce 329, William Jones 308, Woodbury 309, Percival 298, Lee 310, Young 312, J. F. Burns 299, Roper 147, Talbot 114 (also repairs to propeller), Waters 115, Dorsey 117 (also repairs to propeller), McCormick 223; Bahada, Lewark. New stern sleeve: Carlos. Minor hull repairs: Destroyer Dent 116, Yale (also to electric equipment), Santa Rosalia. Survey: Scopas. Minor machinery repairs: West Hika, West Togus, Harry Luckenbach (also to boilers), George Washington. Extensive boiler repairs, installing new turbine gears, new gravity lubrication system, superheaters and soot blowers: Edward Luckenbach. New crankshaft for pumping engine and complete overhauling of same: U. S. Dredger.

MOORE SHIPBUILDING COMPANY, OAKLAND

Engine repairs: West Hixton, Bali, Willfaro, Ventura. Drydocking, cleaning, painting, miscellaneous repairs: Wolverine State, Coaba, Brooklyn, Georgina Rolph, Ryder Hanify, Santa Monica, Fernwood, West Camargo, Amy Turner, Tamalpais, King Cyrus, Coquille, Curacao, Lightship 83. Drydocking, cleaning, painting, wheel work: Richmond. Drydocking, miscellaneous hull repairs: Fred Baxter. Wheel work: S. C. T. Dodd, Claremont. Miscellaneous engine and hull repairs: Colusa, Sherman. Miscellaneous repairs: Golden State Pomona.

NAVY YARD, PUGET SOUND

Drydocking, cleaning, painting bottom, miscellaneous repairs: Arkansas, New York, Wyoming, West Jessup. Care and preservation: Seattle, Oregon, Missoula, Charlotte, S. C. Chaser No. 310. Miscellaneous repairs and alterations: Destroyers Bailey, Delphy, Thornton, Tingey, Morris, Swasey, Meade, Gillis, Rathburne, Waters; Orion, Vicksburg, Neptune, Bath, Bothwell, Eagle No. 57, Pawtucket, Sotoyomo, Tatnuck, Iroquois, Mahopac.

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

General repairs: Point Adams, Venezuela (to boilers), West Jena (and dynamos). Winches: West Hika. Electrical: Stockton.

TODD DRYDOCKS, INC., SEATTLE

Repairs account collision damage: West Hartland. Cleaning and painting: Gazeka, Hoquiam, Aberdeen, Barges Nos. 3 and 4. Miscellaneous repairs: Westerly, Forest King, Ensign (also survey), West Ivis, Admiral Watson (also survey), Indianapolis, Sioux, Tacoma. Drawing tailshaft, etc.: Milwaukee. Cleaning, painting, miscellaneous repairs: City of Spokane, West Jessup, Acquilo, Yosemite, Bolcom, Creosote, Dan Kern.

UNION SHIPBUILDING COMPANY, BALTIMORE, MD.

Miscellaneous engine and hull repairs: Palisades, Coelleda, Western Maid, Liberator, Cape Romaine, Des Moines Bridge, Western Star, Capulin, C. H. Cramp, J. M. Guffey, Waban, Osawatamie, Otho, City of St. Joseph, West Huron.

YARROWS, LIMITED, VICTORIA

Cleaning, painting, repairs: Princess Adelaide, Princess Alice, John A. Lee, Princess Charlotte, Scow No. 11, Teco (also making and fitting new propeller). Repairs to bottom due to stranding: Canadian Inventor. Cleaning, painting: Black, Brown, Blue, Green (Consolidated Whaling Corporation).

About Folks

H. F. Alexander has been re-elected president, and A. F. Haines vice-president and general manager, of the Pacific Steamship Company. Both were re-elected to the directorate at the annual meeting July 5. The following other directors were reelected: R. Stanley Dollar, vice-president; A. M. Dollar, treasurer; M. A. Arnold, James D. Hoge, D. C. Jackling, E. A. Stuart, E. C. Ward, Chester Thorne, W. C. Morrow, and B. S. Grosscup.

H. I. Zimet, formerly vice-president of A. F. Thane & Company, has been appointed manager of the export department of the Charles R. McCormick Company, San Francisco.

Elmer Schlessinger of Chicago has been appointed general counsel of the Shipping Board, succeeding E. M. Hyzer, who will remain as assistant.

Commander V. V. Woodward, manager of the repair department, division of construction and repair, Shipping Board, is chairman of a newly-created trial trip board, which will have charge of everything connected with the performance of new vessels. Other members are: H. B. Taylor, chief turbine engineer; G. K. Nichols, Delaware River district manager, and A. Conti, technical department.

Arthur E. Goddard and James S. Milne, directors of the Todd Shipyards Corporation whose terms had expired, were re-elected for terms of four years at the annual meeting.

Frank M. Warren, president of the Port of Portland Commission, has announced the following committee appointments:

River and harbor improvements—Commissioners Warren, Kelly, Metschan and Mahoney.

Auditing and finance committee—Commissioners Metschan, Sargent, Kenworthy and Thompson.

Plant and construction committee—Commissioners Kelly, Mahoney, Porter and Warren.

Committee on employes, salaries, etc.—Commissioners Thompson, Corbett, Metschan and Porter.

Traffic committee—Commissioners Sargent, Kelly, Corbett and Kenworthy.

Committee on consolidation with the dock commission—Commissioners Warren, Sargent and Kelly.

R. McKenzie, first officer of the steamship Prince Rupert, whose license was suspended for two months, has had his license restored by a supreme court judge of Vancouver and costs of the inquiry were charged to the commissioner who suspended him, on the ground that he had not had a fair opportunity to defend himself.

D. G. Cooke, recently appointed Northwest traffic manager of the General Steamship Corporation, with headquarters in Seattle, has assumed his duties, succeeding E. McConalogue, who has taken charge of the company's business on the Columbia River.

Ben C. Dailey, formerly of the Overseas Shipping Company, San Francisco, has become business manager of the American Fumigation Company.

Charles Van Brunt, formerly chief steward of the Pacific Mail steamship Ecuador, has been appointed port steward, San Francisco.

Daulton Mann, assistant general manager of the Pacific Mail, San Francisco, a son; Harry Naughton, assistant general passenger agent, a son; Paul Faulkner, editor of the house publication, a daughter—such is the Pacific Mail log of June.

W. T. Smith, vice-president of the Merchant Shipbuilding Corporation, who had been chairman of the Atlantic Coast Shipbuilding Industrial Board since its inception, resigned as a member June 21. J. L. Ackerson, president of the Atlantic Coast Shipbuilders' Association and also a vice-president of the Merchant Shipbuilding Corporation, who replaced Mr. Smith as a member of the board, was unanimously elected chairman, his nomination being presented and seconded by the labor representatives. William G. Coxe, vice-president of Pusey & Jones, and Ernest Lee Jahncke, president of the Jahncke Drydock & Ship Repair Corporation, New Orleans, have been chosen to fill vacancies in the employers' representation on the board. The five labor representatives are: James J. O'Connell, president of the Metal Trades Department of the American Federation of Labor; L. L. Letteer, International Association of Machinists; John Tobin, International Brotherhood of Blacksmiths, Drop Forgers and Helpers; Charles F. Scott, International Brotherhood of Boilermakers, Iron Shipbuilders and Helpers, and James A. Cooley, International Union of Steam & Operating Engineers.

Captain Omar J. Humphrey of the United American Lines has been presented by the British India Steam Navigation Company with a watch in recognition of his rescue of 611 passengers of the steamship Sazilka, which was wrecked in the Bay of Bengal in 1919. At that time Captain Humphrey was in command of the West Modus.

Harris Livermore has resigned as president of the United American Lines to take up special work for that company and associated firms, especially abroad.

Seth Mann, attorney and manager of the traffic bureau of the San Francisco Chamber of Commerce, was elected president of the Pacific Coast Traffic League at a meeting in San Francisco in June. Other officers were elected as follows: J. H. Lothrop, vice-president; Hal M. Remington, secretary-treasurer. As directors of the association in addition to the president and vice-president, who are ex-officio members of the board, F. P. Gregson, F. M. Hill and J. W. McCune were elected. The latter is secretary of the Traffic and Transportation Bureau of the Tacoma Commercial Club and Chamber of Commerce.

A. C. Clark has been appointed Eastern Washington soliciting agent of the Seattle Port Commission. He will pay particular attention to stimulating shipments of apples and other fruits through Seattle.

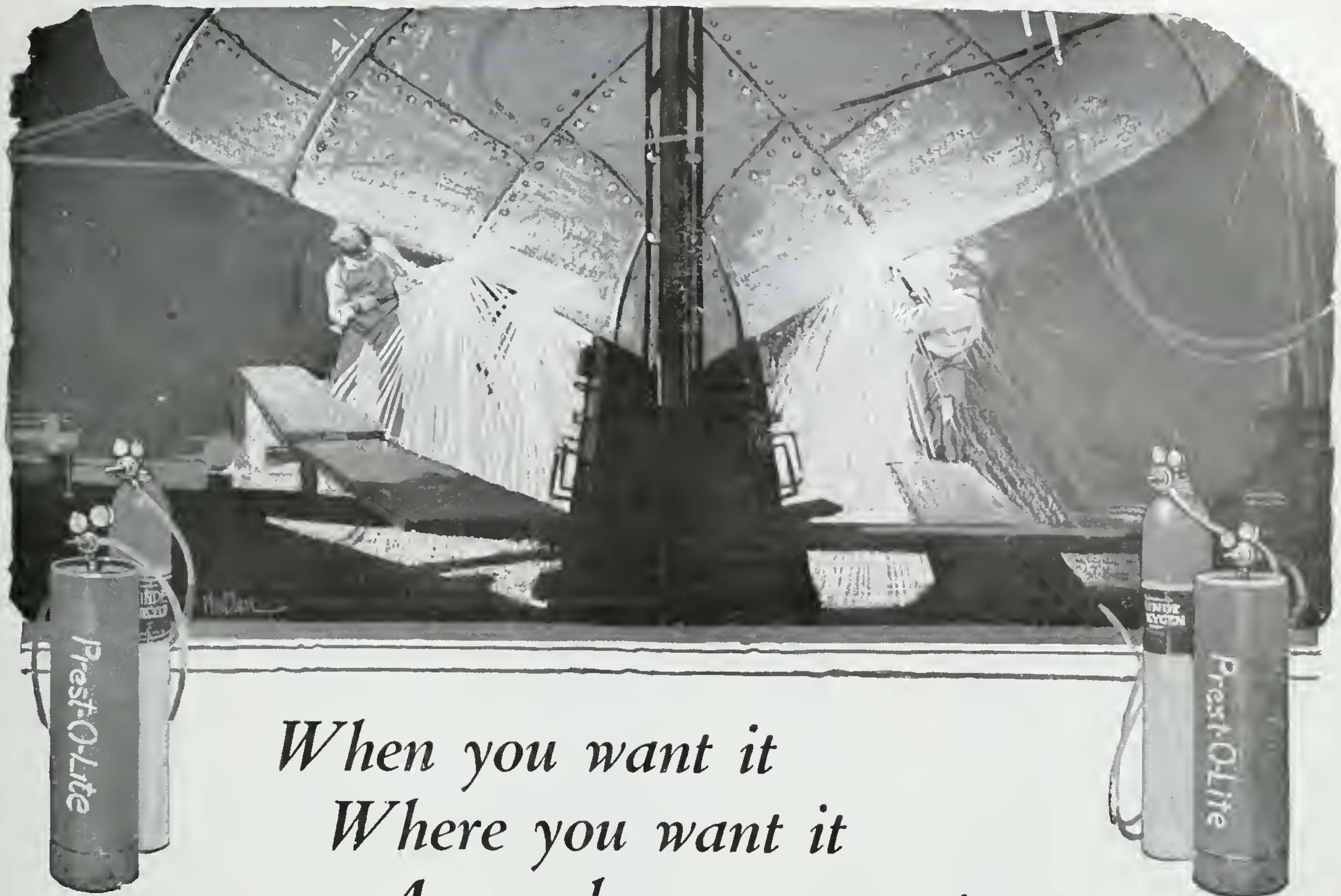
T. B. Randall, assistant marine secretary of the Commercial Union at San Francisco, has accepted an appointment as assistant marine underwriter for the Pacific Coast marine office of the Norwich Union, Union Marine and Phoenix Assurance under George H. Ismon, underwriter. George Hansen, late of the George E. Billings Company, has succeeded Mr. Randall.

Among the shipping men who will sail on the Hoosier State on the San Francisco Chamber of Commerce excursion to the Orient September 22 are: Oliver J. Olson, F. J. Wood, C. A. Thayer. The date has been changed from September 3.

H. E. Murray has been appointed collector of customs at Honolulu, succeeding Malcolm A. Franklin, resigned.

Ralph J. Chandler, president of the shipbuilding company that bears his name, has succeeded A. J. Frey as general manager of the Los Angeles Steamship Company, operator of the Yale and Harvard in the San Francisco-Los Angeles service. Mr. Frey recently was appointed director of operations of the Shipping Board.

J. T. Lilly, of Norton, Lilly & Company, New York, visited the principal ports of the Pacific Coast in July.



When you want it
Where you want it
As much as you want

PREST-O-LITE Dissolved Acetylene and Prest-O-Lite Service have made the oxy-acetylene process indispensable in ship-yards.

Prest-O-Lite
DISSOLVED ACETYLENE

provides ship builders with the purest cutting and welding gas in easily portable, instantly accessible and highly convenient cylinders.

Without such a supply of uniformly high grade gas always at hand, cutters and welders would find impossible many applications of the oxy-acetylene process now in common use.

And Prest-O-Lite Service, operating through forty plants and warehouses, places Prest-O-Lite Dissolved Acetylene at the command of ship-yards anywhere, at any time and in any desired quantity.

THE PREST-O-LITE COMPANY, Inc.
General Offices: Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco
In Canada: Prest-O-Lite Co. of Canada, Limited, Toronto

PW-513-21

FOREIGN TRADE OF UNITED STATES FOR FISCAL YEAR.

The statement of the foreign trade of the United States by months during the fiscal year ended June 30, 1921, just issued by the Department of Commerce, shows a decrease in the value of imports and exports of merchandise, as compared with those during the year ended June 30, 1920. Imports were valued at $3,666,769,537 and exports at $6,519,365,731 during 1920-21, as compared with $5,238,352,114 and $8,108,988,663 during 1919-20. The trade by months and years follows:

	1916-17	1917-18	1918-19	1919-20	1920-21
IMPORTS.					
July	$182,722,938	$225,926,352	$241,877,758	$343,746,070	$537,113,971
August	199,316,480	267,851,767	273,002,914	307,293,078	513,111,488
September	164,038,614	236,196,898	261,668,614	435,448,747	363,290,301
October	178,658,730	221,227,405	246,761,906	401,845,150	333,195,758
November	176,967,749	220,534,550	251,008,037	424,810,272	321,209,055
December	204,834,188	227,911,497	210,885,517	389,710,323	266,057,443
January	241,793,282	233,942,081	212,992,644	473,823,869	208,796,989
February	199,479,996	207,715,540	235,124,274	467,402,320	214,529,680
March	270,257,139	242,162,017	267,595,289	523,923,236	251,969,241
April	253,935,966	278,981,327	272,956,949	495,738,571	254,579,425
May	289,727,161	322,852,898	328,925,593	431,001,944	201,911,185
June	305,622,939	250,350,071	292,915,513	552,605,534	198,000,000
Total	2,659,355,185	2,945,655,403	3,095,720,068	5,238,352,114	3,666,769,537
EXPORTS.					
July	414,713,964	372,758,414	507,467,769	568,687,515	651,136,478
August	510,167,438	488,655,597	527,013,916	646,054,425	578,182,691
September	514,924,131	454,505,904	550,395,901	595,214,266	604,686,259
October	492,813,918	542,101,146	501,860,550	631,618,449	751,214,370
November	516,167,524	487,327,694	522,236,594	740,013,585	676,528,311
December	523,233,780	600,135,006	555,886,112	681,415,999	720,285,774
January	613,324,582	504,797,306	622,036,726	722,063,790	654,271,423
February	467,648,406	411,361,970	585,007,012	645,145,225	486,281,597
March	553,985,699	522,900,238	603,141,618	819,556,037	385,680,346
April	529,927,815	509,412,905	714,890,137	684,319,392	340,364,106
May	549,673,545	550,924,791	603,967,025	745,523,223	329,736,379
June	573,467,789	483,799,399	928,379,203	629,376,757	340,000,000
Total	6,290,048,394	5,919,711,371	7,232,282,685	8,108,988,663	6,519,365,731

At a sale held in Seattle July 12, the full-rigged Chillicothe was sold to Captain John F. Blain and associates for $25,500 to satisfy liens of about $22,000. The Shipping Board's claim, said to be about $140,000, the amount for which the vessel was sold to the Fox interests, cannot be satisfied.

⁂

Announcement has been made in Seattle that the East Asiatic Company would increase its Pacific Coast-Europe sailings from one to two and perhaps three vessels a month during the canned goods season. Bremen has been made a port of call of these vessels.

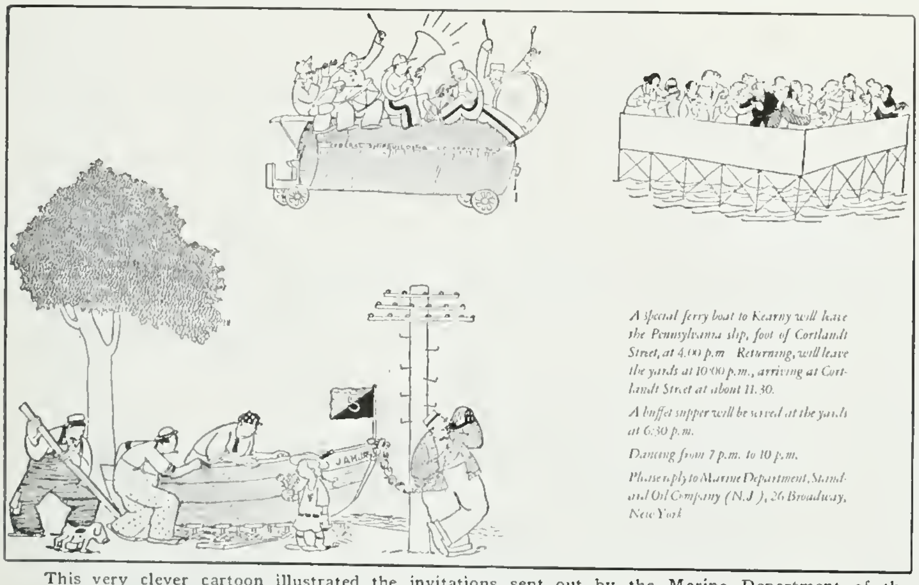
⁂

The recent improvements at the port of Nagoya have made it possible to accommodate larger ships than formerly, vessels as large as 7000 tons now entering, say Commerce Reports. Some foreign liners of the Nippon Yusen Kaisha, on the Shanghai-New York line, the Yokohama-Bombay line, and the Yokohama-Calcutta line are now calling at Nagoya. The port has been suffering from post-war conditions and will greatly benefit by a revival of trade. Most of the cargo shipped from Yokkaichi originates in Nagoya, whose shippers will gain much if they can hereafter enjoy direct exportation facilities.

⁂

Officials of the Los Angeles Harbor Commission and of the Salt Lake Railroad have signed an agreement whereby the city pledges itself in return for concessions by the railroad to put in new wharves and tracks on the east side of the harbor. Authorization of the sale of $2,100,000 in bonds remaining of the 1919 issue is expected to follow. The city now will be enabled to widen the main channel from 500 to 1000 feet. Signing the agreement, negotiations over which had dragged for two years, was facilitated by a visit to Los Angeles by officials of the Union Pacific, headed by President Carl Gray.

According to a cablegram from Consul General C. B. Hurst, Havana, under date of July 2, 1921, the Cuban prohibition against the importation of rice has been removed by a presidential decree. No increase was made in the retail price at which rice may be sold. The prohibition against the importation of rice has been in effect since September 7, 1920.



A special ferry boat to Kearny will leave the Pennsylvania slip, foot of Cortlandt Street, at 4.00 p.m. Returning, will leave the yards at 10:00 p.m., arriving at Cortlandt Street at about 11.30.

A buffet supper will be served at the yards at 6:30 p.m.

Dancing from 7 p.m. to 10 p.m.

Please reply to Marine Department, Standard Oil Company (N.J.), 26 Broadway, New York

This very clever cartoon illustrated the invitations sent out by the Marine Department of the Standard Oil Company of New Jersey for the launching of the tanker J. A. Moffett, Jr., at the yard of the Federal Shipbuilding Company, Kearney, New Jersey, Thursday, July 14, 1921.

Deaths

James Prentice Sneddon, general superintendent of the Babcock & Wilcox Company, June 11.

Captain Alfred Stetson, superintendent of the Griffiths & Sprague Stevedoring Company, in Seattle on June 13.

Captain John W. Russell, former port warden of Seattle, June 29.

Hugo Holtz, purser of the Oceanic liner Ventura, in San Francisco on June 25.

Captain A. L. Pedersen, president of the Bristol Bay Packing Company, in Seattle July 7.

Frank J. O'Connor, general agent of the Pacific Steamship Company, Portland, Oregon, in Portland July 5.

A. E. Mait, cashier of the General Steamship Corporation, in San Francisco July 15.

Captain H. M. Guptill, master of old-time American sailing vessels and a veteran of the Civil War, in Orting, Washington, July 15 at the age of 86. He was the father of Captain J. E. Guptill of the Admiral liner Wenatchee.

PACIFIC MACHINERY

EXPANSION IN A PORTLAND FOUNDRY

IN these days of industrial pessimism it is a pleasure now and again to meet with optimistic manufacturers who have the courage of their convictions. The American Marine Iron Works of Portland, Oregon, prior to the war manufacturing jobbers in foundry and machine shop work, at the outbreak of hostilities considerably expanded their plant and entered heartily into the business of making ship castings. During the emergency shipbuilding period they turned out practically all of the castings for the wooden vessels built by the Standifer Construction Corporation and for the steel vessels built by the same firm. They are now completing the castings for the five 12,000-ton steel tankers which the Standifer yard is building for private account. In connection with this particular order the American Marine Iron Works turned out some very notable propeller castings, as described in an article in a former issue of Pacific Marine Review. These propellers cast in one piece weighed over 11 tons and were 18 feet 3 inches in diameter.

Prior to the war the American Marine Iron Works had patented and developed a valveless pump. Work on this machine had stopped during the war, but early in the present year the company decided to actively push the business of manufacturing these pumps on a large scale. This necessitated additions to the plant and alterations. Seventy-five feet were added to the foundry. As shown in the illustration, this is of the same construction as the main building. The total length of the foundry is now over 200 feet.

The main bay is 50 feet wide, and the runway for the large crane spanning this bay is extended out of the end of the building for 70 feet into the yard so that large flasks can be taken directly by the crane from their place in the storage yard to the molding floor.

Six-inch valveless pump on test at the dock of the American Marine Iron Works, Portland. This pump driven by a 25 H. P. motor at 200 R. P. M. is delivering 1200 gallons per minute against a total head of 56 feet.
Columbia Commercial Studio

A new fireproof concrete three-story warehouse, 100 feet by 160 feet, is being built to take care of the storage of finished machines, spare parts and stock. This is connected to the dock by a new siding which is so located that cars can be unloaded or loaded by means of the large foundry crane.

The two side bays of the foundry are each 25 feet wide by 200 feet long. On one side half the length of the bay is used for castings up to 1000 pounds, the other half being occupied by the core-makers, core ovens and drying ovens for molds. The large oven in this section of the foundry is of the car type, the cars being built very rigidly of steel and having a capacity of 50 tons each.

In the bay on the other side of the foundry one end is occupied by the cupolas, of which there are two, one 40 inches and the other 72 inches inside the lining. The latter is said to be one of the largest cupolas on the Pacific Coast. These cupolas are served by a 15-ton traveling electric crane and by three pneumatic cranes of 2-ton capacity each. In the other end of this side bay small light castings are made up to 50 pounds.

This part of the shop was especially fitted to manufacture castings for drag saw engines, and the company is particularly proud of the work that they have turned out in making the cylinder for the small engines driving these saws. These cylinders are made of semi-steel to stand 100 pounds pressure with a wall thickness of only 3/16 of an inch, and the greatest care is necsary in preparing the semi-steel mixture and in the molding work in order to make a sound casting under such conditions. The American Marine Iron Works have had great success with these particular castings. On one run of 565 cylinders cast and machined, not a single defective casting was found.

In this section of the foundry the American Marine Iron Works are also manufacturing Johnson's safety floor drains, which are also very light in section although of quite large size. This bay is fitted with one Herman plain jar molding machine and two Mumford combination jar squeeze molding machines. The main bay of the foundry is equipped with a large Herman plain jar molding machine, and it has been found that these machines in many cases have increased the output by over 100 per cent.

The firm is patentee, sales agent and manufacturer of Beers Victory pipe bending machine. This machine, which has on several occasions been described in the columns of Pacific Marine Review, has achiev-

General view of the American Marine Iron Works showing additions to foundry and foundations for new warehouse

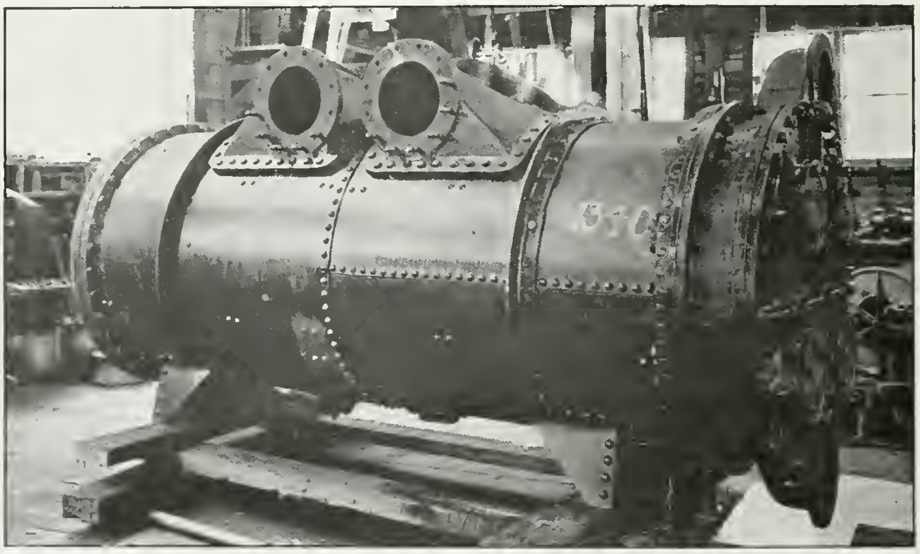
Columbia Commercial Studio

ed quite a reputation for itself in the cold bending of pipe. Sizes up to 6 inches can be easily bent cold without filling, and great speed and economy are realized, particularly in the making of standard multiple bends.

The dock at the American Marine Iron Works is of the double deck type, 400 feet long and 100 feet deep, with direct connections to sidings from transcontinental railways. There is 30 feet of water at this dock at low tide, so that large vessels can discharge cargoes here without difficulty.

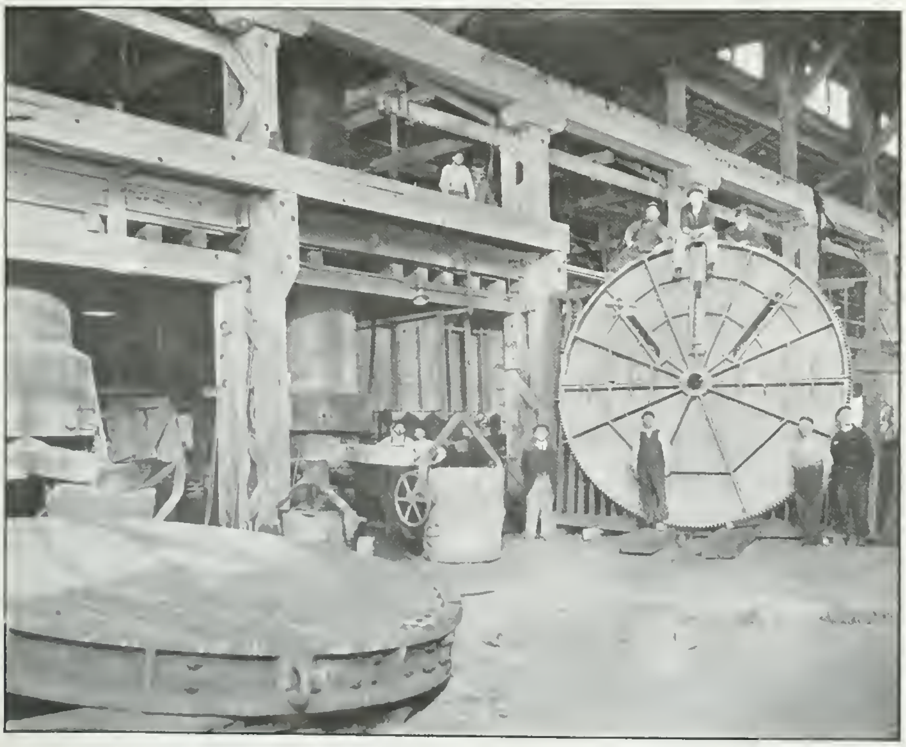
The firm has been rather proud of its record for quick deliveries of castings to the shipyards. The story of one job will illustrate the speed with which this work can be accomplished when it is done in a well-organized foundry by men who go after the work with a will.

At nine o'clock on a Sunday morning a telephone order came in for two wildcats for windlasses on a ship building at the Standifer Construction Corporation. By half past two the superintendent had gotten his crew together, patterns being delivered to them about three o'clock. The first wildcat was cast at 11:30 that night, the men then going to lunch and coming back to start on the second wildcat. At three o'clock in the morning the first wildcat, still in the flask in which it was cast, was shipped to Standifer's yard. At 6:30 Monday morning the second wildcat was cast, and at eight o'clock in its flask was on the way to Standifer's yard.



Snow type condenser built by the American Marine Iron Works

These castings weighed over 4000 pounds each. The second casting was delivered within seventeen hours from the time the patterns had been received in the foundry. Both cats were cast from the same cupola. The castings, which turned out to be clean, strong, sound metal, were machined and on board the tanker by Wednesday morning, delaying the ship's sailing date by only one day.



View in the foundry of the American Marine Iron Works showing one of the cupolas and a large gear casting 13 feet 6 inches in diameter used in Beers pipe bending machine

Columbia Commercial Studio

SOME OBSERVATIONS ON CALIFORNIA INDUSTRIES

By FRANK R. DEVLIN
Former President California State Railroad Commission

IN my opinion, the one thing upon which the material prosperity of California depends more than any other, is the economical, timely and intelligent development of the hydro-electric resources of the state.

California more than any other state in the Union, and perhaps, indeed, more than any other section of the world, has been blessed in natural resources. First the lure of the mines arrested the attention of the world and beckoned the hardy pioneers to the new Eldorado of the West. Then came the transition from mining to agriculture, followed by the marvelous development of the deciduous and citrus fruit industry. Now the state's magnificent harbors and the rivers tapping its fertile valleys presage a wonderful shipping future, and it takes no great vision to foresee its opportunities, facing as it does the certain and comparatively early development of the Orient.

It has always been recognized that the only serious handicap to California as a manufacturing state is the lack of cheap fuel. Nature in disposing of her wonderful bounties was most generous to our state, but California never possessed coal either in character or amount that would be of any appreciable value in manufacturing industries.

With the discovery and development of the California oil fields some years ago, it was hoped that this important link, so necessary to the strength of California's chain of development, was supplied. But the uncertainty of oil production, and the ready absorption of the California supply abroad as well as at home, reduced very measurably the hope that California was ready to take her position in the front rank in the manufacturing world as she had in practically every other line of commercial development. Today experts are endeavoring to estimate how long the California oil supply will last, and feverish effort is being made to discover other oil deposits throughout the state. At the same time engineers and economists are endeavoring to determine how long the supply in the coal fields will satisfy the demands of the nation; survey is being made of the vast coal fields of Pennsylvania, West Virginia, and other coal producing sections.

California has, however, in another form and in an amount that is little short of stupendous, potential fuel and power that will, in my opinion, if intelligently developed, make California the leader as a manufacturing state as it was in mining and as it is in fruit raising.

The tremendous waste of power in this state which has been flowing down the mountain gorges and to the valley streams and thence to the sea in the form of unharnessed and unchecked hydro-electric power is something almost appalling. Science has demonstrated that these millions upon millions of horsepower can be brought from the mountain gorges to the valleys to aid irrigation; to the seaboard to aid manufacture; to the railroads to facilitate transportation; and to the homes to make even more comfortable the residents of California.

With the readjustment period through which we have been passing, will come, in my opinion, an abnormal period of development. Industry and manufacturing will be promoted on a larger scale than ever before. But the one thing that the promoters of large manufacturing industries will first demand before locating a plant will be sufficient and permanent fuel or power. Plants investing millions and tens of millions will look further than a fuel supply for five years, or ten years, or twenty years; but they will make inquiry as to what the fuel or power supply will be fifty years hence.

Unquestionably the most permanent, if not indeed the only permanent, supply of power that nature guarantees will be that of hydro-electric.

The Pacific Coast possesses approximately two-thirds of the potential hydro-electric power of the United States. Is there any question as to the future of California as a manufacturing state with this power available and waiting only the development and conversion from waste water into electric energy? The answer should be No; but the answer should be qualified, and I again repeat what I said at the outset—namely, the one thing upon which the material prosperity of California depends more than any other is the economical, timely and intelligent development of her hydro-electric energy.

Timeliness means now. That is, it means an immediate recognition of our potential hydro-electric power possibilities and an anticipation of the demands which, if we are to enjoy the benefits of those resources, soon will be upon us.

Economical development means comprehensive, business-like, scientific development with due regard to proper co-ordination of the various hydro-electric developments throughout the state.

Intelligent development means a recognition by the public that the development of the hydro-electric resources brings an added value, and added income and added prosperity to every resident of California whether immediately engaged in the electric development work; whether cultivating the fields or the orchards; whether engaged in merchandising in the larger cities or towns of our state; or whether indeed employed as an artisan in any of the various industries of the state.

Intelligent development can be had only through a recognition by our people of the fact that fair and honest treatment must be accorded those who undertake such work.

HEAT LOSSES FROM BOILER SCALE AND SOOT

By F. A. PAGE
Boiler Inspector

THE hard coating of insoluble matter precipitated by boiler feed waters on the water heating surfaces of steam boilers is called scale. Should this deposit be an insoluble powder anywhere inside of the water or steam space, it is called sediment.

Both scale and sediment are poor conductors of heat, both cause overheating of boiler shells, and wherever there is a deposit of sediment or scale, we are most likely to find evidence of corrosion.

One of the principal objections to boiler scale of ordinary thickness is, that it may cause the metal over the fire to be so highly heated as to cause burning. The leakage of joints and tube ends, so caused, results in corrosion and other forms of rapid deterioration.

So far as evaporative efficiency is concerned, soot on fire surfaces is often as effectual a heat retarder as is ordinary scale. Soot is known to be a very good non-conductor of heat, in fact so much so that, according to authorities, the heat resistance of soot is approximately forty times that of boiler steel, or, in other words, a coating of soot one-tenth of an inch thick would offer as much resistance to the transmission of heat as a boiler plate four inches thick.

Water is a poor conductor of heat, and the heat is in most cases applied to the bottom of the shell or tubes. The resulting circulation is generally conceded to travel in vertical lines or planes, the heated water passing upward, its place being taken by slightly cooler water in its turn. Therefore, to secure the best results in evaporative efficiency, the contact or medium of heat transmission between the furnace fire and the water must be in the cleanest and most perfect condition possible, and maintained in that condition. The steel shells or tubes are the mediums, and good mediums, when clean. The instant this outer or inner surface—we are dealing principally with the inner surface—becomes coated or insulated in any way, there is an immediate reduction in the evaporative efficiency of the boiler, which depends upon the amount, solidity and general character of the coating or scale. A very thin scale frequently produces an easily detected loss of efficiency. In conjunction with the loss of efficiency, the presence of scale in a boiler seriously increases its wear and tear. Do not turn cold water into a boiler which is already hot in order to crack the scale to loosen it, so that it can be easily removed, for such a course is disastrous to a boiler and the boilermaker will be required to do much work before your boiler will be fit for service.

From experiments by J. A. Carney (see Proceedings of the American Institute of Mining Engineers, 1897), on the effect of scale on the transmission of heat, it was shown that a calcium sulphate scale of 0.11 of an inch thick caused a loss in evaporative efficiency of over 7 per cent. Other experiments made since, have shown a loss of nearly 10 per cent in evaporative efficiency with a coating of scale only 3/64 or 0.047 of an inch thick.

The evaporative loss of efficiency is largely due to the solidity and general character of scale. Some scales offer as high as one hundred times the resistance to the transmission of heat that boiler steel offers. It is a self-evident fact that it is of the utmost importance that boiler shells and tubes be kept as free from scale as possible, in the interest of safety and also to promote evaporative efficiency and prolong the life of a boiler. (From California Safety News.)

PROPELLING MACHINERY U.S.S. TENNESSEE

(Continued from page 486)

Auxiliary Turbine-Generators

In each engine room there are three 300-Kw. direct-current turbine-generators, which supply current for light, for operating the various motor-driven auxiliary machines throughout the ship, and for exciting the generator fields.

Pumps

The main and auxiliary condensate and circulating pumps, as well as the oil-cooler circulating pumps, are motor driven. The vacuum is normally maintained by air ejectors, but as this is the first use of air ejectors for main condensers on a battleship, steam-driven air pumps are also installed.

The Propeller Motors

The four propeller motors are of the Westinghouse induction type, and each is rated at 8375 horsepower at its maximum speed.

In order to provide two speed ranges, each motor can be connected so as to provide either 24 or 36 poles. The primary, or stator, has two independent windings, one for each pole arrangement: while the secondary, or rotor, has a single winding, with cross connections, which forms a polar winding terminating in three slip-rings with the 24-pole arrangement, and a squirrel-cage winding with the 36-pole arrangement.

The motors are operated at their lowest speed by connecting them for 36 poles and supplying them with power from the main generators operated at their lowest speed, so that for a ship speed of 10 knots the motor speed is 78 r. p. m. and the generator speed is 1430 r. p. m. To increase this speed, the speed of the generators is increased, and at the maximum generator speed the motor speed is 118 r. p. m. and the ship speed 15 knots. To still further increase the ship speed the motors are connected for their 24-pole winding, and by again varying the generator speed a range of motor speeds of from 118 to 180 r. p. m. is obtained, and the speed of the ship is increased from 15 knots to maximum. One turbine generator gives sufficient power up to about 17 knots, while above that speed both are required. This arrangement gives a wide speed range, and at the same time makes it possible to obtain efficient operation of the turbines for both low cruising speeds and full speeds.

The motors are ventilated by means of duplicate motor-driven exhaust blowers mounted on top of each motor. Each blower has a capacity of 12,500 cubic feet of air a minute, and draws air through the cores and windings, and discharges it into ducts to the deck. These blowers are assisted by fan vanes on the rotors of the main motors, which can supply sufficient air to permit the motors to be operated at full load for short periods, even if the exhaust blowers fail.

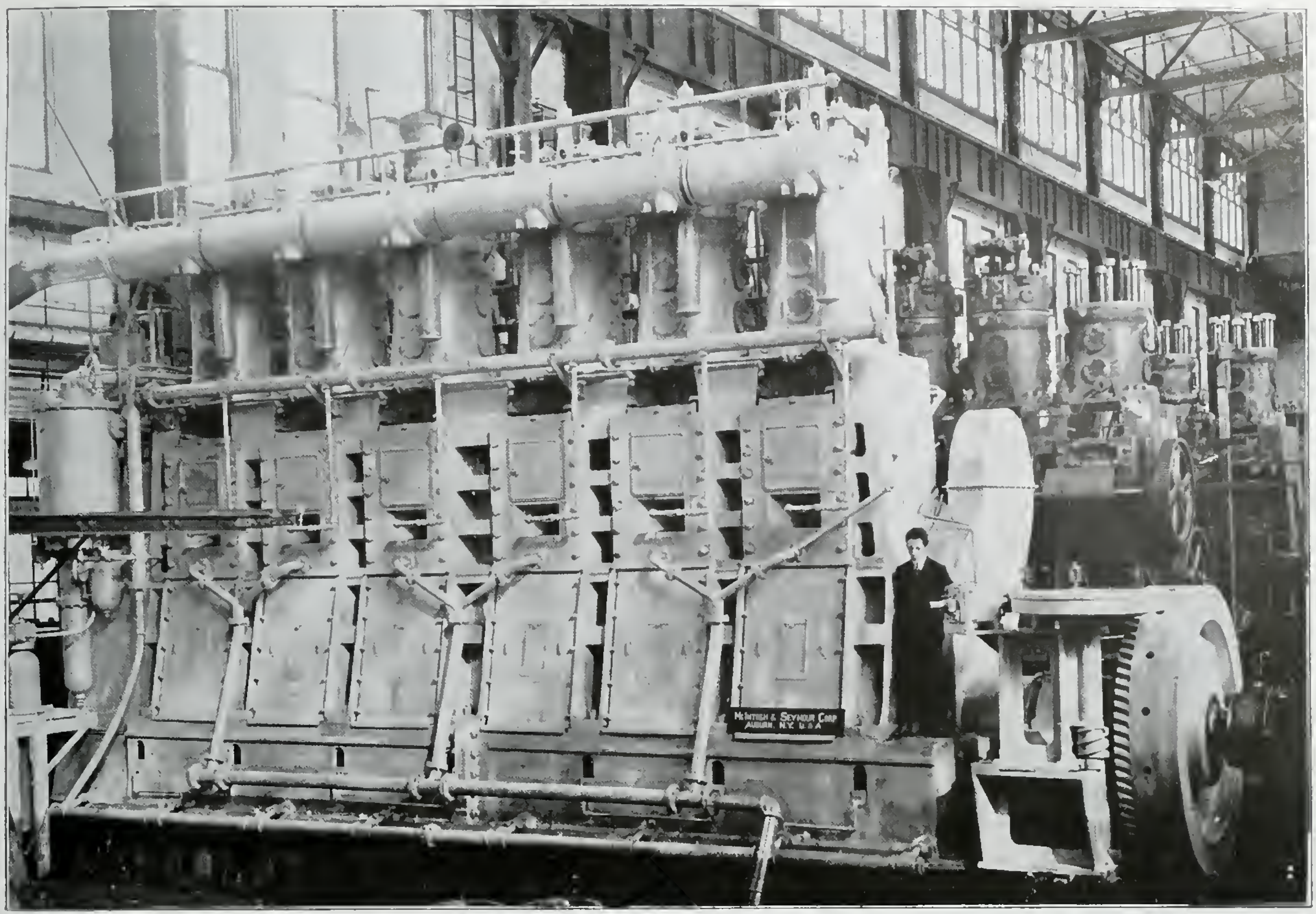
A small direct-current motor is geared through a clutch to each propeller shaft and is used to turn the motor, rotor and the propeller slowly for inspection or repair.

The Control Room

All of the apparatus necessary for controlling the propelling machinery is located in the control room. The switches are mechanically operated by means of levers, which are arranged in a row down the center of the room. All of these levers are mechanically interlocked so that it is impossible to close or open wrong switches. Facing these levers, in plain sight of the operator, is a set of meters giving full information as to the operation of the machinery and the condition of the various circuits.

All of the switches handling the main high-voltage current are of the oil-break type and are capable of being opened safely under full load and voltage, although normally they will not be so opened. The majority of the switches are located in a structure in front of the control board, where they are fully safeguarded with covers but are easily accessible. A special device has been built, by means of which the oil tanks of the switches can be easily lowered so as to expose the contacts. A system of electrical interlocks and disconnecting devices protects the men against possibility of faulty operation, and also makes it possible to render safe for inspection the circuits of any one or two motors while the others are in operation.

All of the main turbines, generators, motors and control equipment, the auxiliary turbo-generators, air ejectors, circulating and condenser pumps, and the motors for operating the steering gear and the deck winches, were manufactured by the Westinghouse Electric & Manufacturing Company.



The above picture shows one of our 1200 I. H. P. Directly Reversible Marine Engines on the test floor. A pair of these engines have been installed on the M/S "KENNECOTT."

Other sizes available for Marine work, 390, 640, 1550, 2000 and 3000 I. H. P. all four cycle and directly reversible.

DIESEL TYPE MARINE ENGINES

HEAVY DUTY

McINTOSH & SEYMOUR CORPORATION

AUBURN, NEW YORK

149 BROADWAY
NEW YORK

412 BISBEE BLDG.
JACKSONVILLE, FLA.

815 SHELDON BLDG.
SAN FRANCISCO, CAL.

(Continued from page 490)

period, handling 16 to 18 charges during that time. A spraying device is arranged in each filter with a nozzle for each leaf. This spraying device moves slowly across the leaves releasing small streams of water in a rotary movement at 45 pounds pressure. All of the water used in sluicing the filters is in turn filtered through mud presses, and the sweet water recovered is used over again in sluicing the Sweetland filters.

Char Filters

The next step in refining sugar liquor is the removal of the coloring matter through contact with animal charcoal. From the Sweetland presses the liquor goes to receiving tanks and is separated into various grades according to purity. From these tanks it runs by gravity to the charcoal filters below. The filters are cylindrical cast iron tanks 26 feet high by 10 feet in diameter, having a capacity of 52 tons of animal charcoal. The purity of the first liquor leaving the char filter is 99.2 to 99.5. This liquor is used for the manufacture of high grade specialties.

The average rate of flow through the char filters is 1250 to 1350 gallons per hour per filter under pressure of 15 to 18 pounds, the liquor being kept in contact with the charcoal for approximately 6½ hours. The filters are usually operated on raw liquor for 16 hours and handle during that time about 20,000 gallons.

The poorer grades of raw liquor are then put through the same filter and either sent on to be made into granulated sugar or returned to be refiltered, according to quality.

After the bone charcoal has become clogged up, the liquor remaining in the filter is allowed to settle and then forced out by hot water from the top. The hot water is run through the charcoal and the liquor taken off to a point where it reaches a density of 30 brix. After that it is run into the sweet water system through the evaporator storage tanks to be concentrated and again put through the refining process. The hot water is continued through the charcoal and taken off as sweet water until it has been reduced to a point where the sucrose content is 21/100 of 1 per cent. After that the wash water goes to waste. On a 2000-ton capacity run approximately 900,000 gallons of water per day is required for the washing of the char filters alone.

Handling charcoal for these filters is one of the large items of expense in sugar refining. The washed charcoal is first dried and then burned in charcoal kilns at temperatures up to 850 degrees Fahrenheit. In the Crockett refinery this process of revivifying the charcoal takes place about twice a week, and the charcoal has an average life in the refinery of about five years. The charcoal used is burned animal bones ground and grated to a specified fineness.

Liquor Gallery

From the charcoal filters the sugar liquor flows through the liquor gallery. Here it is run through a series of weirs and troughs, and the operator can view and test every product and divert it according to its color and purity, to its proper station.

From the liquor gallery the liquor is pumped into storage tanks near the vacuum pans and drawn into these pans to be boiled under vacuum at a temperature of 170 degrees Fahrenheit. As the water is boiled off, the sugar crystallizes, is dropped into mixers below, and from the mixers into centrifugal machines where the moisture is spun off in the same way that the raw sugar was washed in the centrifugals at the beginning.

Leaving these machines the white granulated sugar contains approximately 2 per cent moisture. It is carried by conveyors and elevators up to large cylindrical drums where by the revolution of the drum it is sifted as hot dry air is blown over and through it. This dry granulated sugar then passes to magnetic and size screens, the various sizes being led off from these screens into storage bins. The bins are fitted with spouts and automatic weighing machines for feeding the sugar into sacks and various small containers.

Bar sugar and powdered sugar are made from granulated sugar ground in special mills constructed for the purpose. Bar sugar has a very fine grain and powdered sugar no grain whatever. Confectioner's sugar has to be specially boiled, and cube sugar is made from granulated to which syrup is added as a binder.

"Lumps Is Lumps"

Rather an interesting factor developed in the sugar business in connection with the use of cube sugar during the war. Cube sugar is made in cubes and cubelets, a cubelet being about two-thirds of a cube. The use of cubelets in restaurants was encouraged as a possible means of saving sugar, and now it is found that there is very little demand for cubes, the restaurant people finding that there is a great saving of sugar when cubelets are placed on the tables instead of cubes. We suppose this is due to the psychological idea that a lump is a lump and most people are trained to have one, two or three or four lumps to the cup of coffee or tea, and their beverage seems just as sweet with two cubelets as with the two cubes.

Power Plant

All of the machinery in the Crockett refinery, including the belt conveyors, is operated by electric motors, some 3000 K. W. hours being required for this purpose. This power was formerly purchased from the Pacific Gas and Electric Company, but at the same time it was necessary to heat over a million gallons of water daily for refinery use and to evaporate approximately 640,000 gallons from sugar solutions, all of this heating being done by steam. This presented a very interesting opportunity for steam engineers, and it was solved by C. C. Moore & Company through the installation of a modern boiler plant and turbo-electric generators, this installation having been erected during the last three years.

This plant consists of ten 600 H. P. Babcock & Wilcox boilers arranged with entirely automatic control for oil burning. Peabody type furnaces are used with Leahy rear shot oil burners. Each boiler is insulated with 4 inches of asbestos covered with a steel casing. These boilers supply steam at 150 pounds throttle pressure to three non-condensing Curtis type turbines direct connected to 1500 K. W. 480-volt 60-cycle 3-phase General Electric generators. The pressure of the exhaust steam is 10 pounds, and this steam is used for heating purposes all through the refinery.

Last year the fuel used per ton of sugar melted was 13 per cent less than the average for the previous five years, and at the same time the power used in the refinery was produced as a by-product. At the present time when all of the exhaust steam is used, the power generated will cost about one-tenth of a cent per K. W. hour. Its present operating system does not at all times use all of the exhaust steam; the present cost of power is one-quarter of a cent per K. W. hour average. In order to permit all of the exhaust steam to be used and so reduce operating expenses the corporation is now installing two 14-foot Calandria vacuum pans.

THE NMCo

"NACO"

Electric

CAST STEEL

ANCHOR CHAIN CABLE

marks the only advance in chain making in keeping with shipbuilding progress that has brought us the great steel ships of today.

It is the only cable that affords the measure of protection adequate to safeguard these mammoth liners of the deep.

Its tested strength is 40 per cent greater than that of any other type of Anchor Chain Cable.

That is why it meets the emergency and holds up under greater strains and more severe shocks than any other type of cable.

This is why Naco Chain affords the greatest protection to lives, cargoes and ships.

THE NATIONAL MALLEABLE CASTINGS CO.

CLEVELAND, OHIO

MINIMIZING THE DANGER OF FIRE AT SEA

Many perils menace the men who go down to the sea in ships, but of them all none holds more terrors than that of fire.

The ordinary landsman usually considers himself safe from danger of fire if he has at hand a sufficient water supply and means of bringing that supply in contact with the fire, and hence to his mind the danger of fire in a ship surrounded by an ocean of water seems very remote.

The difficulty of the situation is immediately apparent, however, when we consider the fact that if the fire in a ship gained much headway it would be necessary to pump into the ship, in order to put out the fire, sufficient water to sink the ship.

Keeping this phase of the matter in mind, we are not surprised when statistics show that 75 per cent of the fires at sea result in total loss of the ship.

Any system, therefore, which without the use of water will make ships, and particularly ships carrying oil fuel in bulk and those burning oil fuel in their furnaces, safe, is a very welcome addition to the equipment of our merchant marine and a very profitable investment for our ship owners.

Abundant proof has already been given in actual performance at sea that the installation of Foamite Firefoam Systems on shipboard provides adequate protection for safety against all fire danger, and meets that danger with a promptness and efficiency which is little short of miraculous.

THE great danger of fire on board steamships, especially those using oil for fuel, is of course in the boiler room, where the fires are kept constantly going, to generate the steam necessary to keep the ship on her course.

A Firefoam System has been designed by the Foamite Firefoam Company to protect steamships against this danger. This system has been approved by the United States Steamboat Inspection Service and it is the only system with this approval.

In addition to the Firefoam System for protection of boiler room, the Foamite Firefoam Company will furnish the "F D W" fire alarm system.

This system consists of a fire detecting wire installed throughout all parts of the ship, connected to an indicator located on the bridge or in the captain's or chief engineer's quarters. It is always on duty, and will give an alarm of fire in any part of the ship within a few moments after the fire starts. This fire detecting wire system, combined with Firefoam extinguishing equipment, provides safety, heretofore impossible, against fires at sea.

With all the advance in safety appliances on land and sea, there has been a steady increase in the number of fires in steamships, with a corresponding increase in loss by damage to ships and in destruction of cargoes.

Oil As Fuel

The adoption of oil as a fuel for steamships is responsible for a large percentage of the increase in the number of marine fires. During the last twelve months the loss resulting from such fires has been particularly heavy.

It is practically impossible to avoid a dripping of oil in front of the boilers. This oil in the vicinity of the fuel oil pump is always in danger of being ignited.

A break in the oil line or in any of the units necessary to convey the fuel from the tank to the burners is another grave menace. A break in the pipe line may flood the stokehold. A fire breaking out under such conditions will spread instantly throughout the entire hold.

Oil drippings from the engine room and boiler hold may find their way into the bilge, forming a great fire menace aboard ship.

Oil, which is regarded as the greatest of fire hazards on land, is even more dangerous in the hold of a ship. Water has little effect on blazing oil, because the oil will float on water, and, continuing to burn, spread the fire.

Any attempt to extinguish burning oil confined in the tank or hold of the ship, by the use of water, can have but one result — the water sinks to the bottom, and the flaming oil rises as the quantity of water pumped into the tank increases, and the flaming liquid may overflow or communicate the flames through the hatches to the deck above. The more water that is applied to burning oil, the greater may be the danger.

A survey of losses resulting from marine fires demonstrates the necessity of meeting this contingency. Firefoam does meet it, overcomes it, conquers it.

Firefoam eliminates this danger, because it is lighter than the lightest oil. It floats and flows freely over the burning surface, covering it completely, smothering the flames, and making it difficult to reignite any surface covered by it.

Firefoam is a fire-smothering, fire-extinguishing foam which covers all burning objects as with a blanket. It puts out a fire quicker than any other extinguishing agent and prevents reignition, excluding the oxygen and stifling the flames!

It coats and clings to all surfaces. It floats on the most inflammable liquids. It is effective against fire of any origin or nature!

It stays where it is put, not only while the fire is burning, but long after there is any possibility of its blazing up again.

Firefoam is applicable to every form of fire-risk, and can be applied through Firefoam automatic sprinklers, through stand-pipes and hose lines, and by means of portable apparatus — Firefoam fire pails, extinguishers, and engines.

There is no risk, however small or large, where Firefoam cannot be supplied to meet the demands of even the most exacting situation.

Firefoam Efficiency

All carbon dioxide gas generated in the apparatus of a Firefoam System is retained in the Firefoam and deposited directly on the burning surface in the form of a blanket of bubbles.

These bubbles resist high temperatures; they are strong enough to last for hours after the fire is extinguished, and leave no damage in their wake.

As the Firefoam can be applied to the danger points in a ship within a few moments after the fire is discovered, and since fires even in oil tanks with a capacity of 55,000 barrels have been put out within a few moments after the Firefoam was turned onto the oil, there is no chance whatever for the oil to become heated and overflow.

Firefoam Does No Damage

Firefoam will not damage anything in a steamship— here again demonstrating its superiority over the use of water. The majority of cargoes are ruined by the application of salt water; the very machinery upon which the ship depends for its power to navigate may be ruined by the application of large quantities of sea water.

Firefoam will not damage the ship's cargo or injure passengers or crew.

Clothing drenched with Firefoam shows no effect of its application after a thorough cleansing.

Aquitania Protected by Firefoam

A Firefoam System was installed on the great Cunard liner Aquitania when she was converted recently into an oil burner. The Aquitania may certainly be called a fire-proof ship. She is protected from stem to stern, from boiler room to bridge, with Firefoam.

S. L. KREIDER
SHIPPING
Gen'l Agent
TOYO KISEN KAISHA
WILLIAMS S. S. CO., INC.
At Los Angeles
375 Pacific Electric Building
At San Diego
239 Spreckels Building

Service for Ship Machinery

A typical Westinghouse marine service

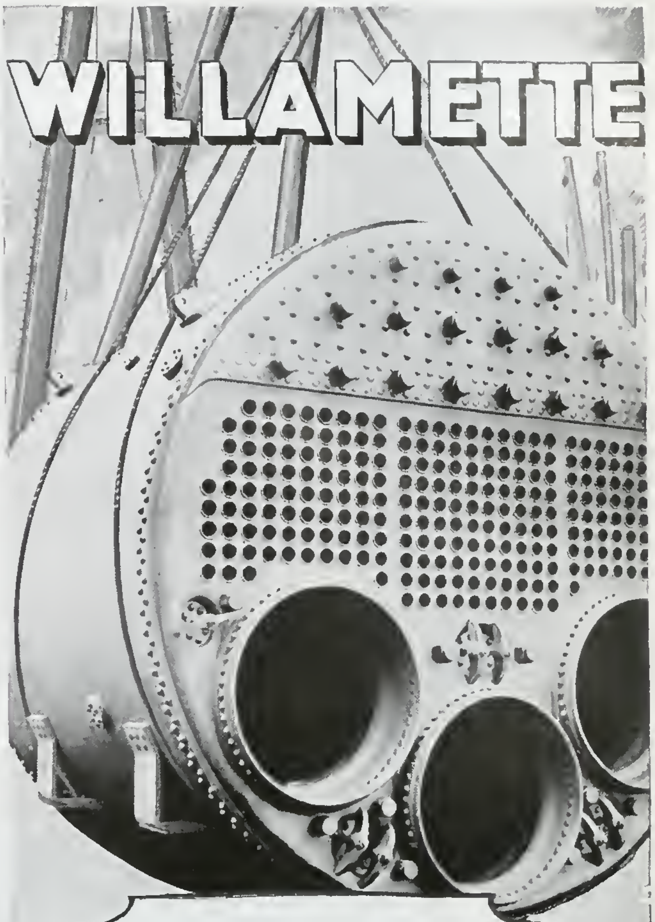
IN order to reduce to a minimum the delays in port for ships using its machinery, the Westnghouse Electric and Manufacturing Company has established marine service stations at New York, Baltimore, Newport News, Savannah, New Orleans, and San Francisco, where stocks of repair parts are kept and a corps of experienced marine engineers, repairmen, and riggers is in readiness. Each station is also supplied with sets of blueprints showing the details of all Westinghouse marine machinery, and each receives complete records and reports on all ships equipped with this machinery.

Each morning the port engineer in charge of the station receives reports of the arrivals in the ports within his territory and details inspectors to visit each Westinghouse-equipped ship. This inspector, with the aid of the chief engineer and the engine-room crew, makes a thorough survey of the equipment and submits a written report to the port engineer with copies to headquarters at South Philadelphia, to the other service stations, and to the owners of the steamship. This report serves as a bisis for repairs on the ship. The necessary repair parts are immediately secured from the local store room and where possible are sent down to the pier by auto truck.

When desired, the Westinghouse organization takes entire charge of the installation of the new parts under the supervision of an engineer, who also conducts dock trials and sea trials when the work is completed.

The service department also supplies guarantee engineers to accompany new ships on their first trips to instruct the crews in the operation of the machinery and to keep performance records.

The Baltimore Westinghouse marine service department going aboard ship



REINFORCED by wide experience covering many important marine operations, the Willamette plant is well prepared to undertake and complete your work with satisfaction, economy and dispatch.

MARINE MACHINERY
MARINE AND STATIONARY BOILERS
DECK MACHINERY AND AUXILIARIES
MARINE REPAIRS OF ANY CHARACTER

Willamette
IRON & STEEL WORKS
Portland, Oregon, U.S.A.

1043 Monadnock Bldg.,
San Francisco, Cal.
1920 L. C. Smith Bldg.,
Seattle, Wash.
Canadian Office
916 Rogers Bldg.,
Vancouver, B. C.

SUTTER 44-19

Mr. Shipowner—Mr. Merchant

Your business is world wide—so is our service.

Shanghai, Sydney, Nagasaki, Africa, no matter where your vessel or goods go, we take care of your insurance problems—and losses.

Would you like to have your own "Insurance Department" without adding a penny to your payroll?

It can be arranged, call Sutter 44-19.

FRANK B. HALL & COMPANY
INCORPORATED
AVERAGE ADJUSTERS & INSURANCE BROKERS
56 BEAVER ST., NEW YORK

SAN FRANCISCO OFFICE—
322 CALIFORNIA STREET

FRANK K. HITCHING

244 California Street Phone Douglas 4705-6

AGENT FOR

YAMASHITA KISEN KAISHA

Australasian Direct Service

REGULAR MONTHLY SERVICE

100 A1 Steamers

— TO —

Auckland, Sydney, Melbourne

(other ports if inducements offer)

	Seattle	Vanc, B C	San Francisco
YOSHIDA MARU No. 1	Aug. 7	Aug. 9	Aug. 15
YOSHIDA MARU No. 2	Sept. 7	Sept. 9	Sept. 15

(Via Los Angeles if inducements offer)

Manufacturers and Agents Attention

ON page 62 of the advertisement section of Pacific Marine Review for July there appeared an article under the caption, "Operators, Attention!" in which there was described an argument which had been started between the United States Shipping Board and certain manufacturers of paint and other marine supplies over the specifications issued by the Shipping Board for paint to be used on its ships. Along with this article there appeared a table showing prices paid by steamship companies and contract prices paid by the Shipping Board for various lines of engine room supplies, in which it was made to appear that the Shipping Board was paying for these supplies an amount greatly in excess of that paid by steamship companies.

The subject matter of this table has been called in question, and it appears from representations made by various manufacturers that the figures are comparatively misleading and in some cases actually in error.

A very slight difference from ordinary standard commercial practice in the specifications of cylinder oil or steam packings might more than account for the differences in price per gallon or pound shown in this table. There might be all kinds of evidence to show that the standard commercial practice was better packing than the "special" specified, but if special specifications have to be lived up to in a contract the contractee must pay the bill.

We are reliably informed that the special grade of high pressure steam packing used by the Shipping Board is bought for $1.50 per pound, not $1.60 as stated, and it is very possible that there are other similar mistakes in the prices named. All such figures must be considered also from the standpoint of the present trend of price reduction, and it is noteworthy that the articles chosen for comparison have no connection with paints, although the article itself emanates from a paint manufacturer and the theme is centered entirely around the alleged abuses in Shipping Board paint practice.

NEW PACKING CATALOG

A CATALOG presenting its full line of packings, gaskets and pump valves is one of the important recent publications of the United States Rubber Company. Fully illustrated, it departs from the usual form of such catalogs and is filled with very definite information regarding each item listed and the specific uses for which it is best fitted.

To assist in the selection of "the right packing for the right place," a classified index of the various styles of packings sets forth the various packings which are recommended for the various conditions of service. The drawings show the details of construction with such clearness that the adaptability of any style of packing may easily be judged.

As the oldest and largest rubber company in the world the United States Rubber Company has a wealth of experience to bring to the aid of its customers and the engineering department of the company is at the service of manufacturers with special problems. The catalog goes into many of these problems, pointing out the special adaptability of each style.

PRATT & WHITNEY STAYBOLT TAPS

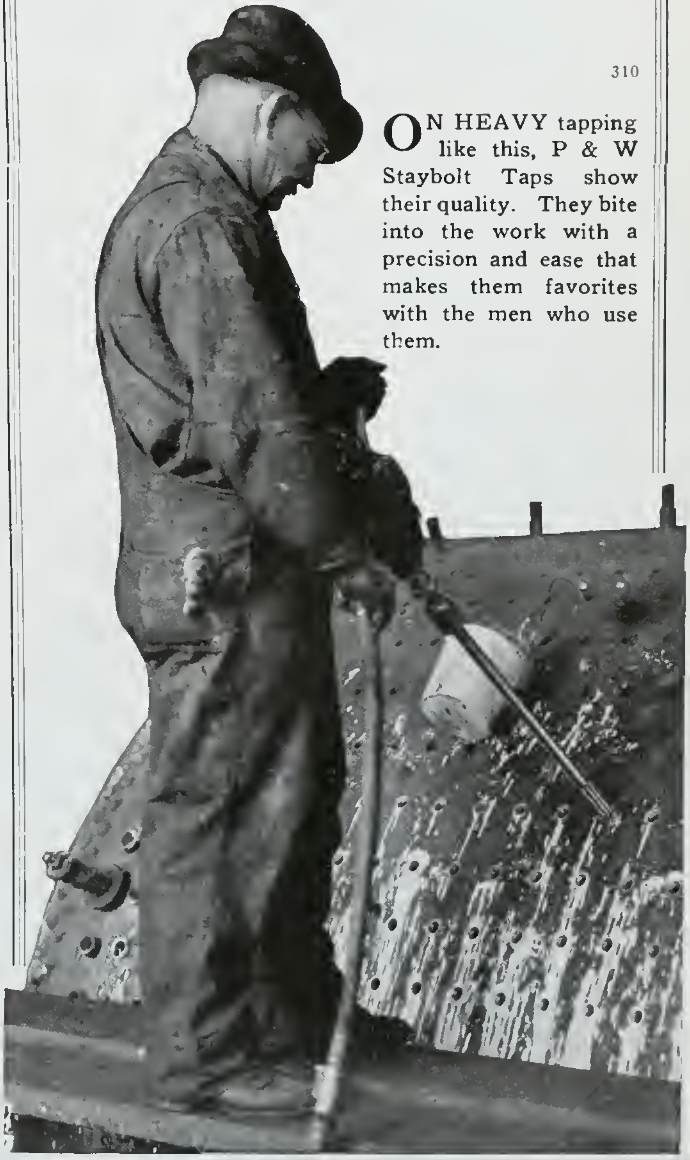
TO MEET all your boiler requirements, we build P & W Staybolt Taps in five standard styles, as well as Spindle Staybolt Taps with and without threaded end and also Combined Reamer and Tap to tap continuous hole in the reamer hole of the far boiler plate.

Our reputation for precision and high quality stands behind these tools. Buy them in any of the styles and sizes listed in our Small Tool catalogue which is yours for the asking.

These taps and our complete line of Small Tools are on sale at our offices in Boston, Philadelphia, Birmingham, Rochester, Cleveland, Detroit, St. Louis, Cincinnati, Seattle, St. Paul, New Orleans, San Francisco.

PRATT & WHITNEY CO.
111 BROADWAY NEW YORK
Works Hartford, Conn.

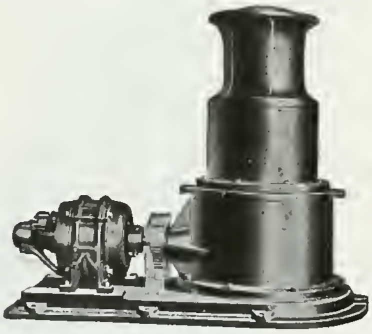
310



ON HEAVY tapping like this, P & W Staybolt Taps show their quality. They bite into the work with a precision and ease that makes them favorites with the men who use them.

NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY
PLANT LOCATED AT HAMPTON ROADS, VA.—THREE LARGE GRAVING DRY DOCKS
Steel, Brass and Iron Foundries, Heavy and Light Forgings, Complete Facilities at one plant for doing any ship repair job quickly
Address 233 BROADWAY, NEW YORK — or — NEWPORT NEWS, VA.

Flory Capstans



STEAM — ELECTRIC — HAND
A Large Line of Standards

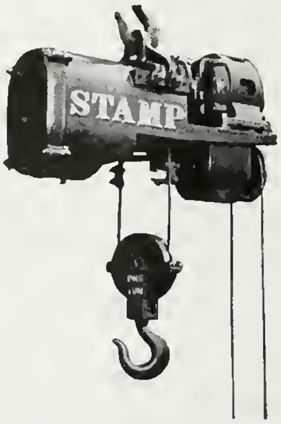
Special Types and Sizes Designed and Built to Order

For Barges—Docks—Tugs—Merchant or Naval Vessels—Dry Docks—Car Pullers

Advise your requirements

S. FLORY MFG. CO.
95 Liberty St., New York Bangor, Penna.
Winches — Windlasses — Capstans — Marine Railway Equipments — Hoists — Cableways

"H'IST 'ER UP"
with a "STAMP"



DO YOU KNOW?

that at a very small cost you can put a STAMP HOIST on the trolley of your large crane and have an auxiliary hoist for light loads, which not only increases the speed of handling but reduces the cost of operation.

Single or variable speed control. Floor or cab operated. ½ to 7½ tons capacity.

STAMP ELECTRIC HOIST CO.
1500 SEVENTEENTH ST., SAN FRANCISCO
Telephone Market 5765

Pacific Marine Review

The National Magazine of Shipping

11,000 TONNER BUILT BY
LOS ANGELES SHIPBUILDING & DRY DOCK CO

September

Pacific Marine Review, Vol. 18, No. 9. Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.

Setting the broken nose of commerce

THE oxy-acetylene welding and cutting torches—those twin metal surgeons—are indispensable in ship yards.

Wherever metals must be cut or joined neatly, quickly and economically the oxy-acetylene process is invaluable.

Prest-O-Lite

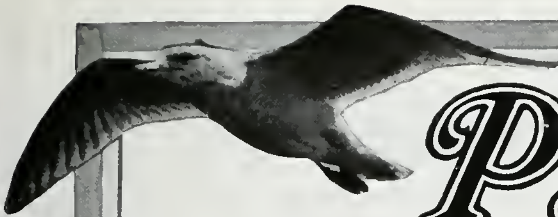
DISSOLVED ACETYLENE

because of its portability, has made it possible to weld or cut in the most inaccessible places. Wherever the job may be—below or aloft, inside or out—Prest-O-Lite goes to the job!

Forty Plants and Warehouses insure a constant and unlimited supply of uniformly pure gas. Write us about the Prest-O-Lite nation-wide service plan.

THE PREST-O-LITE COMPANY, Inc.
General Offices
Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco
In Canada: Prest-O-Lite Co. of Canada, Limited, Toronto

PW-503-21



Pacific Marine Review

CONTENTS

SEPTEMBER, 1921

Frontispiece 43

Argosies of the Argonauts .... Insert

Pacific Coast Fisheries 517

Yachting 521

Editorial 522

What Is Wrong With the American Merchant Marine? 525

Oil Engines and Motorships 526
Progress in Motorship Building; Spanish Diesel Engined Coaster Fitted With Kitchen Reversing Rudders.

Material Handling 531
Conveying and Elevating Machinery in the Sugar Warehouse at Crockett, by Henry T. Hesselmeyer, Chief Engineer Meese & Gottfried Company; Portland's Newest Terminal.

European Marine Notes 536

New Standard Oil Tankers 538

Book Reviews 539

Marine Insurance 541

Full Speed Ahead 546

With the Exporters and Importers 563

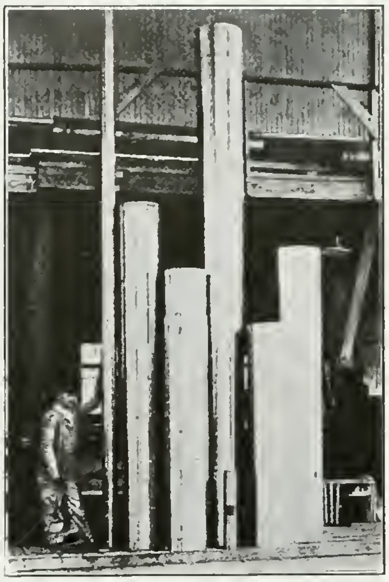
Pacific Machinery 569

Industrial Section .... Ad. page 48

DON'T EXPERIMENT!

Leading Ship Yards Use Our Fluid Compressed Sleeves

READY FOR SHRINKING ON
NO PATTERNS REQUIRED
LENGTHS UP TO 22 FEET
MACHINED TO SIZE WANTED
NO SPLICING—NO JOINTING
DIAMETERS 3" TO 46"
FURNISHED ON SHORT NOTICE

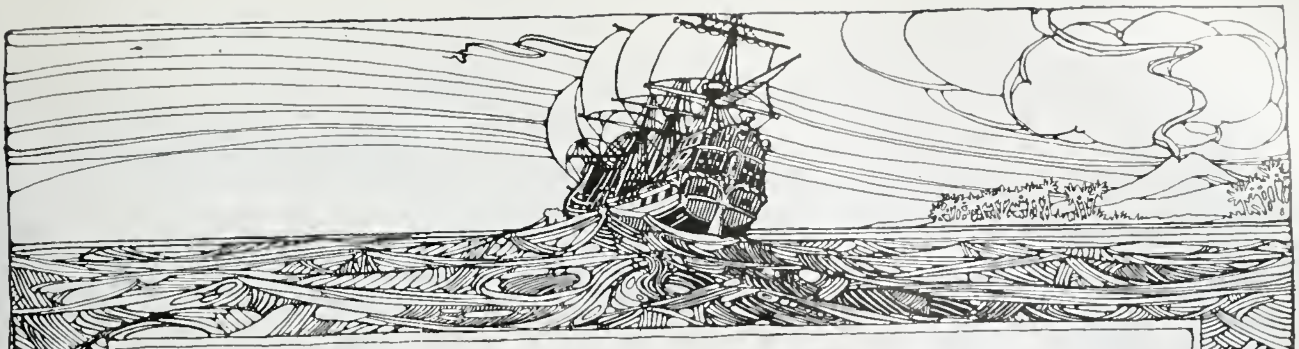


Below is a Partial List of Customers who have used—and are using—our Sleeves.

Some users of our fluid compressed seamless tubes for Propeller Shaft Sleeves and pump and Press Liners and Roll Covers, Ship and Marine Engine Builders:

Wm. Cramp & Son Ship & Engine Building Co., Philadelphia, Pa.
Hardie Tynes Mfg. Co., Birmingham, Ala.
U. S. Navy Department
Federal Shipbuilding Co., Kearny, N. J.
N. Y. Shipbuilding Corp'n, Camden, N. J.
Newport News Shipbuilding & Dry Dock Co., Newport News, Va.
Atlantic Corporation, Portsmouth, N. H.
American Shipbuilding Co., Cleveland, Ohio
Toledo Shipbuilding Co., Toledo, Ohio
McDougall-Duluth Co., Duluth, Minn.
Kraft Ship Yards & D. D. Co., Chicago, Ill.
Saginaw Shipbuilding Co., Saginaw, Mich.
Westinghouse Electric & Mfg. Co., Lester, Pa.
Merchant Shipbuilding Corp'n, Bristol, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Grant-Smith-Porter Ship Co., Portland, Ore.
Pacific Coast Shipbuilding Co., San Francisco, Cal.
Johnson Iron Works, New Orleans, La.
International Shipbuilding Co., Gulfport, Miss.
American Bridge Co., Chicago, Ill.
W. & A. Fletcher Co., Hoboken, N. J.
Robins Dry Dock & Repair Co., Brooklyn, N. Y.
Llewellyn Iron Works, Los Angeles, Cal.
Reading Iron Works, Reading, Pa.
Allis-Chalmers Co., Milwaukee, Wis.
Downey Shipbuilding Co., Arlington, Staten Island
Bath Iron Works, Bath, Me.
Collingwood Shipbuilding Co., Collingwood, Ont.
Staten Island Shipbuilding Co., Staten Island, N. Y.
Groton Iron Works, Groton, Conn.

The Sandusky Foundry & Machine Co.
Sandusky, Ohio



U. S. Government Contracts

We pay taxes, and we are therefore always in hearty sympathy with all legitimate efforts made by Congress to effect economies in our national expenditures.

However, we object most strenuously to having our representatives effect economies by avoiding obligations which have previously been executed in good faith, and that appears to be just what is happening under the present furor for economy at Washington.

Particularly is this true in the matter of the 1916 naval program. In that program vessels to cost some hundreds of millions were authorized by Congress and contracted for in good faith by the Bureau of Construction and Repair of the Navy Department.

These ships have practically all been laid down in the shipyards or navy yards, material has been ordered for them, some ships have been delivered, more are in various stages of completion. The shipyards and navy yards have executed contracts with hundreds of subcontractors in various parts of the country for machinery and material, fittings and equipment, for these vessels, the aggregate involving the work of many thousands of skilled artisans, and now on a plea of economy this work is all in a state of suspense for an indefinite period of delay.

If there were any real economy to be gained by such action, there might possibly be justification, but it is so obvious that delay of this sort will tremendously increase the final cost of these vessels, and the laying off of thousands of additional men consequent on the delay will so obviously increase the general depression, that this action seems not only uneconomical but from a business point of view extremely penny wise and pound foolish if not absolutely senile.

All of the business interests of the industrial and marine centers in the United States should join in a protest to Congress against this action and in a demand for a deficiency appropriation to continue with the work in hand. This should be done entirely on an economic basis and apart altogether from the question of the disarmament conference.

From the sailing ship of earlier days to the specialized, oil-burning, steel cargo-carrier of today; through all its ups and downs to its present outstanding position, the American Merchant Marine has fostered and will maintain those traditions which enrich the history of sea transportation.

For nearly a quarter century, the New York Shipbuilding Corporation has contributed of its skill and its ideals to the upbuilding of that which is best in our merchant and naval fleets of today. The largest single unit in America's shipbuilding capacity, New York Ship started unhampered by limitations of physical layout or inherited practices. Its founders had the vision and the ability to pioneer in the adoption and development of many shipbuilding methods now accepted as standard by all.

These ideals have been steadfastly maintained; and upon the foundation of complete plant facilities and modern steel-working practice there has grown up a tradition of accomplishment in the building of good ships—ships that proudly take leadership in the greater American Merchant Marine that reflect New York Ship's

"Character—Craftsmanship—Service"

NEW YORK SHIPBUILDING CORPORATION

THE ARGOES OF THE ARGONAUTS

FEW Californians realize the importance to California of the harbor of San Francisco, and perhaps this can be brought home to the minds of Californians more forcibly than in any other way by a presentation of the conditions existing in San Francisco Bay itself at the time of the admission of California into the United States. In order to show this condition we are printing herewith a list of the ships in the harbor on September 9, 1850.

This list was furnished us through the courtesy of Mr. F. C. Matthews. Mr. Matthews is a San Franciscan who has been intimately connected with work in the harbor for forty-five years. As a boy he watched with delight the stately clipper ships sailing in through the Golden Gate. Falling in love with these "white-winged darlings of the sea," he made it his hobby to study the history of the sailing ships of the Pacific. The list as prepared by him and as printed below represents a tremendous amount of painstaking research, to which Mr. Matthews devoted much of his spare time for many years.

This list has never been published before in so complete a form. Between the lines our readers will be able to discern much of the adventure, hardship, the brave forward-looking vision, which has built this great state into the place it holds in our American Commonwealth.

We wish to emphasize here the fact that there were in San Francisco harbor as early as September 9, 1850, upwards of 660 sea-going vessels representing the flags of practically every maritime country in the world.

Mr. Matthews promises the readers of Pacific Marine Review in future issues the intimate stories of some of these ships of the later and more famous extreme American clippers of the early fifties.

Vessels in San Francisco Bay September 9th, 1850

NAME	Flag	Rig	Tonnage	Date of Arrival
Abagun	Am.	Bk.	330	July 30, '50
Abby Baker	Am.	Bk.	257	July 24, '50
Acadian	Am.	Bg.	157	Oct. 29, '49
Acadian	Br.	Bg.	368	June 17, '50
Ada	Br.	Bg.	390	Apr. 7, '50
Adario	Am.	Bk.	268	May 9, '50
Adelaide	Am.	Bg.	178	May 5, '50
Adeline	Am.	Sc.	85	June 23, '50
Adeline	Dan.	Bg.	111	June 25, '50
Adirondack	Am.	Sh.	699	Aug. 1, '50
Adventure	Br.	Sc.	102	Sept. 5, '50
A. Emery	Am.	Sc.	98	Sept. 6, '49
Agate	Am.	Bg.	194	Apr. 25, '50
Agincourt	Br.	Sh.	669	July 30, '50
Agnes	Am.	Bk.	206	May 10, '50
A. Hayford	Am.	Bg.	187	Aug. 23, '50
Albree	Am.	Bg.	378	May 3, '50
Alexander	Am.	Sh.	398	June 2, '50
Alexander	Am.	Sc.	69	May 6, '50
Alexandrine	Am.	Sh.	491	July 30, '50
Algoma	Am.	Bk.	293	June 19, '50
Alhambra	Am.	Sh.	694	Oct. 12, '49
Alice	Chile	Bg.	120	Dec. 27, '49
Alice Tarleton	Am.	B.	360	Aug. 10, '50
Almena	Am.	Bg.	175	July 18, '49
Almendralina	Chile	B.	200	Oct. 12, '49
Almira	Am.	Bg.	197	Sept. 5, '50
Alpha	Am.	Bk.	517	Aug. 2, '50
Amelia	Am.	Bg.	136	May 6, '50
Amelia	Br.	Bg.	149	May 6, '50
America	Am.	Bk.	314	July 30, '50
America	Am.	Bk.	178	May 29, '50
America	Hambg.	Bk.	220	July 25, '50
Amity	Am.	Sh.	550	Aug. 15, '50
Amizade	Port.	Bg.	250	Aug. 22, '50
Andrew Scott	Am.	Sh.	318	May 9, '50
Anenome	Br.	Bg.	230	July 6, '50
Anita	U. S.	Bk.	194	June 27, '50
Ann A. Knowles	Am.	Sc.	120	Aug. 11, '50
Ann Mary Ann	Am.	Sh.	380	May 1, '50
Ann Parry	Am.	Bk.	348	Dec. 31, '49
Anne	Am.	Bk.	222	Aug. 29, '49
Annie E. Maine	Am.	Sc.	......	Mch. 7, '50
Anson	Am.	Sh.	300	July 30, '50
Antares	Am.	Bg.	199	Feb. 22, '50
Antelope	Swed.	Bk.	400	July 29, '50
Antelope	Br.	Stmr.	597	Aug. 3, '49
Apollo	Am.	Sh.	412	Sept. 18, '49
Arabia	Br.	Bg.	91	Aug. 10, '50
Arabian	Am.	Bg.	169	Aug. 26, '50
Archibald Gracie	Am.	Bk.	200	July 18, '50
Arco Iris	Am.	Bk.	253	Aug. 22, '50
Ariadne	Hambg.	Bg.	178	Aug. 28, '50
Arkansas	Am.	Sh.	627	Dec. 20, '49
Arno	Am.	Sc.	......	June 20, '50
Artemisia	Br.	Bk.	558	Aug. 5, '50
Astoria	Am.	Sc.	......	Sept. 2, '50
Athol	Br.	Bk.	337	Aug. 13, '50
Attila	Am.	Bg.	206	May 10, '50
Audley Clark	Am.	Sh.	331	Sept. 1, '49
Augustus	Br.	Bk.	......	Sept. 9, '50
Abon	Am.	Sc.	123	Aug. 8, '50
Balance	Am.	Sh.	321	Nov. 23, '49
Barbara	Br.	Bk.	460	July —, '50
Bay State	Am.	Sc.	70	Aug. 14, '50
Bazaar	Am.	Sh.	452	Feb. —, '50
Bee	Br.	Bg.	134	Apr. 10, '50
Belgrade	Am.	Bk.	252	May 28, '50
Bella Pernambucana	Port.	Bk.	217	June 13, '50
Belvedere	Am.	Bk.	390	Oct. 12, '49
Bingham	Am.	Sh.	375	Nov. 4, '49
Birmingham	Am.	Sh.	570	Apr. 7, '50
Blakely	Br.	Bk.	315	Sept. 2, '50
B. M. Prescott	Am.	Bg.	138	May 18, '50
Bolton	Am.	Bk.	220	Dec. 15, '49
Bordeaux	Am.	Bg.	......	Sept. 6, '50
Bostonian	Am.	Bk.	370	Aug. 10, 50
Brazilian	Br.	Bg.	168	Apr. 8, '50
Brilliante	Span.	Bg.	150	Aug. 22, '50
Broadaxe	Br.	Bg.	136	Aug. 2, '50
Brontes	Am.	Bk.	298	Aug. 19, '50
Brothers	Am.	Bg.	200	July 30, '50
Burmah	Am.	Sh.	337	Jan. 3, '50
Burlington	Am.	Sh.	535	June 28, '50
Burnham	Am.	Bk.	350	Mch. 10, '50
Byron	Am.	Bk.	346	July 12, '50
Byron	Am.	Sh.	492	—— —, '49
Cachalot	Am.	Bk.	230	July 1, '50
Caleb Curtis	Am.	Bg.	......	Sept. 8, '50
Cadmus	Am.	Bk.	306	Aug. 24, '50
Caledonia	Am.	Sh.	445	June 15, '50
California	Am.	Bk.	369	Mch. 8, '50
California	Am.	Sc.	72	Mch. 8, '50
California Packet	Am.	Sh.	602	Aug. 24, '50
Callao	Am.	Bg.	156	Aug. 1, '49
Calumet	Am.	Sh.	317	Feb. 26, '50
Camargo	Am.	Bg.	199	Jan. 9, '50
Camilla	Br.	Bg.	202	Aug. 13, '50
Camilla	Mex.	Sh.	325	July —, '50
Cantero	Am.	Bk.	266	Apr. 29, '50

NAME	Flag	Rig	Tonnage	Date of Arrival
Carl & Herman	Hambg.,	Sh.	600	Aug. 5, '50
Carnival du Cheverus	Fr.,	Bk.	316	July —, '50
Caroline Augusta	Am.,	Sh.	406	June 26, '50
Caroline Clark	Am.,	Bg.	162	June 14, '50
Carthagena	Br.,	Bk.	443	July 30, '50
Casilla	Am.,	Bg.	161	Aug. 29, '50
Castilla	Chile,	Bk.	205	July 7, '49
Catharine	Am.,	Bk.	237	Feb. 21, '50
Catharine	Am.,	Sh.	478	Aug. 2, '50
Cayuga	Am.,	Bg.	237	June 16, '50
Cecil	Am.,	Sc.	90	Aug. 13, '50
Centinella	Chile,	Bg.	160	July 7, '49
Ceres	Am.,	Bg.	290	July 28, '50
Ceres	Fr.,	Sh.	323	Dec. 15, '49
Ceylon	Am.,	Bg.	196	June 30, '50
Chariot	Am.,	Sh.	359	Feb. 21, '50
Charles Carroll	Am.,	Sh.	411	Dec. 6, '49
Charles Herbert	Am.,	Sc.	67	June 29, '50
Charlotte	Am.,	Bg.	170	July 24, '49
Charlotte	Am.,	Sh.	390	June 22, '50
Chase	Am.,	Bk.	152	—— —, '49
Chateaubriand	Fr.,	Sh.	567	Feb. 22, '50
Chatham	Am.,	Bg.	171	Nov. 1, '49
Cheslea Smith	Am.,	Sloop	11	May 31, '50
Chenango	Am.,	Bk.	361	Aug. 7, '50
Chesapeake	Am.,	S. S.	392	Aug. 7, '50
Chesapeake	Am.,	Sc.	99	Feb. 2, '50
Cheshire	Am.,	Sh.	499	June 17, '50
Chilo	Am.,	Sh.	420	Aug. 21, '50
Christiana	Am.,	Bg.	226	Mar. —, '50
Christiana	Am.,	Sh.	620	Aug. 27, '50
Circassian	Br.,	Bk.	219	Aug. 4, '50
Citizen	Am.,	Sh.	464	Jan. 11, '50
Citizen	Am.,	Sh.	360	June 6, '50
Clarissa Andrews	Am.,	Sh.	396	Aug. 12, '50
Clarissa Perkins	Am.,	Sh.	240	Aug. 22, '50
Clyde	Br.,	Sc.	40	Oct. 23, '49
Cohota	Am.,	Sh.	603	Aug. 13, '50
Col. Fanning	Am.,	Sc.	138	May 18, '50
Colorado	Am.,	Bg.	199	June 15, '50
Columbia	Am.,	Bg.	156	Aug. 24, '50
Columbus	Am.,	Sh.	344	Apr. 30, '50
Condor	Ec.,	Bg.	84	July —, '50
Confederacion	Chile,	Bk.	331	Feb. —, '49
Congress	Am.,	Bk.	273	June 16, '50
Constance	Am.,	Bk.	390	Aug. 10, '50
Constant	Br.,	Bk.	535	Aug. 17, '50
Constellation	Am.,	Sh.	276	June 13, '50
Coosa	Am.,	Bk.	258	Mch. 10, '50
Cordova	Am.,	Sh.	332	Apr. 8, '50
Corea	Am.,	Sh.	375	Aug. 27, '50
Cornelia	Am.,	Bg.	96	July 19, '50
Correo del Pacifico	Chile,	Bg.	127	Sept. 8, '50
Correo del Talcahuano	Chile,	Bg.	104	Mch. —, '50
Correo del Valparaiso	Hwn.,	Bg.	120	—— —, '49
Corvo	Am.,	Sh.	340	July 31, '50
Creole	Am.,	Sc.	142	June 23, '50
Crescent	Am.,	Sh.	340	May 27, '50
Crocus	Am.,	Bg.	221	June 23, '50
Cuba	Am.,	Bk.	240	Sept. 6, '50
Curacoa	Am.,	Bg.	131	Aug. 14, '50
Curtis	Am.,	Bk.	249	Mch. 8, '50
Cynosure	Am.,	Sc.	......	Sept. 5, '50
Cyrus	Am.,	Bk.	247	Feb. 6, '50
Dalmatia	Am.,	Sh.	358	Aug. 27, '50
Damariscove	Am.,	Sc.	102	July 12, '50
Delaware	Am.,	Bk.	290	Aug. 16, '50
Delahos	Am.,	Bk.	......	Sept. 9, '50
Deteroit	Am.,	Bg.	......	Sept. 4, '50
Diadem	Am.,	Sh.	657	June 28, '50
Diana	Peru,	Bk.	168	June 25, '50
Dianthe	Am.,	Bk.	284	June 23, '50
Dispatch	Br.,	Bg.	139	July 30, '50
Dimond	Am.,	Bk.	199	Mch. —, '50
Don Juan	Am.,	Bk.	254	June 6, '50
Dos Amigos	Mex.,	Sc	97	June 17, '50
Dos Hermanos	Ec.,	Bk.	220	Mch. —, '50
Dover	Am.,	Bg.	167	Aug. 20, '50

NAME	Flag	Rig	Tonnage	Date of Arrival
Dudley	Am.,	Bk.	249	May 1, '50
Dumbarton	Am.,	Sh.	499	Aug. 30, '50
E. A. Slicer	Am.,	Sc.	56	June 23, '50
Eagle	Am.,	Bg.	......	Sept. 9, '50
Eagle	Am.,	Bg.	190	June 23, '50
Eclipse	Br.,	Bg.	191	July 28, '50
Ecuador	Br.,	Stmr.	221	Aug. 23, '50
Edgar	Am.,	Sh.	420	Aug. 10, '50
Edinburgh	Am.,	Bg.	179	Aug. 30, '50
Edward	Am.,	Sh.	350	Dec. 13, '49
Edwin	Am.,	Bk.	239	May 4, '49
Eleanor	Am.,	Sh.	301	Mch. 30, '50
Elida	Nor.,	Bk.	280	Aug. 20, '50
Eliza	Am.,	Bk.	240	June 2, '49
Eliza	Br.,	Sc.	33	Apr. 7, '50
Eliza Adams	Am.,	Sh.	408	Jan. 28, '50
Eliza Taylor	Am.,	Bg.	134	Aug. 3, '50
Eliza Warwick	Am.,	Sh.	530	July 25, '50
Elizabeth	Am.,	Sh.	397	Sept. 17, '49
Elizabeth	Am.,	Bk.	......	Sept. 7, '50
Elizabeth	Am.,	Sc.	176	Apr. 7, '50
Elizabeth	Br.,	Sc.	21	Feb. 10, '50
Elizabeth B.	Am.,	Sc.	98	May 6, '50
Ella Frances	Am.,	Bk.	328	Dec. 15, '49
Ellen Brooks	Am.,	Sh.	464	June 16, '50
Emily	Am.,	Sh.	301	July 31, '50
Emma	Am.,	Bg.	150	Jan. 9, '50
Emma Prescott	Am.,	Bg.	185	May 23, '50
Emma Skerrett	Br.,	Bg.	......	Sept. 9, '50
Emperor	Am.,	Sc.	110	July 8, '50
Empire	Am.,	Sc.	79	June 2, '50
England	Br.,	Sh.	724	July —, '50
E. Randall	Am.,	Bg.	143	May 6, '50
Esperanze	Hanov.,	Bk.	360	July 30, '50
Eudoras	Am.,	Sc.	144	Sept. 15, '49
Eugene	Am.,	Sc.	161	Apr. 22, '50
Eureka	Am.,	Bk.	372	June 17, '50
Eureka	Am.,	Bk.	318	Aug. 3, '50
Eureka	Am.,	Bk.	277	Aug. 23, '50
Europe	Am.,	Sh.	557	Feb. 8, '50
Excel	Am.,	Sc.	81	July 29, '50
Ezpeleta	Am.,	Bk.	180	May 6, '50
Fabius	Am.,	Bg.	188	Aug. 6, '50
Falmouth	Am.,	Sc	97	Aug. 12, '50
Fame	Am.,	Sc.	95	Aug. 4, '50
Fame	Br.,	Bk.	202	Mch. —, '50
Fanny	Am.,	Sh.	800	Aug. 5, '50
Fanny	Br.,	Bg.	260	June 28, '50
Far West	Am.,	Sh.	598	Dec. 11, '49
Favorite	Am.,	Sc.	38	July —, '50
Fawn	Am.,	Bg.	......	Sept. 8, '50
Fayaway	Am.,	Sc.	77	June 5, '50
Felix Araucano	Chile,	Bg.	103	—— —, '49
Felix Carolina	Chile,	Sc.	86	Mch. —, '50
Flinders	Br.,	Sc.	18	Aug. 13, '50
Flora	Am.,	Bk.	338	Dec. 20, '49
Flora	Hambg.,	Bg.	137	Aug. 4, '50
Florence	Am.,	Sh.	360	Aug. 26, '49
Florida	Am.,	Bk.	200	Aug. 15, '50
Frances Ann	Am.,	Sh.	446	Nov. 1, '49
Frances Helen	Am.,	Sc.	95	Aug. 21, '50
Franklin Adams	Am.,	Bg.	198	Apr. 28, '50
Frederick Warren	Am.,	Bk.	353	Aug. 10, '50
Friendship	Am.,	Sh.	366	Feb. 22, '50
Galen	Am.,	Bg.	226	May 29, '50
Ganges	Am.,	Bg.	244	June 14, '50
Garnet	Am.,	Bg.	194	Apr. 29, '50
Gazelle	Br.,	Bg.	285	Apr. 18, '50
General Green	Am.,	Bk.	242	July 25, '50
General Harrison	Am.,	Sh.	409	Feb. 3, '50
General Morgan	Am.,	Sc.	138	Sept. 6, '50
General Scott	Am.,	Bg.	236	July 21, '50
General Worth	Am.,	Sc.	173	Oct. 15, '49
George Henry	Am.,	Bk.	......	Sept. 3, '50
George Ryan	Am.,	Bg.	212	May 7, '50
George Shattuck	Am.,	Bg.	210	May 7, '50
George Washington	Am.,	Sc	131	May 28, '50

NAME	Flag	Rig	Tonnage	Date of Arrival
Georges	Fr.,	Sh.	424	June 5, ’50
Georgia	Am.,	Bk.	360	Aug. 6, ’50
Georgiana	Br.,	Sloop	25	Feb. 13, ’50
G. H. Montague	Am.,	Sc.	167	Mch. 1, ’50
Gipsey	Am.,	Bk.	470	Aug. 23, ’50
Glencoe	Am.,	Bg.	229	June 3, ’50
Globe	Am.,	Sh.	317	Nov. 2, ’49
Gloucester	Br.,	Bk.	297	May 28, ’50
Gold Hunter	Am.,	Sh.	281	June 2, ’50
Goodwin	Am.,	Sh.	595	Aug. 16, ’50
Grotius	Am.,	Sh.	299	Mch. —, ’50
Gulnare	Am.,	Bg.	195	May 14, ’50
Gustave	Hambg.,	Bg.	141	Aug. —, ’50
G. W. Kendall	Am.,	Bg.	183	Aug. 23, ’50
Hamilton	Am.,	Bk.	322	Mch. 15, ’50
Hardy	Am.,	Bg.	280	July 19, ’50
Harmony	Br.,	Sh.	529	July 2, ’50
Harriet	Am.,	Sc	128	June 5, ’50
Harriet Atwood	Am.,	Sc	73	Aug. 10, ’50
Harriet Rockwell	Am.,	Sh	470	Feb. 26, ’50
Harriet Thompson	Am.,	Bk.	238	Jan. 14, ’50
Harvard	Am.,	Sh.	492	Aug. 4, ’50
Harvest	Am.,	Bk.	294	May 29, ’50
Henrietta Wilhelmina	Holl.,	Bg.	100	June 25, ’50
Henry	Am.,	Sh.	434	May 16, ’50
Henry	Am.,	Bg.	153	Aug. —, ’50
Henry Ewbank	Am.,	Bk.	330	Dec. 27, ’49
Henry Harbeck	Am.,	Bk.	400	July 1, ’50
Henry Kelsey	Am.,	Bk.	197	July 28, ’50
Henry Lee	Am.,	Sh.	409	Sept. 13, ’49
Henry Pratt	Am.,	Sh.	600	July 18, ’50
Henry Tuke	Am ,	Sh.	365	July 15, ’50
Henry Von Gagen	Holl.,	Bk.	300	Aug. 15, ’50
Herald	Am.,	Bg.	162	Mch. —, ’50
Herbert	Am.,	Sh.	586	Sept. 8, ’50
Hercule	Fr.,	Sh.	224	June 8, ’50
Hercules	Am.,	Sh.	371	Aug. 3, ’50
Hiram	Russ.,	Bk.	316	May 1, ’50
Hibernia	Am.,	Sh.	551	June 17, ’50
Hedgdon	Am.,	Bg.	198	Mch. —, ’50
Hope	Am.,	Bk.	186	Aug. 23, ’50
Horatio	Am.,	Bk.	240	Mch. —, ’50
Hortensia	Am.,	Bk.	293	Aug. —, ’50
Houqua	Am.,	Sh.	582	July 23, ’50
Hugh Walker	Br.,	Sh.	496	July 23, ’50
Huron	Am.,	Sh.	290	Mch. —, ’50
Ilzaide	Am.,	Sh.	418	July 28, ’50
Imaum of Muscat	Br.,	Sh.	......	Sept. 6, ’50
Independence	Am.,	Bg.	261	Aug. 13, ’50
Indianeran	Holl.,	Bk.	300	Aug. 22, ’50
Inez	Am.,	Sh.	356	—— —, ’49
Invincible	U. S.,	Sc.	133	Aug. 5, ’50
Iowa	Am.,	Sh.	874	June 17, ’50
Itaska	Am.,	Bk.	242	July 20, ’50
Iwanoena	Am.,	Bk.	254	July 24, ’50
Izotte	Am.,	Bk.	275	June 15, ’50
J. A. Burr	Am.,	Sloop	52	July 29, ’50
J. A. Jessuren	Am.,	Bk.	203	July 31, ’50
Jacob M. Ryerson	Am.,	Sc.	177	June 27, ’50
Jacob S. Waln	Am.,	Bk.	214	Jan. 12, ’50
James	Br.,	Bk.	195	Aug. 26, ’50
James B. Lippincott	Am.,	Sc.	·115	June 6, ’50
James Caskie	Am.,	Bg.	283	May 1, ’50
James Franklin	Am.,	Sc.	78	Aug. 20, ’50
James R. Whiting	Am.,	Sc.	137	Aug. 23, ’50
James Stewart	Br.,	Sh.	386	Aug. 15, ’50
Jane	Am.,	Bg.	168	June 7, ’50
Jane	Am.,	Bk.	198	Mch. —, ’50
Jane A. Hersey	Br.,	Bg.	136	Mch. —, ’50
Jane Frances	Am.,	Bk.	391	Aug. 26, ’50
Jane Henderson	Am.,	Sh.	637	Aug. 13, ’50
Jane Tudor	Br.,	Bk.	445	Aug. 27, ’50
Janet	Br.,	Bk.	333	Mch. —, ’49
J. C. Demarest	Am.,	Sc.	60	June 30, ’50
Jane Lucie	Fr.,	Bg.	......	May 28, ’50
Johannes Sarkies	Br.,	Bk.	454	June 17, ’50
John Adams	Am.,	Bk.	380	July 10, ’50

NAME	Flag	Rig	Tonnage	Date of Arrival
John Allyne	Am.,	Sc.	92	Aug. 15, ’50
John Bull	Br.,	Sc.	71	May 6, ’50
John Calvin	Br.,	Bk.	510	Aug. 4, ’50
John Clifford	Am.,	Bg.	161	Aug. 26, ’50
John Dunlap	Am.,	Sc.	105	May 2, ’49
John G. Colley	Am.,	Bk.	282	June 17, ’50
John Jay	Am.,	Sh.	494	—— —, ’49
John Munn	Br.,	Bk.	639	Aug. 29, ’50
John Story	Am.,	Sc.	90	Aug. —, ’50
John W. Cater	Am.,	Bg.	217	May 6, ’50
Joseph Fish	Am.,	Bk.	250	Aug. 3, ’50
Josephine	Am.,	Sc	120	July 18, ’50
Josephine	Am.,	Sh.	480	July 28, ’50
Josephine	Br.,	Sc.	50	Aug. 4, ’50
Josephine	Am.,	Bk.	148	Aug. —, ’50
Joven Adonis	Peru,	Bk.	250	May 28, ’50
J. S. Cabot	Am.,	Sc.	180	Aug. 11, ’50
Julia	Chile,	Bg.	120	Mch. —, ’50
Juliet	Am.,	Sc.	120	Aug. 24, ’50
Julius Pringle	Am.,	Sc	97	Aug. 10, ’50
Jupiter	Am.,	Sc	97	June 21, ’50
J. W. Brown	Am.,	Sc.	......	Sept. 3, ’50
Kate Heath	Am.,	Bg.	188	May 5, ’50
Kauai	Hw.,	Sc.	16	July 2, ’49
Keku Lanoi	Hw.,	Sc.	42	Mch. 1, ’50
Kensington	Am.,	Sh.	494	July 24, ’50
Keoka	Am.,	Bk.	247	Aug. 20, ’50
Keona Ana	Hw.,	Bg.	200	Aug. 27, ’50
Kilby	Am.,	Bk.	478	Aug. 14, ’50
Kingsbury	Am.,	Bg.	198	Aug. 3, ’50
Kirkwood	Am.,	Bk.	280	Aug. 23, ’50
Knickerbocker	Hambg.,	Sh.	344	Nov. 2, ’49
Komeet	Holl.,	Bg.	150	Aug. 27, ’50
Lady Adams	Br.,	Sh.	274	Aug. 28, ’49
Lady Shaw Stewart	Br.,	Bg.	181	Jan. 14, ’50
La Grange	Am.,	Bk.	270	Sept. 17, ’49
Lalla	Br.,	Bg.	177	Dec. 12, ’49
Lambert Suydam	Am.,	Sc.	161	June 11, ’50
La Soledad	Gren.,	Bg.	100	Aug. 4, ’49
Laura	Br.,	Bk.	329	July 28, ’50
Laura Snow	Am.,	Bk.	293	June 13, ’50
Lawsons	Br.,	Bg.	255	Aug. 3, ’50
Le Baron	Am.,	Bk.	169	Aug. 16, ’50
Leo	Am.,	Bg.	136	May 6, ’50
Leveret	Am.,	Bg.	......	Aug. 16, ’50
Linda	Am.,	Bk.	245	Sept. 25, ’49
Lindsays	Am.,	Bk.	217	June 18, ’49
Lion	Am.,	Bg.	235	Aug. 14, ’50
L’Italiano	Chile,	Bg.	120	Aug. 10, ’50
Lord Hobart	Br.,	Bg.	160	Apr. 24, ’50
Louisa	Am.,	Sh.	590	July 18, ’50
Louisa Bliss	Am.,	Bk.	359	Aug. 29, ’50
Louise Marie	Fr.,	Bk.	190	Dec. 15, ’49
Lowell	Am.,	Sh.	414	July 26, ’50
Lowell	Am.,	Bg.	240	Aug. 4, ’50
Lydia	Am.,	Sc.	60	July 13, ’50
Lydia Ann	Am.,	Bk.	198	Aug. 12, ’50
Macedonia	Am.,	Sh.	414	Aug. 14, ’50
Madonna	Am.,	Bk.	270	July 1, ’49
Madonna	Am.,	Bk.	498	Jan. 25, ’50
Magdala	Am.,	Bk.	298	Dec. 10, ’49
Magnolia	Am.,	Sh.	386	Apr. 12, ’50
Magnolia	Am.,	Bk.	258	Feb. 26, ’50
Maguasha	Br.,	Bg.	151	May 5, ’50
Manchester	Am.,	Sh.	507	June 17, ’50
Manco	Am.,	Sh.	350	May 1, ’50
Manuela Fierra	Chile,	Sc.	90	Mch. —, ’50
Marathon	Am.,	Sh.	382	Aug. 26, ’50
Marcellus	Am.,	Sh.	659	July 29, ’50
Marcia Cleaves	Am.,	Sh.	436	May 16, ’50
Margaret	Am.,	Bg.	246	May 28, ’50
Maria Victoria	Peru,	Bg.	140	Oct. 6, ’49
Martha	Am.,	Sh.	273	Apr. 2, ’50
Martha	Am.,	Sh.	533	June 8, ’50
Martha W. Brett	Am.,	Bk.	228	Mch. 15, ’50
Mary A. Jones	Am.,	Bg.	190	July 28, ’50
Mary Ann Folliott	Br.,	Sh.	408	Aug. 4, ’50

NAME	Flag	Rig	Tonnage	Date of Arrival
Mary Ellen	Am.	Bg.	160	July 30, '50
Mary Frances	Hwn.	Bk.	230	Oct. 1, '49
Mary Reed	Am.	Sc.	103	Aug. 8, '50
Mary Waterman	Am.	Bk.	240	May 14, '50
Mary and Emma	Am.	Sc.	58	Aug. 10, '50
Mary and Jane	Am.	Bg.	198	Aug. 16, '50
Mary and Martha	Am.	Bk.	316	Mch. —, '50
Mary and Phoebe	Am.	Bg.	148	Aug. 25, '50
Masconomo	Am.	Sh.	824	July 20, '50
Massachusetts	Am.	Stmr.	353	June 8, '49
Mattakeaset	Am.	Sh.	481	Apr. 24, '50
Mayflower	Am.	Sh.	349	Sept. 13, '49
Mazagram	Fr.	Sh.	256	Aug. 13, '50
McLellan	Am.	Bg.	364	Aug. 15, '50
Mentor	Am.	Sh.	460	June 30, '49
Merchant	Am.	Sh.	389	Aug. 26, '50
Merchantman	Am.	Bg.	234	July 24, '50
Meta	Am.	Bg.	208	Aug. 17, '50
Meteor	Am.	Bg.	129	Sept. 1, '50
Metropolis	Am.	Bg.	209	June 15, '50
Mexican	Am.	Sc.	128	May 7, '50
Minerva	Am.	Bk.	195	Mch. —, '50
Minerve	Fr.	Sh.	309	May 8, '50
Monsoon	Am.	Sh.	380	Apr. 7, '50
Montano	Am.	Sh.	365	Nov. 27, '49
Montgomery	Am.	Bk.	247	Aug. 15, '50
Monument	Am.	Sh.	499	May 9, '50
Morgan Dix	Am.	Bk.	180	July 19, '50
Morrison	Am.	Sh.	565	Sept. 20, '49
Mount Vernon	Am.	Sc.	74	Apr. 22, '50
Mousam	Am.	Bk.	220	Aug. 5, '50
Nathaniel Hooper	Am.	Sh.	427	Feb. 4, '50
Nestor	Am.	Sh.	396	June 6, '50
New England	Am.	Bk.	238	May 8, '50
New World	Am.	Stmr.	650	July 11, '50
Niagara	Am.	Bk.	232	Aug. 27, '50
Niantic	Am.	Sh.	451	July 5, '49
Nile	Am.	Bk.	180	Mch. —, '50
Ninfa	Ec.	Sloop	17	—— —, '49
Ninus	Am.	Bk.	255	May 19, '50
Noble	Br.	Bk.	251	June 25, '50
Nonpareil	Am.	Bg.	137	June 25, '50
North Bend	Am.	Bg.	176	July 9, '49
North Carolina	Am.	Sh.	669	June 14, '50
N. S. de Doris	Port.	Bk.	300	Aug. 13, '50
Obed Mitchell	Am.	Sh.	355	Sept. 17, '49
Oberlin	Am.	Bk.	330	May 6, '50
Ocean	Br.	Bg.	176	Dec. 29, '49
Oceanie	Fr.	Bk.	205	Aug. 5, '50
Odd Fellow	Am.	Sc.	120	Aug. 4, '50
Olive Branch	Am.	Sh.	336	Jan. 25, '50
Oneco	Am.	Sh.	640	June 24, '50
Oniota	Am.	Bg.	209	Apr. 30, '50
Orator	Br.	Bk.	442	May 31, '50
Orb	Am.	Bk.	230	Sept. 9, '49
Oregon	Am.	Bk.	325	Aug. 29, '50
Oriental	Am.	Bk.	480	July 31, '50
Orion	Am.	Bk.	449	May 6, '50
Ortolan	Am.	Sc.	74	Aug. 6, '50
Oscar	Am.	Bk.	369	Mch. —, '50
Osceola	Am.	Sh.	549	June 15, '50
Othello	Am.	Sh.	370	Nov. 13, '50
Packet	Br.	Bg.	188	July 23, '50
Page	Am.	Sc.	160	Aug. 6, '50
Palladium	Am.	Bk.	341	Jan. 9, '50
Palmetto	Am.	Bk.	282	Aug. 22, '50
Palmyra	Br.	Bg.	145	June 19, '50
Panama	Br.	Bk.	300	Sept. 9, '50
Panama	Am.	Sh.	508	Aug. 8, '49
Patagonia	Br.	Bg.	230	Aug. 11, '50
Paul	Fr.	Bk.	201	Sept. 30, '49
Pauline	Am.	Bg.	149	Sept. 1, '49
Pembroke	Am.	Bk.	199	Apr. 2, '50
Perfect	Am.	Bg.	156	Apr. 7, '50
Perseverance	Chile	Bg.	168	May 27, '49
Peru	Am.	Bk.	220	Sept. 2, '50
Philip Hone	Am.	Sh.	291	Aug. 11, '49
Philomena	Am.	Bk.	......	Sept. 9, '50
Phoenix	Am.	Sh.	314	Aug. 5, '50
Pianet	Am.	Bg.	119	May 14, '50
Pico	Am.	Bk.	215	June 18, '50
Pilgrim	Am.	Sc.	98	Aug. 5, '50
Plato	Am.	Bg.	205	June 18, '50
Pleiades	Am.	Bk.	260	May —, '50
Polka	Am.	Bk.	182	Aug. 6, '50
Pondichery	Fr.	Sh.	323	Aug. 10, '50
Pontrac	Am.	Sc.	69	Apr. 19, '50
Popmunnet	Am.	Bk.	183	June 26, '50
Portenia	Br.	Bg.	221	Aug. 8, '50
Portland	Am.	Bk.	287	Aug. 16, '50
Post Boy	Br.	Sc.	44	July 2, '50
Powhattan	Am.	Sc.	550	July 29, '50
Powhattan	Am.	Bk.	226	—— —, '—
Primavera	Am.	Bg.	180	—— —, '49
Prospect	Br.	Bg.	200	Aug. 13, '50
Providence	Am.	Sc.	72	July 29, '50
Providence	Am.	Sc.	61	Apr. —, '49
Quadratus	Am.	Bg.	132	May 10, '50
Quito	Am.	Bg.	138	Feb. 19, '50
Quoddy Belle	Am.	Bg.	147	May 7, '50
Rachel Stevens	Am.	Bg.	213	Aug. 26, '50
Ralph Thompson	Br.	Bk.	385	Aug. 5, '50
Rambler	Am.	Sc.	50	July —, '49
Raritan	Am.	Sh.	494	July 28, '50
Raymond	Br.	Bk.	498	July 19, '50
R. B. Potter	Am.	Sc.	120	Aug. 6, '50
Regia	Br.	Bg.	181	Aug. 23, '50
Regulus	Am.	Sh.	387	Sept. 30, '49
Reindeer	Am.	Bg.	136	Aug. 4, '50
Reindeer	Am.	Bg.	161	Aug. 27, '50
Resolutie	No. Ger.	Sh.	374	Sept. 25, '49
Rhine	Am.	Bk.	174	July —, '50
Rhodes	Am.	Bk.	479	June 14, '50
Ricardo	Peru	Bg.	100	Oct. 12, '49
Richard Towle	Prus.	Bk.	......	Sept. 5, '49
Rio Grande	Am.	Bk.	298	Feb. 21, '50
Rival	Am.	Bk.	214	June 16, '50
River Chief	Br.	Bg.	150	July 2, '50
Rob Roy	Am.	Sh.	530	Aug. 8, '50
Robert	Am.	Bg.	146	July 20, '50
Robert Browne	Am.	Sh.	502	Aug. 29, '49
Robert Bruce	Am.	Bg.	114	July 30, '50
Robert Henderson	Br.	Bk.	368	June 23, '50
Robert Succouf	Fr.	Sh.	324	Aug. 13, '50
Rodolph	Am.	Sc.	123	Sept. 8, '50
Rolla	Am.	Bk.	309	July 17, '49
Rome	Am.	Sh.	344	Feb. 28, '50
Rose Standish	Am.	Sh.	940	Aug. 5, '50
Rosetta Joseph	Br.	Bk.	264	Aug. 17, '50
Rostan	Ital	Bg.	180	July 22, '50
Rowland	Am.	Bk.	400	July 31, '50
Ruby	Am.	Sc.	127	May 7, '50
Russell	Am.	Bk.	301	July —, '50
Russell	Am.	Sh.	348	Mch. —, '50
Ruth	Am.	Bg.	146	Mch. —, '50
Sabina	Am.	Sh.	417	Aug. 9, '49
Sacramento	Am.	Sc.	140	Aug. 24, '50
Sacramento	Am.	Bk.	368	Sept. 9, '50
Saint Andrew	Br.	Lorcha	48	May 13, '50
Saint James	Am.	Bk.	335	Aug. 30, '50
Saint Lawrence	Am.	Sh.	356	June 7, '50
Salem	Am.	Sh.	480	Oct. 12, '49
Sam and Ben	Am.	Bg.	182	May 15, '50
Samuel French	Am.	Bg.	188	Apr. 25, '50
San Francisco	Am.	Bk.	268	Jan. 12, '50
San Jacinto	Am.	Bg.	185	May 6, '50
Santiago	Am.	Sc.	99	June 17, '50
Sarah	Am.	Bk.	286	Mch. 14, '50
Sarah	Br.	Sh.	398	Aug. —, '50
Sarah Boyd	Am.	Bk.	360	Aug. 15, '50
Sarah Hooper	Am.	Bk.	220	Aug. 3, '50
Sarah Lavinia	Am.	Sc.	164	May 24, '50
Sarah Parker	Am.	Sh.	387	Jan. 14, '50

(Continued on page 524)

Pacific Marine Review

The National Magazine of Shipping

September, 1921

Copyright, 1921, by J. S. Hines

PACIFIC COAST FISHERIES

California, the Premier Fishing State—I.

UNDOUBTEDLY the most important body of water from the standpoint of the fisheries of the world is the North Pacific Ocean. For untold centuries the coasts of Japan and of North China have furnished millions of pounds of sea food annually to the teeming populations of Asia, and since the advent of Anglo-Saxon civilization on the Pacific Coast the fisheries of that region, including the whole western shore of North America from the tip of Lower California to Bering Strait, have constantly increased in the volume and market value of the catch until at the present time the annual American sardine, tuna and salmon fisheries of this coast are the most important in the United States.

While we know through tradition and the written record that the Indians of the Columbia River region in Oregon and Washington, of the Sacramento River region in California, and the various rivers of the Alaska peninsula have for long centuries taken advantage of the salmon runs on the rivers and prepared from their catches of fish much of the food that was necessary to tide them over the winter seasons, still modern commercial fishing in these waters may be said to date from the establishment of the first salmon cannery at Washington, Yolo county, California, in 1864.

Fishermen's Wharf, San Francisco, in 1921. Compare with picture below and note persistence of type in the fishing boats

Total Catch of Fish in California

1916— 90,672,360 pounds
1917—208,217,091 pounds
1918—256,505,656 pounds
1919—259,713,573 pounds
1920—213,847,807 pounds

Footnote: Out of the total catch in 1920, 78.6 per cent went to the canneries, 18.8 per cent was consumed fresh, and 2.6 per cent was shellfish, either canned or consumed fresh. These proportions illustrate very graphically the need for education of Californians as to the value of fresh fish in the daily food rations.

Fishermen's Wharf, San Francisco, in 1900, showing the old lateen sail rigs and the first unit of the present Fishermen's Lagoon
Reproduced from Christmas Number San Francisco News Letter 1901

First Fish Cannery

It is rather a singular coincidence that this first cannery should have been established through conditions due to the Civil War and that it should have been a floating cannery. We can only wonder whether the vision of Messrs. G. W. and William Hume and Andrew S. Hapgood, the founders of this original cannery, included the future world struggle which was to bring about commercial conditions that would place the fish canning industry of California at the top of the list for the United States and possibly for the entire world.

Prior to 1864 the Hume brothers had fished commercially for salmon in the Sacramento River, selling their catch fresh in the local markets. They were from the state of Maine and were in correspondence with Hapgood, who was engaged in canning lobsters in their home state. They induced him to go into partnership with them for the canning of salmon. He ordered and shipped the necessary machinery, coming with it around the Horn, while they purchased a large scow and built upon the scow an erection to house the machinery. The equipment was very primitive, and most of the work was done by hand. From this humble beginning the salmon canning industry on the Pacific Coast has grown to a point where many millions are invested in boats, nets, machinery, equipment, warehouses, etc., and thousands of men are annually employed.

The sardine and salmon cannery of the F. E. Booth Company at Monterey, said to be the largest fish cannery in the world

California Fish Commission

The early commercial fishing in salt water was almost exclusively for the purpose of supplying fresh fish for local market consumption. The most important center, both on account of the large quantity and great variety of fish taken and also on account of the larger market, was at San Francisco. The importance of these salt water fisheries and of the fisheries in the Sacramento and San Joaquin Rivers at an early date attracted the attention of the state government so that under the administration of Governor H. H. Haight the legislature of 1870 established a board of fish commissioners for the state of California who were to carry out the provisions of "an act to provide for the restoration and preservation of fish in the waters of the state." This date is important to bear in mind in connection with California fisheries on account of the fact that this was the first board of fish commissioners in the United States and antedates by one year the Federal Bureau of Fisheries. The work of the California board of fish commissioners has thus grown normally with the growth of the fishing industries, and the growth of the fishing industries is in no small degree due to the activities of the commission.

Fish Transplanting

In its very early history—in fact, in the year 1872—the commission made an attempt to import eastern and middle western game fish into the waters of California. They fitted up a special aquarium car, loaded it with black bass, brook trout, salt water eels, lobsters, oysters, two varieties of perch, catfish, etc., but after leaving Omaha the car was involved in a train wreck, and all of the contents became a total loss.

Undiscouraged, they immediately sent an agent east, who obtained 40,000 shad from the Hudson River which were safely brought out and planted in the Sacramento at Tehama. To show the importance of this early transplanting of fish, it is only necessary to call attention to the fact that at the present time over a million and a half pounds of shad are taken annually in California waters. From the year 1871 constantly increas-

Sardine Pack by Districts

	1916	1917	1918	1919	1920
San Francisco	3,113	140,126	892,026	1,362,518	1,104,776
Santa Cruz	32,375	6,147	559,265	5,141,869	7,342,699
Monterey	10,459,029	41,621,150	64,915,002	81,447,280	69,719,517
Los Angeles	2,592,370	52,615,300	78,077,612	54,600,194	28,182,847
San Diego	2,551,026	9,718,336	13,207,265	11,183,539	12,167,199
Miscellaneous	10,899	2,272	1,641	141,779	691
Total	15,648,812	104,103,331	157,652,811	153,877,179	118,517,729

ing work in transplantation has been carried out, many fish hatcheries have been established, and much beneficial control exercised over methods of fishing, limitation of seasons, and regulation of fishing streams.

Sardines

In the '80s commercial fishermen were impressed with the tremendous runs of large sardines, particularly in the vicinity of San Francisco Bay, and in 1890 the first sardine cannery in California was established at North Beach, San Francisco. The demand for sardines at that time was confined to small sizes, and these were hard to get, the sardine in the waters of Central California being usually caught in lengths of from ten to twelve inches. For commercial reasons, therefore, the San Francisco cannery was abandoned after about two years' operation. Its machinery was sold and shipped to San Pedro in Southern California, where smaller sardines could be more easily obtained.

This San Pedro cannery was operated on a small scale until about 1910, when its attention was attracted to tuna packing, and after some experiments this new industry was launched and grew very rapidly. In 1911 20,000 cases of tuna were put up, partly at San Pedro and partly at San Diego. This delicious product (the "seachicken") very quickly made its way in the market, and by 1917 the pack exceeded 350,000 cases put up by twenty-one canneries.

Meanwhile in 1903 F. E. Booth of San Francisco began canning sardines at Monterey Bay. He put over a campaign to create a demand for the larger sized fish packed in one pound oval cans under the name of Monterey mackerel, later reverting to the true name of Monterey sardine. The industry at Monterey has grown steadily until today the largest establishment in the world exclusively devoted to the canning of fish is located at that point, together with a large number of other canning establishments, so that in 1919 81,447,280 pounds of sardines were required to supply the canneries of this district alone.

The tuna canners of Southern California also turned their attention to sardines, whose seasonal run follows close on that of the tuna, and today the sardine output of the southern canneries now equals that of Monterey Bay.

California Fish Round the Earth

It is difficult for those not expert in estimating fish quantities to visualize any such figure as 81,000,000 pounds of sardines. The total catch of sardines in California waters during the year 1919, which so far holds the banner for volume, was 153,877,179 pounds. In 1920 this dropped to 118,517,729 pounds. Taking the latter figure as a basis, let us do a little comparative figuring and see just what is represented by that weight of fish. The great majority of these fish of course are canned, and in that year the figures show that these sardines were put into 1,062,996 cases. These cases held 55,462,738 cans of sardines. These cans placed end to end would make a line of cans 4947 miles in length, and they would contain 463,055,924 fish. These fish placed end to end with the tail of one fish in the mouth of the other, it is estimated, would make a girdle of fish 61,192 miles in length, which would be long enough to encircle the entire earth twice at the equator and have enough left to make a frame around continental United States.

The Bolinder, a typical crude oil engined general purpose fishing boat and cannery tender

It will be noted from the annexed tables that the total catch of sardines in California waters grew from 15,000,000 in 1916 to 153,000,000 in 1919, an increase of 1000 per cent in four years. Like all the other canning industries in the world, this industry undoubtedly over-expanded during that period and is now settling down to a more normal basis. The opinion of all of the experts is that the California canned sardine is equal, if not superior, to the imported variety, and undoubtedly with judicious use of publicity in exploiting their product the sardine canners of California have before them a period of great prosperity. At any rate, the Californiac is here supplied with a new thrill in investigating the resources of his wonderful state, for this business of canning sardines has put California well out at the top of the list as the greatest fishery state in the Union.

Boats and Methods

The methods and the boats used by California fishermen are of great variety. Up to about 1903 or 1904 the lateen rigged, double ended sailboat of the Greek type brought here by Italian fishermen was almost universally used in salt water fishing around San Fran-

The inner lagoon at Fishermen's Wharf, San Francisco, showing the boat repairing plant and power boats equipped for salmon trolling

cisco Bay. In the Sacramento River fishing, which at that time was of great importance, boats of every kind and description were used, but largely the flat-bottomed, square-ended scow. With the advent of the gasoline engine the Italian fishermen were quick to seize the advantages given by a more ready access to market from the sea fishing grounds, and the majority of the double-ended boats were fitted up with motors of from 5 to 10 horsepower with little or no change to the structure of the boat except the introduction of stiffening timbers under the engine and in way of the tailshaft. When in 1910 to 1916 the canning industry began to place great demands upon the fishermen and commercial sea fishing became very profitable, almost every type of small boat was commandeered and rushed in to the work, but experience has shown that a slightly modified form of this Mediterranean double-ended fishing lugger is best adapted for practically all offshore work. This has been particularly true since the introduction of trolling for salmon, the high blunt-pointed stern of these boats allowing the fisherman to attend to his tiller and to an outrigged line on each side very handily.

Trolling

In salmon trolling two stout-poles, usually of bamboo or poled saplings, are lashed to the boat in such a way as to carry fishing lines from 10 to 12 feet outboard on either side. These poles are guyed to the bow of the boat and carry a short line, known as the pole line, which is snapped to the main fishing line and the slack of the main line carried over from this snap to the boat's stern. The main fishing lines are usually set for different depths on either side of the boat while prospecting to discover the location of a school of fish. The boat trolls along with its engine choked down at about two to four miles an hour. Practically all of the boats carry but one fisherman, and it can be readily seen that with any great breadth of stern to his boat this one man might have considerable trouble in managing his tiller and landing a fish at the same time. The strike of the salmon with this rig is detected by the rapid jerking of the pole tip. With the majority of the commercial fishermen there is no attempt made to play the fish, the line being pulled in hand over hand, the landing being commonly effected by a gaffhook, and the fish instantly killed by clubbing over the head.

Catch of Salmon in California Waters

1916—10,939,534 pounds
1917—11,061,587 pounds
1918—13,093,188 pounds
1919—13,145,727 pounds
1920—11,133,819 pounds

Footnote: During the years represented in this table sea fishing of salmon by the trolling method has grown in importance, while the river fisheries, which formerly represented the great bulk of the annual catch, have dwindled very rapidly. In 1920 less than 4,000,000 pounds were caught in the rivers of the state or about 35 per cent of the total.

Trawling

In fishing for market there has grown up quite a business with larger boats in deep-sea trawling, the boats following the schools of fish as they migrate up the coast and the fish being brought to market by fish carriers, to which they are transferred from the boats on the fishing grounds. This is in line with the best practice in the fisheries of Europe and of the Northeast Coast of America, and as the fish markets grow on the Pacific Coast this business will undoubtedly largely increase.

At the present time there are at San Francisco eight companies engaged in the trawling business, employing twenty-six boats as fishers and carriers. It has very recently been recognized by the majority of these companies that the method of employing independent carriers to bring their fish from the fishing grounds to market is uneconomical, and an association has been formed known as the Associated Trawling Company, five companies being now incorporated with that association. These five companies have eighteen fishing boats, eight of which are kept continuously on the fishing grounds. These boats are served by one carrier, and it has been found that by pooling the fish the profits to each company are very much better than with independent operation.

Fishing Boat Statistics

According to reports of the California Fish and Game Commission, there are listed with them as of December 31, 1920, a total of 2055 boats engaged in commercial fishing. These boats vary in length from 16 to 65 feet; 1906 of these boats are gas driven, 7 are steam driven, 36 are sail, 102 are row boats, and 4 are barges. The total value of these boats is $5,050,432, and the value of nets and gear $1,839,990.

In these fishing boats will be found very many different makes and types of gasoline engine, but the great majority will have engines built in California. In talking with many fishermen about their boats and the performance of the power plant, we find an almost universal desire to get some good, reliable, small crude oil engine, and we verily believe that those manufacturers who are preparing to change over their gasoline engines to the burning of crude oil and the heavier distillates have their faces set in the right direction so far as the future market in fishing boats is concerned.

It should be borne in mind by the designers of boats and power plants for boats for commercial fishing that, aside from the blunt-pointed stern form for the boat itself, there is no well established standardized practice. The whole industry has arrived at its present proportions with a speed which has left no time for either the boat builder or the fisherman to think through the problems and arrive at very definite conclusions about the best gear, and hence there will be found a tremendous variation in opinion among the practical fishermen as to just what is best.

Pacific Marine Review plans in a series of articles to put before its readers a few suggestions for the solution of the many problems which are facing the fishermen and the fish canning industry of the Pacific, and possibly to show how experience gained in the more slowly developed fishing industries of the Atlantic can be used to good advantage on the Pacific.

THE REVIVAL OF YACHTING

THE year of 1921 has marked a very great quickening in the yachting spirit along the California coast. The strenuous efforts that have been made by the enthusiasts in the various clubs have resulted in quite a program of regattas and races for the summer and fall season.

Last month we recorded the revival of the San Francisco Challenge Cup Race in San Francisco Bay and the Lipton Cup Race in Puget Sound. The Southern California Yachting Association staged a great regatta at Santa Barbara for four days, August 9 to August 12, inclusive, in which many of the most famous of California's pleasure sailing craft and not a few of the motor cruisers took part.

This regatta was preceded by several races among the various classes of yachts and power boats from their home ports to Santa Barbara, and from Newport Harbor in a combined power and sail race the sloop Carollie won from the Joy and the Viking IV from the Uncas. The sloop Gretchen won the race of the San Diego Yacht Club from that port, her one competitor, the Trilby, having to put back with a broken stay. In the race from Los Angeles Harbor all of the contestants, except the yawl Ortona, used their auxiliary power plants, and for that reason the Ortona, although last to arrive, was unofficially declared winner. Captain John Barneson's schooner, the Invader, was the first of the Los Angeles fleet to arrive in Santa Barbara.

Three boats of the San Francisco Yacht Club—the sloop Mah Pe, sailed by Captain Henry Dinning; the ketch Shawnee, L. A. Norris; and the schooner Seaward, Edward Lowe, Jr.—raced from the Golden Gate to Santa Barbara Harbor, a distance of 272 miles. Ordinarily this race should have been practically a run before the Northwest trades, but there is nothing so capricious as wind, and before the race was finished the press of California was full of "scare" headlines about missing yachts. The race started on Saturday morning and was not finished until 6:30 o'clock on Tuesday evening, the little sloop Mah Pe crossing the line at that time three hours ahead of the Seaward and three and a half hours ahead of the ketch Shawnee.

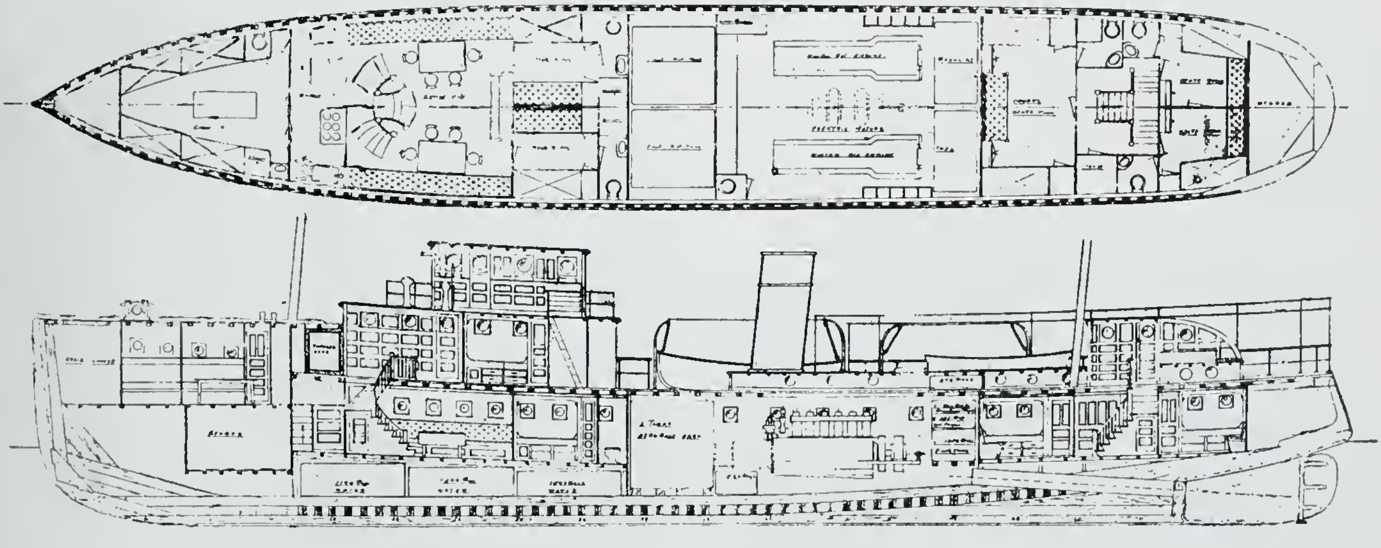
In the race for the Santa Barbara Club cup Captain John Barneson's sloop, the Lady Betty, won out from a very fast field on a 10-mile L-shaped course in one hour, 44 minutes, 29 seconds.

The Lipton trophy race, open only to sloops having a water line of between 20 and 30 feet, was by this provision closed to three or the fastest yachts at the regatta. The Lady Betty's water line is about 18 feet, the Galliano's water line is approximately 34 feet, and that of the Mah Pe, one of the fastest sloops on the coast, is over 37 feet. The Lady Betty, however, was successful in qualifying by loading enough ballast to increase her water line to 20 feet. Thus burdened, she again won against a field composed of the Trilby and the Gretchen of San Diego and the Mischief I from Los Angeles. The Lady Betty, however, was disqualified in this race on account of an alleged foul on the Mischief I in rounding the fourth flag, and the race was awarded to the Mischief I on that ground.

September is to be also a busy month in yachting. The week end from the 3d to the 5th the San Francisco Yacht Club is to hold a great picnic and jollification at McNear's Island and a 30-mile race from the island to Vallejo and return. During the same week end the Vancouver Yacht Club is staging a regatta on Puget Sound.

Many of the boatbuilders are busy on new work, particularly in Southern California. We illustrate below one of the most interesting of the new jobs, a cruising yacht for Captain G. Allan Hancock, the Velero II, which is now under construction at the William Muller Shipyard in Wilmington. This vessel is 125 feet over all, 20 feet beam and 7 foot draft, designed for a sea speed of 10 knots with a cruising radius of 6000 miles. It is chiefly remarkable for the elegance of its appointments and for the fact that it will be the first vessel built on the Pacific Coast to use the Diesel electric drive.

The power plant will consist of two Winton Diesel oil engines, 6-cylinder, 7½ inch bore and 11 inch stroke, developing 135 B. H. P. at 450 R. P. M., each directly connected to a 90 K. W. 125 volt Westinghouse generator supplying current to a 250 H. P. 275 R. P. M. double armature motor wound to take 125 volts per armature and directly connected through a Kingsbury thrust bearing to the propeller shaft. This power plant makes possible a very easy and direct control of the driving motor from the pilot house. In a future issue we shall give full particulars of this interesting installation.



The cruising yacht Velero II building at the William Muller Shipyard, Wilmington, to be equipped with Winton-Westinghouse Diesel electric drive

Pacific Marine Review
The National Magazine of Shipping

576 Sacramento Street
SAN FRANCISCO, CALIFORNIA U. S. A.

Official Organ of the Pacific American Steamship Association

Subscription Price, per year (Domestic) $2.00
(Foreign) $3.00
Single Copies . . . . 25 cts

J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor

NEW YORK OFFICE
339 at 30 Church Street
M. B. STEWART, Manager

Pacific Marine Review is sold at all leading News Stands
Entered as second class mail matter at Postoffice
San Francisco, California

Published on the First of Each Month. Copyright
1921 in the United States by J. S. HINES

THE CALIFORNIA

JUST two years ago this month the people of San Francisco Bay region had the joyous privilege of welcoming the great war fleet of the United States Navy assigned for duty on the Pacific Ocean. Now that fleet is welcoming into its midst our own contribution to its numbers, the superdreadnought California.

This latest addition to Uncle Sam's Navy is not only named after "the greatest state in the Union," but was built at Mare Island on San Francisco Bay in the very heart of that state. Into her fashioning California citizens wrought the best of their brawn and brain, and the great majority of the personnel who will man her guns and work her machinery are native born Californians.

The naval vessels built for the United States on the Bay of San Francisco have in times past given very good account of themselves when called upon in emergencies to uphold the honor of the flag, and we are sure that the U. S. S. California, if occasion arises, will uphold the traditions passed down from Santiago and Manila Bay.

PANAMA CANAL

THE report of Governor Morrow to the Secretary of War shows the freight tonnage passing through the Canal in May decreased greatly as compared with April. May, 1921, shows 792,735 tons as against 907,613 tons for April, 1921, and as against a monthly average for the last year of 989,951.

The new trade routes opened by the Canal are doing large volumes of freight business, but it seems to be largely a one-way traffic. For example, the East Coast of the United States shipped 82,537 tons to the Far East and 31,488 tons to Australia, whereas the Far East shipped only 9883 tons and Australia only 370 tons back to the East Coast of the United States. The Pacific Coast shipped 112,892 tons to Europe and received back through the Canal only 7522 tons.

The following table gives a very interesting comparison of the tonnages carried by the ships of various nationalities and the average tolls paid per ton of cargo:

	Cargo carried	Av. tolls a ton of cargo
British	230,217	$1.24
Chilean	2,009	2.95
Danish	25,531	.69
Dutch	12,099	.87
French	10,771	1.32
German	711	2.15
Italian	3,614	2.13
Japanese	35,510	1.36
Norwegian	38,017	.77
Peruvian	11,895	.98
Swedish	6,567	1.16
United States	415,794	.80
	792,735	.973

This table, with reservations, may be used as an index to the profits in ship operation. In April the average tolls paid per ton of cargo were .926. In other words, the cargo tonnage more closely approximated the measurement tonnage in April than in May.

Excluding the 183,859 tons of United States coastwise traffic, the cargo in American bottoms would be 231,935 as against 230,217 for British bottoms. As most of the canal business originates and terminates in the United States, these figures are a very uncomfortable indication that British competition is fast overhauling the American merchant marine in carrying American foreign freights.

OCEAN FRUIT TRAFFIC

SHIPMENTS of fruit through the Panama Canal during the past year on an experimental basis have demonstrated that the water route is both practicable and economical, and arrangements are now being made for future shipments on a larger scale.

This trade is being developed along three lines: Pacific Coast fresh fruits to the East Coast of the United States; Pacific Coast fresh fruits to the United Kingdom and Europe; and Chilean fruits to the East Coast of the United States.

It is reported that the California and Northwestern associations of fruit growers organized for the marketing of their crops are in a position to contract with steamship companies for cargo or part cargo lots, and that they have joined in an agreement to guarantee one steamship company 9500 carloads of perishable fruit for Atlantic and Gulf markets to be taken at a rate substantially lower than the present all rail rate. Of this total 4000 carloads are to be Washington apples. The Port Commission of Seattle is stimulating the movement of the fruit through that port by quoting low rates of refrigerator storage in transit.

Citrus fruits shipped from Los Angeles to New York have arrived in nineteen days with very much less percentage of decay and deterioration than in ordinary rail shipments and at a rate less than one-half the all rail rate.

The South American Line, a Chilean company, is reported to be building three large vessels with refrigerator equipment, to be placed in the New York service carrying fresh fruits and vegetables. The Chile seasons being the reverse of those on the Pacific Coast of the United States, the Chilean fruit will reach northern markets in the early spring, so that the bulk of the Chilean fruit will be off the eastern markets before the large volume of California shipments begins.

SHIPBUILDING COSTS

EVER since the beginning of the end of the emergency shipbuilding program American shipyards have been making strenuous efforts to reduce costs of construction. That these efforts have not been in vain is shown by not only the actual reduction in figures on private contracts but by the fact that we are getting very measurably close to, if not bettering, the costs of shipbuilding abroad.

Quite recently an American yard bidding on the construction of oil tankers had the contract taken away by a British yard. The American bid was approximately $175 a deadweight ton, the British approximately $140. On the face of it this would appear to show that British costs are 20 per cent less than costs in America, but a little figuring on current and normal exchange rates will show that the difference in bid is not actually a difference in cost of construction, but a differential in favor of the British builder through the present abnormal exchange. One hundred and forty dollars is approximately £35, which at normal exchange is approximately $175, so that we may consider this particular contract to prove us on a practical equality in costs with the British shipbuilder.

Much to the dismay of our cousins across the water, there has been recently placed with the New York Shipbuilding Corporation an order from the Japanese government for a combination collier for the Japanese Navy, and American yards have also taken orders from British companies for British tankers. Many of our large repair plants on the Atlantic seaboard are advertising at the present time in British marine journals that they can effect British repairs more quickly and at less cost than is possible in the United Kingdom. Some of these British journals are getting quite alarmed over the prospect of the loss to Great Britain of repair and building contracts, which normally and naturally should have gone to British yards.

In the bulletin of the Atlantic Coast Shipbuilders' Association we find this very optimistic note on the question of shipbuilding costs:

"It is reported that the works manager of one of the largest American shipyards recently stated that cargo carriers of the standard type could be built in this country at $115 per ton, $100 less than the Shipping Board steel fleet cost per ton. It is understood that this price would also allow the shipbuilding company to make a profit. It was stated that the increased efficiency of labor is responsible for the ability of the yards to build at a lower cost, although material and freight rates remain considerably above the pre-war figure. The president of an American shipyard has been quoted as saying that American shipyards could now build passenger liners as cheaply as the British or French shipbuilding plants. The American repair yards advertise in British papers that repairs may be effected in this country more cheaply than in the United Kingdom yards."

SHIP PRICES

NOTWITHSTANDING the strenuous efforts made to lower the cost of construction on ships, it cannot be denied that current sale prices of new and used vessels are still extremely small in comparison with construction cost figures. Great Britain is still the world's market for ships, and the attached list printed by the Newcastle Daily Chronicle recording the sale of fifty-eight British cargo carriers of an aggregate deadweight tonnage of 282,672 can be taken as a very fair average of the present price that may be expected for ships sold.

These ships, sold during the first quarter of 1921, brought an average price of £14, or, at present exchange rates, approximately $54. Most of these vessels were quite new, and the figures obtained on these sales should be extremely interesting to American ship operators in general and to the Shipping Board in particular as indicating in a general way not only the price that may be expected on the sale of any considerable tonnage of Shipping Board vessels, but also as indicating to the operator the proper book value of the vessels that he is operating.

The Newcastle Daily Chronicle's figures follow:

List of Trading Steamers Sold

Sold	D. W. Tons	Total Tonnage	Amt., £
2	Under 1,000	450	7,750
7	1,000- 2,000	10,520	145,600
6	2,000- 3,000	13,707	134,000
4	3,000- 4,000	13,750	125,000
10	4,000- 5,000	43,117	374,000
2	5,000- 6,000	11,790	70,500
11	6,000- 7,000	50,740	526,500
6	7,000- 8,000	45,507	415,500
6	8,000- 9,000	50,291	1,349,000
2	9,000-10,000	19,100	275,000
2	Over 10,000	23,700	350,000
58		282,672	4,073,850

These figures give an average of only £14 8s. 2d. a ton deadweight, compared with former figures ranging up to £40, £50 and £80 a ton.

DO YOU KNOW

That California is now the first state in the Union in the volume and value of her fisheries' products?

That the sardines alone canned in California last year would, if placed end to end, make a double girdle around the earth at the equator and have enough left over to make a border around the United States?

That the Fish Commission of California is the oldest body of its kind in the United States, antedating by one year the Bureau of Fisheries of the Federal government?

That on September 9, 1850, there were in the harbor of San Francisco more seagoing ships than in any other harbor of the United States?

That Germany has under construction a large program of motorships?

That the captain of a vessel is personally responsible for the wages of his crew?

That American registry is sometimes not American registry?

Information on all of these points and many other interesting phases of American marine life is covered in this issue of Pacific Marine Review.

OUR COVER

Shows the West Faralon, second of five 11,000-ton flush deck freighters built for the U. S. Shipping Board by the Los Angeles Shipbuilding and Dry Dock Company, on her trial run in Los Angeles Harbor.

These freighters combine exceptional cargo carrying capacity and ample cargo handling facilities with a loaded sea speed of 11½ knots at very low fuel consumption.

ARGOES OF THE ARGONAUTS

(Continued)

NAME	Flag	Rig	Tonnage	Date of Arrival
Sarah Sands	Br.,	Stmr.	......	Sept. 7, '50
Sarah Warren	Am.,	Bk.	188	Apr. 6, '50
Sarah & Eliza	Am.,	Sh.	359	Aug. —, '50
Saratoga	Am.,	Sh.	1200	July 30, '50
S. D. Bailey	Am.,	Sc.	98	June 25, '50
Sea Eagle	Am.,	Bg.	199	Oct. 30, '49
Sea Gull	Br.,	Bg.	61	Aug. 11, '50
Sea Gull	Nor.,	Bk.	203	Aug. 12, '50
Sea Gull	Am.,	Stmr.	266	Aug. 10, '50
Sea Witch	Am.,	Sh.	907	July 24, '50
Seise de Junio	Ch.,	Bg.	117	Sept. 5, '50
Selina	Am.,	Bg.	......	Sept. 8, '50
Selma	Am.,	Bk.	407	Oct. 6, '49
S. H. Waterman	Am.,	Bk.	480	June 16, '50
Sheridan	Am.,	Sh.	900	July 31, '50
Sierra Nevada	Am.,	Sc.	90	May 21, '50
Sir Geo. Pollock	Br.,	Sh.	630	July 31, '50
Siroc	Am.,	Bg.	168	June 15, '50
Six Brothers	Am.,	Bg.	147	May 6, '50
Smyrna	Am.	Bk.	370	Aug. 21, '50
Solomon Piper	Am.,	Bk.	196	Aug. 15, '50
South America	Am.,	Sh.	605	Jan. —, '50
Sovereign	Am.,	Sc.	90	June 19, '50
Spartacus	Am.,	Sc.	92	Aug. 12, '50
Spartan	Br.,	Bk.	366	Sept. 2, '50
Spencer	Br.,	Bg.	188	Aug. 6, '50
Splendid	Am.,	Sh.	392	Feb. 15, '50
Splendid	Am.,	Bk.	......	Sept. 4, '50
Star	Am.,	Bk.	212	June 5, '50
Star of China	Br.,	Bg.	101	Oct. 11, '49
State of Maine	Am.,	Sh.	727	Aug. 8, '50
Steiglitz	Am.,	Sh.	349	June 22, '50
Success	Am.,	Bk.	203	Apr. 7, '50
Suliote	Am.,	Bk.	260	Aug. —, '50
Superior	Am.,	Sh.	575	——— —, '49
Surprise	Fr.,	Sc.	22	June 25, '49
Surprise	Fr.,	Sh.	273	June 15, '50
Susan	Am.,	Bk.	281	Aug. —, '50
Susan Abigail	Am.,	Bg.	210	May 29, '50
Susan Drew	Am.,	Sh.	696	Feb. 26, '50
Susan G. Owens	Am.,	Sh.	730	July 24, '50
Susan Wardwell	Am.,	Sc.	120	Aug. —, '50
Swiftsure	Am.,	Bg.	215	July 30, '50
Swiss Boy	Am.,	Bg.	260	Aug. 6, '50
Tahmaroo	Am.,	Sh.	375	July 1, '49
Talca	Chile,	Bg.	188	Aug. 4, '49
Talma	Am.,	Bg.	391	Mch. —, '50
Tarquin	Am.,	Bk.	420	Aug. 5, '50
Tasso	Am.,	Bk.	286	Oct. 12, '49
Teal	Br.,	Bk.	364	May 2, '50
Tecumseh	Am.,	Bk.	391	Jan. 7, '50
Tecumseh	Am.,	Bg.	190	Apr. 30, '50
Telassar	Am.,	Sh.	......	Sept. 5, '50
Thames	Am.,	Sh.	414	May 27, '49
Thili	Chile,	Sc.	92	Jan. 22, '49
Thomas Bennett	Am.,	Sh.	483	Nov. 8, '49
Thomas Lord	Br.,	Sc.	70	Dec. 28, '49
Thomas P. Hart	Am.,	Bg.	173	Aug. —, '50
Thomas, W. Sears.	Am.,	Sh.	500	July 15, '50
Tiberias	Am.,	Bk.	300	July 24, '50
Timbo	Br.,	Sc.	123	July 1, '50
Toccao	Am.,	Sc.	28	Apr. 12, '50
Toulon	Am.,	Bk.	272	May 16, '50
Traveller	Am.,	Sc.	.. ...	May 13, '50
Treaty	Am.,	Bg.	240	Oct. 3, '49
Tremont	Am.,	Bg.	278	May 5, '50
Trenton	Am.,	Sh.	668	Aug. —, '50
Triton	Br.,	Bg.	......	July 8, '50
Triumph	Am.,	Bg.	187	June 6, '50
Two Brothers	Am.,	Sc.	67	Aug. 15, '50
Tyrone	Am.,	Sh.	537	Nov. —, '49
Undine	Am.,	Bk.	215	May 13, '50
Unicorn	Br.,	Stmr.	650	Oct. 31, '49
Union	Br.,	Sc.	73	Aug. 17, '50
Urania	Am.,	Sc.	197	July 22, '50
Utica	Am.,	Sh.	525	Jan. 27, '50
Valhalla	Am.,	Bk.	275	May 18, '50
Valparaiso	Am.,	Sh.	697	June 28, '50
Vandalia	Am.,	Sh.	360	July 6, '50
Veloz	Chile,	Bg.	104	Jan. 15, '50
Venice	Am.,	Sh.	420	Aug. 13, '50
Vesta	Am.,	Bg.	155	Dec. 1, '49
Veto	Am.,	Bg.	149	Aug. 13, '50
Victoria	Am.,	Bg.	38	Aug. 22, '50
Victoria	Mex.,	Sh.	345	Mch. —, '50
Victorine	Am.,	Bg.	115	July 30, '50
Virginia	Chile,	Sh.	230	Aug. 13, '50
Vistula	Am.,	Sh.	365	Jan. 9, '50
Volante	Br.,	Bg.	154	May 6, '50
Volante	Peru,	Sc.	90	Mch. —, '50
Wakullah	Am.,	Bg.	207	Aug. 4, '50
Waldemar	Dan.,	Bk.	300	Aug. 3, '50
Wallace	Am.,	Bk.	300	Aug. 29, '50
Walter	Am.,	Bk.	256	Nov. —, '49
Wataga	Am.,	Sh.	415	June 17, '50
Water Lily	Br.,	Bg.	155	Aug. 16, '50
Wave	Am.,	Sc.	21	Jan. —, '50
Wellingsley	Am.,	Bg.	210	May 6, '50
Will	Am.,	Bg.	147	Aug. 15, '50
Will o' the Wisp	Br.,	Bg.	101	Aug. 2, '50
Will Watch	Br.,	Bg.	50	July 1, '50
William A. Spofford	Am.,	Sc.	197	Aug. 12, '50
William Brandt	Russ.,	Sc.	900	July 28, '50
William G. Hackstaff	Am.,	Sc.	92	June 29, '49
William Gray	Am.,	Sh.	295	June 15, '50
William Joy	Am.,	Bk.	194	July 7, '49
William O. Alden	Am.,	Bk.	274	May 6, '50
William Penn	Am.,	Bg.	158	Feb. 21, '50
William and Henry	Am.,	Sh.	260	Sept. 16, '49
William and James	Br.,	Sc.	74	June 17, '50
Windsor Fay	Am.,	Bk.	......	July 28, '50
Winslow	Am.,	Bk.	263	June 25, '50
Winthrop	Am.,	Bg.	230	July 30, '50
Woodside	Am.,	Sc.	55	June 16, '50
Zenobia	Am.,	Sh.	630	Aug. 13, '50
Zingari	Am.,	Bk.	386	Aug. 4, '50
Z Ring	Am.,	Bk.	223	July 31, '50
Zuid Pool	Holl.,	Sh.	320	Sept. —, '49

WHAT IS WRONG WITH THE AMERICAN MERCHANT MARINE?

A first assistant engineer on a California-built steamer, owned by the United States Shipping Board and at the time discharging cargo in a European port, asked himself the question which forms the title for this article. The article is his own answer to the question and evidently is given without any particular attempt at scientific analysis. It comes straight from the heart of the man as an expression of his experience. It was sent to us in the form of a letter.

You, dear reader, may not agree with all the conclusions reached by our correspondent, but there can be no doubt that he is accurately describing the actual conditions at present existing on American and particularly Shipping Board vessels.

These conditions must be radically changed if America is to attain the position she should hold in merchant marine service.

WE have a large number of ships on the ocean. They are to be seen in plenty at practically every port. In all of the British channel ports—and we have visited most of them—could be seen ships flying the American flag. The same was true for Hamburg, for Rotterdam, and for the ports of the Baltic. As I am writing, I can see, from the porthole of my stateroom, four or five ships with the American flag. We have the ships but we do not seem to be getting the business, and I read in the papers from home of many ships laid up both on the many ships laid up on the Atlantic Coast, in the Gulf ports and on the Pacific.

What is wrong with the American merchant marine?

The answer is easy.

From the standpoint of an engineer or deck officer, the difficulty lies largely in the fact that the ship's officers have no way in which to enforce their orders, and there is practically no discipline. On an American ship under Shipping Board regime as at present in force, a fireman, wiper, watertender, oiler, seaman, or any other subordinate can practically do as he pleases on account of the fact that they know that the slightest enforcement of discipline by the officers can be reported on shore to the disadvantage and possible discharge and disgrace of the officer.

In port the crew do practically as they please—go ashore and return when they get good and ready. If any disciplinary measures are attempted, the crew immediately go to the American consul and tell him any kind of story that comes into their heads. The consul then sends for the captain and chief engineer, has them up on the carpet for a "call-down," usually giving to the crew anything that they want, delays the ship, has the ship's officers running back and forth—ship to shore—all at the expense of the ship operator and the American people through the Shipping Board.

The clause in the LaFollette Act, confirmed by the Jones Act, which allows the crew to draw pay at any port, gives large opportunity for men to go ashore at European ports, get drunk, run with women, find all kinds of deviltry ashore, and then come back to the ship in a condition fit for the hospital, and draw their wages on the return trip while laid up on account of their own vileness.

To me, the only cure for this aspect of American merchant marine operation lies in changing the laws so as to give officers on board any American ship the power to see that their orders are carried out and to free those officers from the petty annoyances which are constantly being imposed upon them through the organizations of marine labor. Then make sure that the men who man the ships are thoroughly American, both as to citizenship and as to ideals—that they are clean men of sound mind and body, and that they know their trade as seamen. Then there should be a thorough understanding as to working hours and conditions of living. I believe that when a man signs on as a ship's officer there should be an understanding for at least one year with a firm or for a certain ship, and that the remuneration should be based on a certain minimum wage and on the showing made for economy of operation by the ship. In the case of an engineer this man should have served his time in a first-class marine engineering shop and have been to sea at least one year as a junior engineer. If during this year the man has shown himself to be idle or dissipated, the company will know of it and he should never receive his ticket as a third assistant.

No man can serve two or more masters at the same time, and it is beginning to be apparent that a man cannot serve his employer properly and be a member of a labor union at the same time. Very frequently at sea directions by the chief engineer or the captain are held up by insubordinates with the remark that the union rules are so and so. No man with union rules uppermost in his brain can possibly be an efficient worker, either on the deck or in the engine room of an American merchant ship.

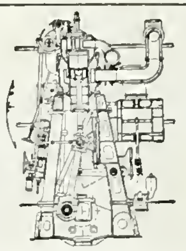
The whole economy of operation must be based on prompt and cheerful obedience to the orders of superiors who have learned by training and experience what is the best thing to be done under any given emergency, and the kind of men who are needed in our merchant marine today are those who will promptly and cheerfully obey orders and learn from the results of that cheerful and prompt obedience how to act themselves when circumstances place them in authority. The same Great Teacher who first told us that no man could serve two masters told us also in beautiful parable that he who was faithful in little things should be made ruler over great things.

I am a married man with a family to take care of, and I am going to do it, and I believe every man should do the same. I may be called a "scab" or something worse, but I have the satisfaction of knowing that in what I do I am honoring my flag, my country and my home, and I sincerely hope that my brother engineers will see these matters in the same light and put their shoulders to the wheel in trying to keep that flag in an honorable place among the merchant navies of the seven seas.

ERRATA

On page 473 of the August issue of Pacific Marine Review the caption under the cut of the motorship Yngaren located the Yngaren and Sunderland and the shipbuilding yards of William Doxford and Sons, Limited, on the Tyne, whereas all three are "really" located on river Wear some 20 miles south of Tynemouth.

Oil Engines and Motorships



PROGRESS IN MOTORSHIP BUILDING

THE very healthful condition of the infant motor shipbuilding industry is indicated by Lloyd's quarterly shipbuilding returns issued June 30. These returns show that there are 183 motorships with a gross tonnage of 502,944 under construction at the present time in the world's shipyards. These figures do not take into account the motorship construction in Germany, and, as was intimated in these columns last month, Germany is putting on quite a sizable motorship program. If the German figures were added, the total number of sea-going motorships would be over 210 with a gross tonnage well over 600,000.

The interesting fact which stands out in these figures is that, while the number of steamers under construction has fallen approximately 14 per cent as compared with the preceding quarter, the number of motorships building is practically the same. Of this motorship program over 200 are in European shipyards, while only three, with a gross tonnage of 18,850, are building in the United States.

These figures show very plainly that our European rivals are fast gaining the advantage in economically operated cargo ships. In Sweden there is a tonnage of motorships building twice as large as the tonnage of steamers and, according to the present trend, no more steamers will be ordered for offshore trading. It is also worthy of note that at the present time no steel sea-going motorship is laid up for lack of freight, while many hundreds of steel steamers are so laid up.

Scandinavian Motorships

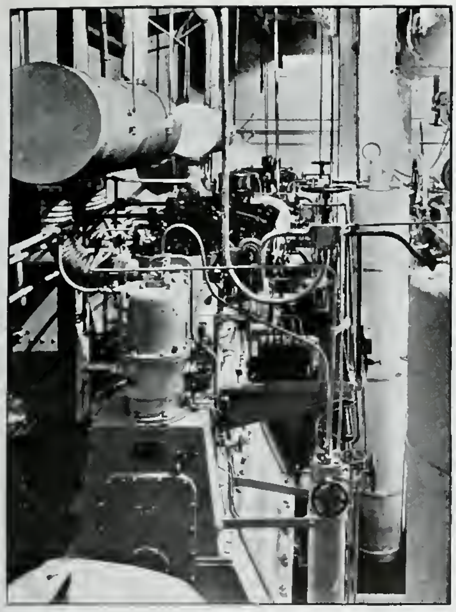
The Johnson Line of Stockholm, well known on the Pacific Coast, has just announced that, subject to the permission of the Swedish government, it proposes to sell all of its steamers and to build and operate motorships exclusively. This progressive firm recently launched their twelfth motorship, the Cometa, at Burmeister & Wain's yard. At the present time the total steam fleet of this company, aggregating 50,000 tons, is laid up, not being able to make a profit in carrying freight, while its motor vessels, aggregating 80,000 tons deadweight, are all in daily service. The Johnson Line has two other motorships building at Burmeister & Wain's, and as soon as its steamers are disposed of it will undoubtedly order many more.

Practically every Scandinavian shipowner appears to be tending in the same direction. The East Asiatic Company has already sold all its steamers and now possesses fifteen fine sea-going motorships. The Transatlantic Steamship Company of Gothenburg is building three oil-engined ships and, according to the statement of its directors, does not intend to build any more steamers. Two-thirds of the ships under construction in Scandinavia at the present time are motor vessels.

New British Orders

Messrs. Hunting & Sons have contracted with the Tyne Iron Shipbuilding Company for a 10,000-ton motorship, their first oil-engined craft. This ordinary cargo boat will be 365 feet in length, 51 feet beam, and 25 feet draft. The machinery equipment will consist of two Werkspoor motors, each of 1200 i. h. p. generated in six cylinders with 560 m.m. bore and 1000 m.m stroke, running at 120 r. p. m. These motors will be built by the Northeastern Marine Engineering Company of Wallsend-on-Tyne, who had in the past the largest output of marine steam engines of any British firm. They have converted their shops for

Working platform, U. S. S. B. motorship William Penn



Engine room of motorship William Penn, port side, showing B. & W. generating sets

the manufacture of marine Diesel engines on a large scale and hold the Werkspoor license.

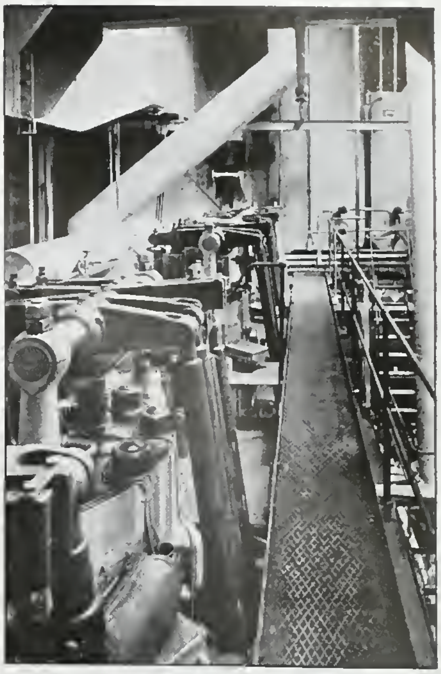
Motor Shipbuilding on the Tyne

Practically every large Tyne shipbuilding firm is now actively engaged in motorship construction, and even the most conservative of builders recognize the fact that shipowners will not order steamers on any large scale as long as they have to compete with motorships. In fact, it may be said that the greater the shipping slump the more favorable will be the reaction upon the development of motor craft, and as soon as trade shows a tendency to revive, British shipbuilders will be ready for the flock of motorship orders which is expected to be forthcoming.

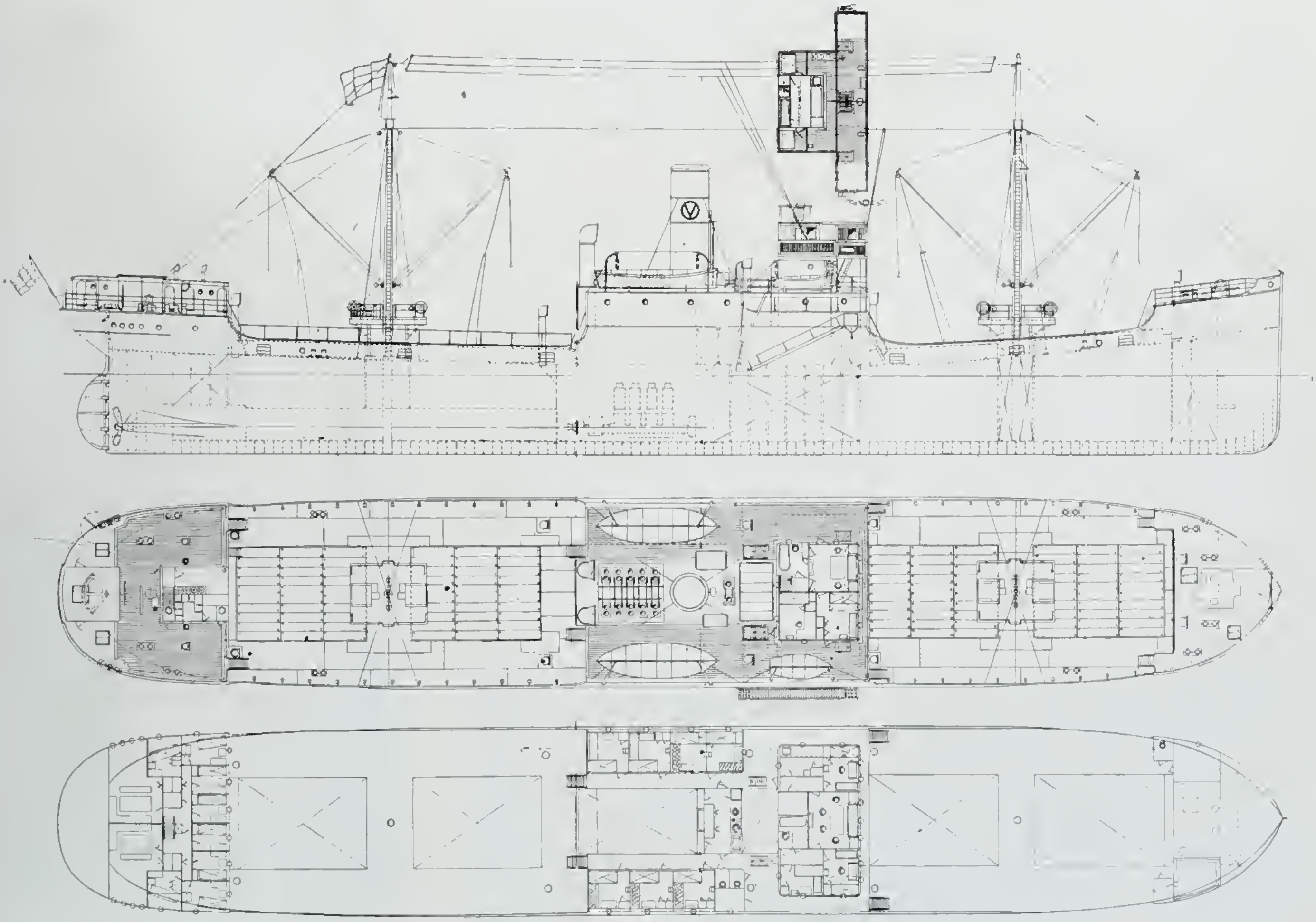
Single Screw Motorships

As noted in our columns last month, the Doxford-engined Yngaren has been completed, and two similar single screw vessels are on the stocks. Beardmore's are also constructing three ships, each equipped with only one engine. Several single screw motorships have been built and are under construction in Holland, and the Swedish shipyard, Oresundsvarvet, has just completed the Sulina, a single screw cargo carrier for the Swedish Levant Company. She is engined with a 1600 horsepower Burmeister & Wain type built by Gotaverken. This ship will carry 4450 tons deadweight, and it is understood that she will be used as an ordinary tramp.

Shipowners are very seriously considering the oil engine for the tramp class of ship, owing to the fact that there has been during the past year or two a large increase in oil bunkering stations throughout the world and oil of suitable quality for Diesel engine work can be obtained in practically all of the principal ports. The great majority of European engine



Upper platform of motorship William Penn, showing tops of cylinders



Profile and plans of 2700-ton D. W. C. motorship building at the Burgerhout Ship Yard, Rotterdam. She is powered with twin 600 H. P. Bolinder engines of new design manufacturers are developing special types of slow speed long stroke motors for installation in single screw craft, these engines being arranged to drive their own auxiliary machinery and form a self-contained unit which can be substituted for the steam engine in conversion jobs.

German Program

One firm alone in Germany, the Deutsche Werft of Hamburg, has orders for ten cargo ships totaling over 60,000 tons deadweight, all to be engined with Burmeister & Wain type Diesels manufactured at the A. E. G. Works in Berlin, the only change from the standard B. & W. design being a slight alteration in the method of operating the maneuvering gear. The engines are of 1550 i. h. p., two being installed in each ship. The standard Danish arrangement for engine room auxiliaries has been adopted with the usual electrically operated air compressor. It is estimated that over 200,000 tons of motorshipping is now on order in Germany, and the development there should be watched very closely.

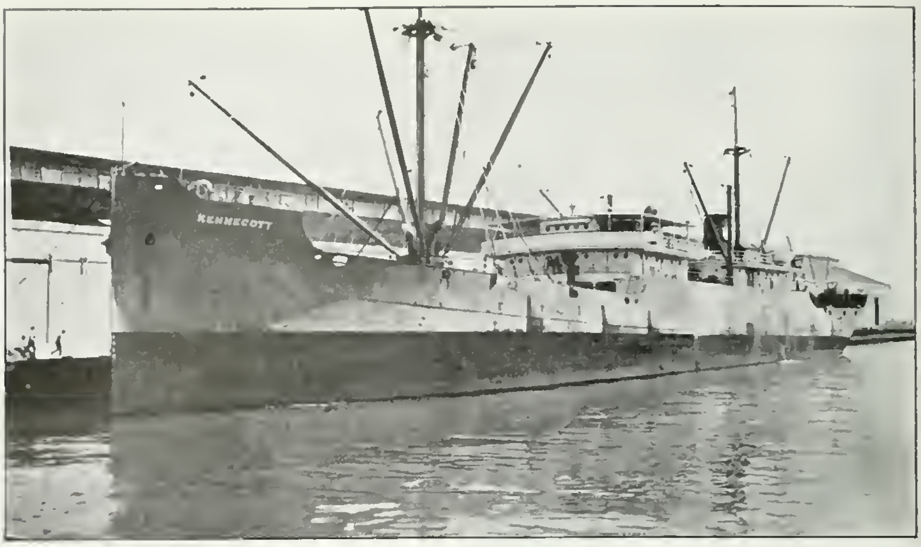
High Powered Semi-Diesel

A very interesting development has recently come to light in the new design for the Bolinder engine. An efficient electric plug has been developed for starting in place of the bulb and torch, so that now the engines can be started from cold very much more quickly and efficiently. The power per cylinder has also been increased and the air compressor dispensed with. The new motors are directly reversible and are claimed by the manufacturers to have all the advantages of the Diesel engine and at the same time to be more cheaply constructed and more simple to operate.

Two of these engines of 600 b. h. p. each are now being installed in a 2700-ton deadweight capacity ship building at the Burgerhout shipyard at Rotterdam. This vessel is 250 feet in length with a beam of 40 feet 8 inches and is expected to prove a very useful and economical type. The auxiliary plant on this ship is driven entirely by electric motors, the power being supplied by three Bolinder motor generating sets of 40 horsepower each.

American Motorship Program

To offset this splendid European program of motorships, the United States has at the present time under construction one motor tanker, the H. T. Harper, building at the Moore Shipbuilding Company ,Oakland, California, and to be delivered probably during September, and two freighters building at the Merchant Shipbuilding Corporation, Chester, Pennsylvania.



A snap of the American motorship Kennecott at a San Francisco pier by our staff photographer

The tanker H. T. Harper will be 330 feet in length, 46 feet in beam, 21 feet 6 inches loaded draft, and of 4750 deadweight tons carrying capacity. She will be engined with two Werkspoor engines built by the Pacific Diesel Engine Company of Oakland, each of 1100 i. h. p.

The freighters building at the Merchant Shipbuilding Corporation, Chester, Pennsylvania, have not yet been named. They are on order for the American-Hawaiian Steamship Company and are to be 445 feet long, 59 feet 8 inches beam, 28 feet 6 inches loaded draft, 11,000 deadweight tons carrying capacity, 11½ knots speed. They will each be engined with two six-cylinder Burmeister & Wain type Diesel engines, each of 2250 i. h. p. supplied by the William Cramp & Sons Ship & Engine Building Company.

U. S. Shipping Board

It certainly is high time that American shipowners, shipbuilders and marine engineers should awaken to the importance of motorship development, and it is to be hoped that the William Penn, recently delivered to the Shipping Board—and evidently from her description a first-class Burmeister & Wain type motorship—will be given a most thorough and painstaking trial and that the results will be given the widest publicity, for it seems as if no records in marine engineering or marine operation have any very great effect upon the American engineering mind unless they are made under American auspices.

It is rather unfortunate in this connection that the Shipping Board should in its trials of this vessel be in the position of being the owner of the largest number of steamships under single ownership in the world, so that if it should be proven by the trials of this single ship that the motorship is vastly superior to the steam-engined vessel, the Shipping Board will by publishing that superiority immediately reduce the value of its great fleet of steamers. Bearing this fact in mind, shipowners should watch the operation of the William Penn very carefully themselves and draw their own conclusions as to the economy of the Diesel engine at sea.

The Trend in Diesel Engines

Some of the engineering societies in Great Britain have recently drawn attention to the fact that the present trend in design of Diesel engines toward large cylinder diameters is in a very risky and dangerous direction. The larger the cylinder the greater the metallurgical problem, and the metallurgical problem has always been the great stumbling block in the production of Diesel engines of high power.

Some recent developments brought out by Michell, the designer of the Michell thrust block, have turned the attention of engine designers to the old swash-plate substituted for the crank in reciprocating engines with promise of good results. In another part of this issue the design of the Michell engine is described somewhat in detail. It is sufficient to say here that this design produces a very compact arrangement of small cylinders located concentrically with the shaft and working in opposed couples against the swash-plates in such a way as to balance all internal strains.

The British Diesel engine designers are now engaged on the adaptation of this idea to the Diesel engine principle, and there is some hope expressed that this form of engine may work out with a very economical and compact oil-burning unit.

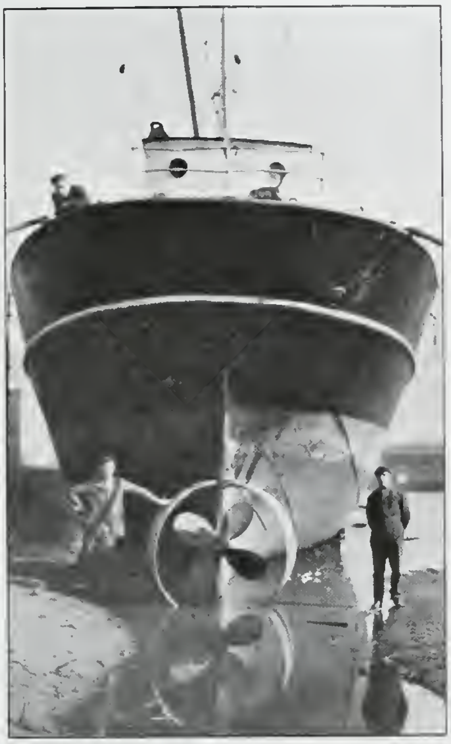
SPANISH DIESEL ENGINED

Coaster Fitted with Kitchen Reversing Rudders

SINCE the days of Columbus history has seldom attributed to Spain the lead in any direction of national enterprise, including even navigation, in which the Spanish were at one time Britain's keen rivals. It is noteworthy, therefore, that one of the newest inventions affecting the progress of navigation—namely, the Kitchen reversing rudder—has been adopted by Spanish owners in one of their coasting vessels, the Alca, which at the present moment is one of the largest vessels fitted with reversing rudders actually at work.

Some particulars of the vessel will no doubt prove interesting to our readers, particularly those concerned with the motor-driven vessels. The Alca is a steel vessel of 500 tons displacement and 300 tons deadweight carrying capacity engaged in carrying coal and general cargo along the Atlantic Coast of Spain. Her dimensions are: length 140 feet, beam 22 feet 3 inches, and depth 10 feet molded, her load draft being 8 feet 3 inches. Originally built as a sailing vessel, she has now been re-rigged and equipped with a 150 b. h. p. Sulzer Diesel land type engine, which turns a propeller of 4 feet diameter. The engine has no reversing or clutch devices of any kind, and all stopping, running astern and maneuvering of the vessel is obtained solely with the Kitchen reversing rudder.

To install these rudders the original rudder post was removed by cutting it through at the top and bottom of the propeller aperture; an extension to the stern foot to take the bottom pintle was added and securely riveted to the keel; and at the top of the rudder a strong gudgeon or bearing was riveted to the ship frame.



Stern view of Spanish coasting vessel Alca, fitted with Kitchen rudder

Inside wheel house of Alca, showing double control of Kitchen rudder

The rudder blades are of mild steel plate ½ inch thick; the inside dimensions of the blades are 64 by 58 inches, the major axis being horizontal.

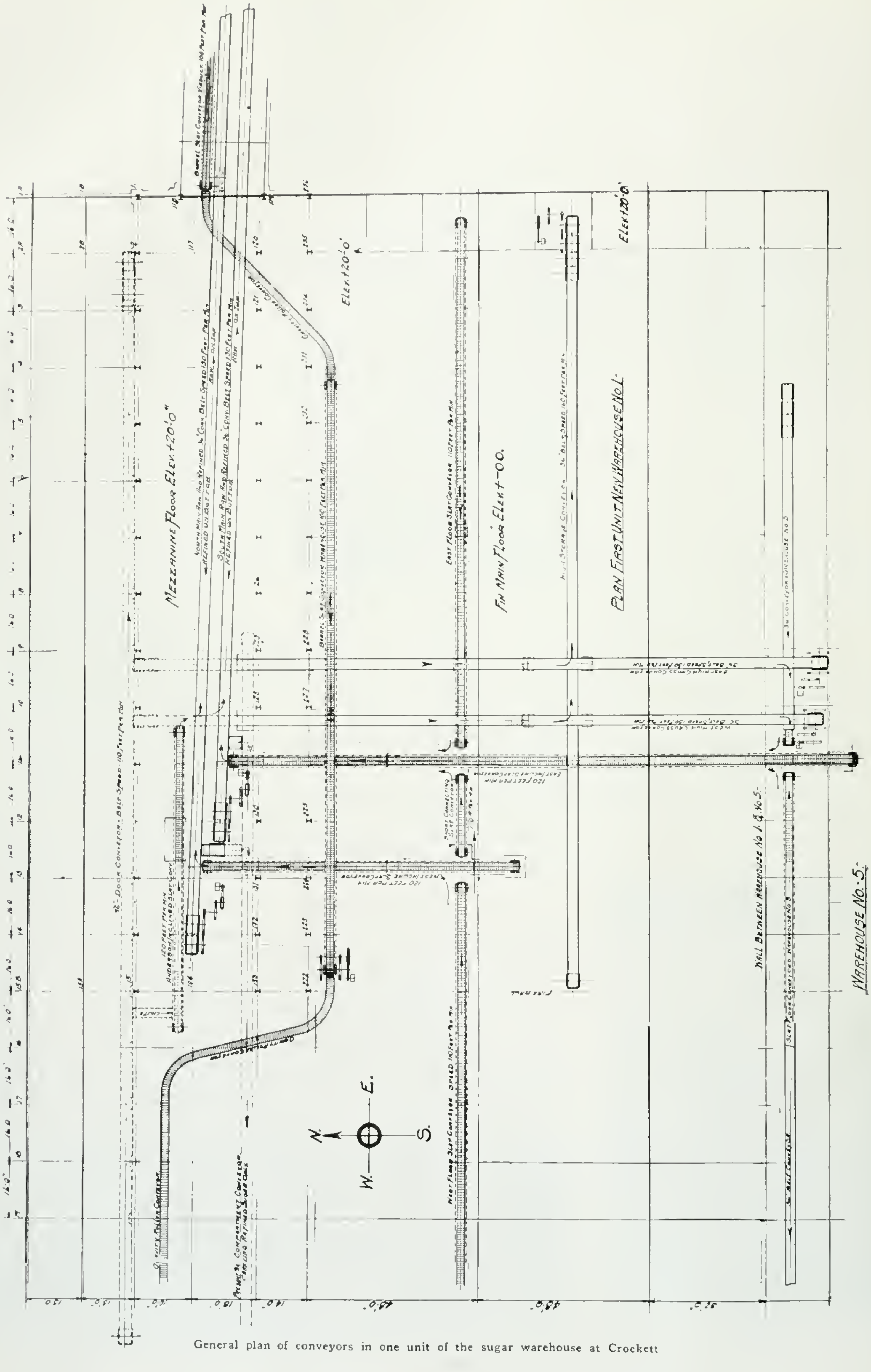
The speed and reverse control wheel for operating the rudder is mounted in the wheelhouse on the starboard side of the steering wheel. The motion from this control wheel is conveyed to the rudder head operating gear by means of steel chains over guide sheaves and rollers, and it is this wheel which regulates the opening and closing of the rudder blades and of course all their intermediate positions.

Helm is controlled in exactly the same manner as with the ordinary type of rudder, and for those who are not conversant with the Kitchen reversing rudder it may be pointed out that the opening and closing of the rudder blades in no way interferes with their helm carrying powers. Either of these operations can be carried out independently of the other, as they are not interconnected.

The vessel attains a sea speed under power of 6¼ knots, and the following results of maneuvering trials are interesting. The astern speed was 2¼ knots. The time taken to bring the vessel from full speed ahead to dead stop was 34 seconds and the distance traveled was 200 feet. The diameter of her turning circle at full speed ahead was 140 feet, less than the vessel's own length. The time taken to spin about an axis amidships, as if on a pivot, through a half circle, occupied 1 minute and 25 seconds.

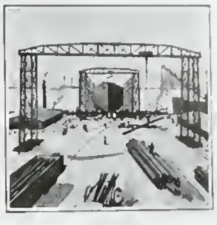
The rudder control is most efficient and practically instantaneous in effect and permits the maneuvering and working of the vessel in and about the congested harbors and docks with the greatest ease and reliability.

The Spanish motor coaster Alca returning from her trial trip


Mezzanine Floor Elev. +20'0"
1st Main Floor Elev. +00.
Plan First Unit New Warehouse No. 1
Elev. +20'0"
Wall Between Warehouse No. 1 & No. 5
Warehouse No. 5
N.
E.
S.
W.

General plan of conveyors in one unit of the sugar warehouse at Crockett

Material Handling



CONVEYING AND ELEVATING MACHINERY

In the Sugar Warehouse at Crockett

By HENRY T. HESSELMEYER
Chief Engineer, Meese & Gottfried Company, San Francisco, California

THE main building at Crockett was erected in 1880 and used for many years as a flour mill. About 1900 it was changed to a beet sugar refinery and in 1903 was turned over for the purpose of refining cane sugar only and has been used for that purpose ever since. As early as 1905 conveyors were installed for handling the sugar and these conveyors are still in use, having been added to from time to time as the capacity of the refinery was increased.

Early in 1917 the directors decided to increase the capacity of the refinery to 2000 tons a day. This made necessary a thorough overhauling and partial rebuilding of both the refinery and the warehouse and during this reconstruction the present system of conveyors and elevators was worked out by Mr. George M. Rolph, general manager of the California & Hawaiian Sugar Refining Corporation, and his engineering staff at Crockett, assisted by the engineers of Meese & Gottfried. Much time was spent in the arrangement of these conveyors and in consideration of the co-ordination of the system so that the vast amount of material could be handled to the greatest advantage.

On the site of the old wooden structure a new modern warehouse is being built with concrete floor, supported on concrete and wood piling, brick walls and reinforced concrete roof. This building will be 200 feet wide, 1000 feet long and about 40 feet high in the clear, in four sections, each 250 feet long, separated by brick fire walls. Sections numbers 1 and 4 of this new building have been finished and as fast as is practicable the wooden section between them will be changed over.

In the August issue of Pacific Marine Review we described somewhat in detail the refinery of the California and Hawaiian Sugar Refining Corporation, which is located at Crockett, California, about thirty miles northeast of San Francisco. In that article reference was made to the very extensive system of conveyors used in the warehouse and refinery, all of which were installed by Meese & Gottfried of San Francisco. We are therefore very glad to be able to give to our readers the present article, which details quite elaborately the conveying system as installed in the warehouse at Crockett, which is probably the most extensive of its kind on the Pacific Coast, and we are especially glad to have this description prepared by Mr. Henry T. Hesselmeyer, who, as chief engineer of Meese & Gottfried Company, was principally responsible for this installation.

The floor of this warehouse is continued out over deep water to form a dock for unloading the ocean going vessels which deliver the raw sugar from Hawaii. The warehouse is arranged with unloading platforms on a second level above the dock so that the sling loads of sacks of raw sugar may be delivered by the ships' winches either on the platforms or on the dock level. With this arrangement it has been found possible to work the ships' winches up to their capacity.

Dock Conveyor

Just outside the north wall of the warehouse is located what is known as the dock conveyor. This is a horizontal belt, 36 inch wide 7-ply rubber, with the centers of the driving pulleys 1000 feet apart. This belt is driven from both ends and is designed to deliver sugar on both the upper and lower stretch, carrying sugar in both directions at the same time. This arrangement required special designing for suitable takeups for slack at both ends of the belt. The driving machinery at each end consists of two cast iron pulleys of 58 inches diameter by 38 inches crown face, rubber lagged. These pulleys are fitted to 5 7/16 inches diameter shafts, the outer ends of which each carry a spur gear of 61 inch pitch diameter. The bearings of the pulley shafts are so placed that these spur gears mesh on their pitch lines. These gears are driven by a cast steel spur pinion, power being transmitted from a 25 h. p. motor through a Meeseco short center belt drive using 10-inch double leather belting to a large pulley on a countershaft, thence through double reduction spur gears to the main spur pinion. It will be seen that each of the driving pulleys of the belt conveyor has a large arc of belt contact. A gravity takeup, consisting of a floating idler pulley 48 inches diameter by 38 inches face, mounted on a shaft whose bearings are carried in a cast iron frame which has free vertical action on pipe guides sufficient to handle 20 feet of belt, is loaded with sufficient weight to give the proper tension at all times.

This driving mechanism is duplicated at the other end of the belt, with the exception that here a swinging belt tightener is provided which acts as an auxiliary takeup to the gravity mechanism at the other end. Both upper and lower belts run on pipe rollers 5 inches in diameter by 39 inches long, ⅞ inch diameter end shafts of these rollers being carried in hard maple blocks which serve as bearings.

This belt is designed to handle

1500 tons of sugar per day in each direction at a speed of 100 feet per minute. Sugar can be taken off this conveyor at any point on the first floor.

Inclined Slat Conveyor

To avoid unnecessary handling as much of the sugar as possible is taken directly from the ship to the melt house in the refinery. For this purpose an inclined slat conveyor was installed near the east end of the dock conveyor and parallel with it. This conveyor is 36 inches wide by 100 feet long between centers of head and tail sprocket shafts, and has an inclination of 20 degrees from the horizontal. It delivers bags of sugar to either the north or south main conveyors leading into the refinery. It is composed of number 212 interlocking bolted roller chain of 4-inch pitch, with A-2 right and left attachments to every link, and 1⅜ inches thick by 3½ inches wide pine slats 36 inches long bolted thereto. The speed is 110 feet per minute, the drive being a 15-horsepower electric motor transmitting power through a Meeseco short center belt drive to double reduction spur gears at the head sprocket shaft.

Main Belt Conveyors

The main North and South belt conveyors to which sugar is delivered by this inclined slat conveyor are located on the second floor of the warehouse and the third floor of the refinery and are each, like the dock conveyor, designed to carry sugar in two directions. They are 36-inch wide 7-ply rubber belting and are each about 800 feet long between centers of the driving pulleys. They are parallel with each other, having a passageway of four feet between them. Each is capable of handling about 2000 tons of raw sugar per day if necessary, the duplication being provided to insure against all possible contingency of shut-down, and both belts are in daily operation at about half their capacity. They are driven by the same mechanism as has already been described for the dock conveyor. They receive raw sugar at the west end and carry it on the upper belts to the cut-in station on the third floor of the refinery above the raw sugar bin. The speed of these belts is 130 feet per minute, slightly faster that that of the dock conveyor. After discharging the raw sugar on the third floor of the refinery the belts pass over 48-inch idler pulleys and descend to the second floor of the warehouse, where the driving machinery is located. Here after leaving the gravity takeup the belt runs under the second floor and refined sugar is loaded on the return belt for conveyance to warehouse number 5, or, if intended for shipment by steamer, for conveyance to the 36-inch compartment conveyor which takes it to the end of the raw sugar warehouse.

High Cross Conveyors

Raw sugar coming from the dock conveyor to be stored in the first section of the new warehouse is sent over one or both of the high cross conveyors. These are located nearly in the center of the warehouse section and run at right angles to the dock conveyor. They are spaced 16 feet apart. These conveyors carry sugar only on the upper belt but are used for the conveyance of both raw and refined, arrangements being made for reversing the direction of travel of the belt at will. The receiving ends near the dock conveyor are about 10 feet above the floor of the warehouse so that bags of sugar can be sent down on chutes from either the upper or lower belts. For a distance of 120 feet the high cross conveyors rise at an angle of 14½ degrees and reach a height of 40 feet above the floor. They then pass over the high storage conveyors and descend at an angle of 14½ degrees for a distance of 65 feet, entering the refined sugar warehouse through openings in the wall. Each of these high cross conveyors has a total length of 200 feet between centers of pulleys.

In handling raw sugar the bags are taken off these conveyors by means of deflecting plates and deposited on the high storage conveyor by which they are distributed to any portion of the warehouse and deposited through portable chutes. The refined sugar coming from either the main north or south belt conveyors passes by the deflecting plates and continues until it reaches the main 36-inch belt conveyor in warehouse number 5, from which it is distributed to any point in the refined warehouse.

The high cross conveyors are composed of 7-ply rubber belting, 36 inches wide. They are driven at the upper end only and travel at 150 feet per minute. Power is provided by a 15-horsepower motor driving through the Meeseco short center belt drive and double reduction spur gears. Suitable gravity takeups are provided and the belts are carried on pipe rollers at intervals of 3 feet, with idler puleys 36 inches diameter at points where the direction is changed. These conveyors are mounted on structural steel trusses extending across the full length of the warehouse, the trusses being supported by I-beams placed between the columns. A walkway is provided on the side of each truss for inspection of the conveyor.

Another high cross conveyor is provided, similar to those just described, for taking sugar from the east end of warehouse number 1 into warehouse number 4. This belt conveyor is inclined at 14½ degrees for 120 feet, at which point it reaches a height of 40 feet above the floor. It then runs horizontally for about 400 feet to the south end of warehouse number 4. From this conveyor bags of sugar can be discharged to any position in warehouse number 4 by means of suitable wooden chutes.

For returning raw sugar from warehouse number 4 the roller chain slat conveyor is provided which lifts the sugar from the floor of the warehouse and delivers it onto the high cross conveyor, whose direction of travel is reversed to take the raw sugar back for delivery to the other conveyors which carry it to the cut-in station.

High Storage Conveyor

At the center of the warehouse and extending its full length is located the storage conveyor. This is practically a duplicate of the dock conveyor. It is 1000 feet long between centers of pulleys, driven at both ends, travels 180 feet per minute, carries sugar diverted to it from the high cross conveyors an dcarries sugar both on the lower and upper belts. It will be noted in this description that each of these belt conveyors travels faster than the one preceding it, this arrangement doing away with any danger of blockage. The steel channels which support the bearings of the pipe rollers for the belts of this conveyor are hung from the lower cords of the roof truss, and the driving machinery is supported on a platform made up of heavy I-beams and also hung from the trusses of the roof. By the use of the conveyors so far described the warehouse can be entirely filled with sacks of sugar pilled 35 feet high.

Floor Conveyors

For withdrawing sugar from the warehouse use is made of floor conveyors. In the center of the warehouse and level with the floor a series of three slat conveyors was installed over fifteen years ago and these are still in use. They are composed of two strands of interlocking bolted roller chain 4-inch pitch, with bolted pine slats 3½ inches wide and 24 inches long. Each sec-

(Continued on page 537)

View from inshore end of Portland municipal terminal number 4, showing grain elevator and administration buildings

PORTLAND'S NEWEST TERMINAL

THE Commission of Public Docks of the city of Portland, Oregon, have undertaken, in the construction of the municipal terminal number 4, to give the city of Portland one of the most modern and up to date terminal units that is to be found anywhere among the sea-ports of the world. The complete terminal will include five large piers and three slips with warehouse and open storage and with abundance of machinery for handling both mixed package and bulk cargoes, the whole covering an area of 160 acres and having a harbor frontage on the Willamette River of 2730 lineal feet.

When fully completed this terminal will have ample space for the berthing at one time of fourteen 500-foot vessels and will have a combined trackage of approximately 16 miles. Fifty acres adjoining the terminal are available for industrial sites with an ideal combination of rail and water service.

A large flour mill is under construction and will soon be operating on this ground immediately adjacent to the grain elevator of the terminal. This concrete elevator has a 1,000,000 bushel storage capacity and is equipped with machinery capable of delivering 20,000 bushels of bulk grain per hour to the holds of vessels at the pier.

The pier alongside this elevator has a length of 1500 feet and a width of 225 feet. The transit shed, 180 feet wide, extends the full length of the pier. Six hundred feet of this pier are constructed with two levels so as to take care of the handling of general cargo readily from a ship's deck at all stages of the water in the river. The pier has a capacity to take care of 35,000 tons of general cargo or 56,000 tons of grain and flour. Slip number 1, lying between piers 1 and 2, is 280 feet wide, 2500 feet long, and will be kept dredged to a low-water depth of 32 feet.

Pier number 2, also 1500 feet long and 225 feet wide, has a transit shed 166 feet in width by about 750 feet long on its outer end, the inner end of the pier being open. Pier 1 is fitted with a very extensive rubber belt conveyor system for bulk cargoes, which transfers to the conveyor feeding the grain elevator.

Both pier number 1 and pier number 2 are equipped with a complete system of mains for pumping bulk oil and molasses directly from the holds of ships alongside the piers to storage tanks. The vegetable oil and molasses plant consists of eleven steel tanks having a combined capacity of 1,092,000 gallons, and two 60-ton scale tanks for the weighing of oils or molasses as delivered to the tanks from the vessel or as delivered to tank cars from the storage.

Piers number 3 and number 4, with slip number 2 between them, are to be finished as business demands.

Bulk Cargo Facilities

Pier number 5 was designed as a straight pier, 900 feet in length, with a quay running from its outstream end to the southerly line of the terminal. This quay and the fill back of it have been completed and elaborately equipped for the handling of bulk cargoes other than grain, such as coal, ores, etc. This quay is also arranged for oil bunkering.

The bulk storage bins on pier number 5 are largely of concrete construction and will have a total capacity of 16,000 tons. They are designed for the handling and shipping of phosphate rock, coal, sulphur and other such commodities. Here is the Ottumwa box car unloader, which picks up a full size box car loaded with bulk freight, opens its door, tips it first one way and then the other, discharges all of the contents, closes the door, and delivers the car on the track again, the total operation requiring seven minutes.

For the convenience of shippers and as a check on all shipping weights, a standard Fairbanks track scale with a capacity of 150 tons has been installed as part of the terminal equipment. This scale is operated under the supervision of the weighing and inspecting department of the Continental Freight Bureau.

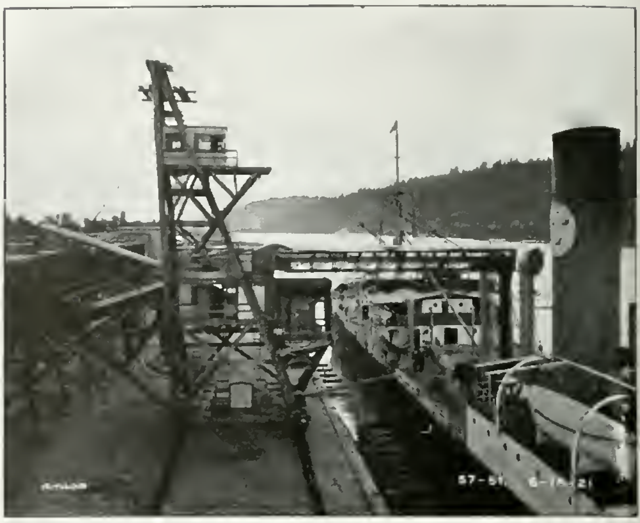
Belt Conveyors

There are in connection with this pier number 5 over four acres of open storage space for lumber, structural steel, etc. A belt conveyor carries the bulk material from the bin at the car unloader to the storage bins. Trackage is also provided above the storage area and the storage bins, for the handling of bottom dump cars through a double-hoppered pit, with duplex shaker feeders discharging the material onto conveyor belts. Approximately 250 tons of phosphate rock or 150 tons of coal per hour can be handled in this way.

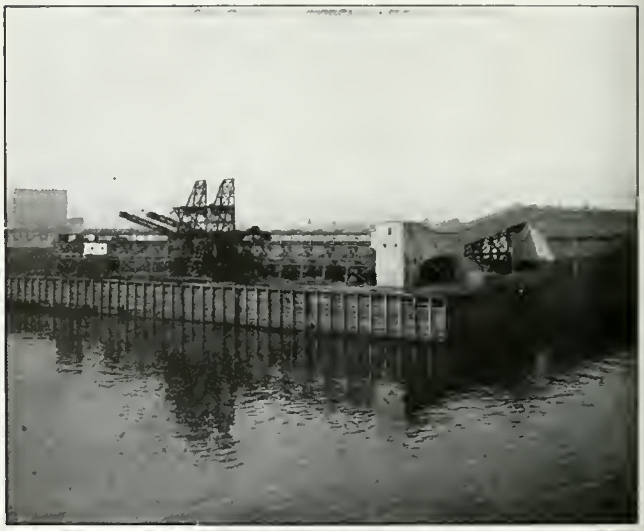
Belt conveyors equipped with portable spouts take material from the bottom of storage bins, and dis-

VIEWS OF PORTLAND'S NEWEST TERMINAL

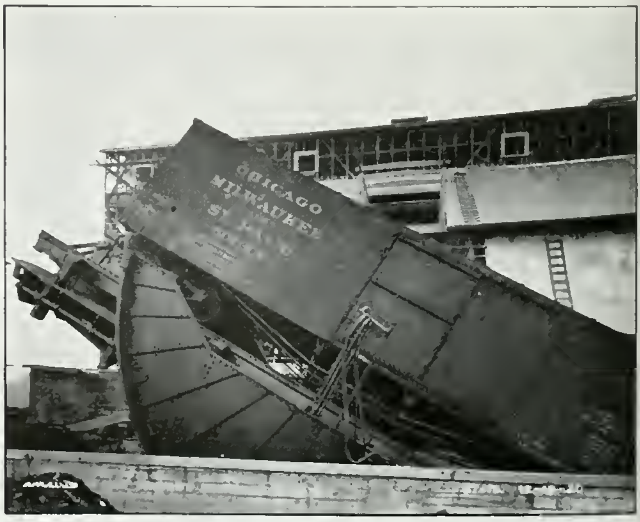
Original ground before being broken for terminal site


Loading coal with the new conveyor system of the Port of Portland

Looking through one of the busy sheds of the municipal pier


Bunker facilities for bulk commodities

One of the conveyor belts for bulk commodities



A modern box car unloader

Portland municipal terminal number 1

charge onto traveling towers which are operated along the face of the pier and carry adjustable conveyors on swinging booms by which the material can be delivered into the hold of the vessel. This process can be reversed for unloading ships.

Fuel Oil Storage

In the rear of the bulk storage plant on pier 5 there has been installed a 55,000-barrel tank for fuel oil, with a 10-inch pipe line to the face of the quay at pier 5.

In the channel approach to terminal number 4 the port of Portland has excavated a channel the full width of the river, 1600 feet, with a minimum depth at low-water of not less than 30 feet, and the material obtained from this channel dredging was deposited on the site of terminal 4, about 80 per cent of which has now been raised to the required elevation.

This terminal is operated by the commission and they have built in connection with its operation an administrative building, a restaurant which has a capacity for seating 200 people at one time, and an employes' welfare building with clubrooms, showers and other conveniences.

The location of terminal number 4, while it is ideal from a standpoint of rail and water connection, is considerably removed from the main business and residence portions of Portland. At the time of the beginning of construction work it was fully one and one-half miles from the nearest street car connection. The commission requested the extension of the street car system by the Portland Railway Light & Power Company, but that organization was unable to satisfactorily arrange its finances at the time to make the extension. The commission then procured franchises from the city and county and constructed the extension itself, placing the same in operation early in November. The greater portion of this street car extension lies on Kellogg street and its continuation, and the commission has had this street widened so that Kellogg street is now a paved roadway, 50 feet wide, connecting the terminal with the city of Portland.

Contemplated Improvements

The new terminal has become very popular with shipping on account of the splendid records made in loading and discharging cargoes from vessels. In fact, the use of this terminal has been so large that the Port of Portland Commission is working out at the present time a project looking to still further development of the channel of the Willamette, and has now proposed an engineering plan which contemplates the improvement of Swan Island and the west channel of the Willamette which, if adopted and carried out, would give in Guilds Lake on the west side of the river railroad trackage facilities and terminal yards of 3000-car capacity, with pier slips and industrial sites covering 888 acres. On Swan Island, served on both the east and west sides by deep water channels, the plan calls for docks and industrial sites covering 160 acres. On Mocks Bottom there would be a long open dock facing on the east channel, with industrial sites back of it, served by railroad yards hacing the capacity of 2700 freight cars, covering 482 acres. This would give a total reclaimed area of 1530.79 acres. The plan contemplates the closing of the south end of the east channel by a railway mole which would give direct railroad service to the docks on Swan Island. It is estimated that the acquisition of the real estate and the cost of the dredging required would involve approximately $5,000,000.

The outline of this plan as given here shows that the Port of Portland Commission and the business men of Portland are looking forward to a great expansion of business in the future and is one of the indications that there will be a great market on the Pacific Coast in the not far distant future for the activities of terminal engineers and the manufacturers of material handling machinery and equipment.

View of portion of Portland's waterfront from across the Willamette, showing part of the fleet of torpedo boat destroyers at anchor in the stream

EUROPEAN MARINE NOTES

Special Correspondence Pacific Marine Review

THE return of the British coal miner to work after having ceased all labors since April 1 is a good point for British shipping. This will be understood without any detailed explanation. A great deal of shipping will be freed and demand for tonnage is already good, especially for coal shipments. Steamers have been secured for the voyages to Italy, South America, Port Said, India, the Dutch East Indies, Denmark and Germany.

The reopening up of the coal trade will mean that British steamers will once again become scattered throughout the world. Ships which proceed to the East with coal cargoes will become available for loading homewards grain and other foodstuffs. Owing to the curtailment of sailings from this country, the supply of ships in the Far East to accept homeward loadings has lately not been quite equal to the demand. There is no doubt in the minds of coal exporters and shipbrokers that British firms should be able to regain trade east of Suez. Centers which before the war relied on British coal have, during the past few years, been taking South African coal.

In Italy and South America competition from the United States is to be expected. Yet it is pointed out by a writer in the Times Trade Supplement that in Italy, at any rate, British coal should be delivered at prices below those for American coal. On the basis of a price of $8 a ton for ordinary South Wales steam coal, and a freight of $3.50 a ton, it should be possible to deliver British coal there at about $11.60 a ton. Assuming a price of $6 a ton for American coal, and a freight of a similar amount, American coal should cost at least $12 delivered in Italy. But it is admitted that American firms have secured a strong foothold in this market, as well as in South America, and that the competition of American firms will have to be encountered. Both in the Italian and Egyptian markets, American exporters now hold large contracts, and to the extent of these the demand for British coal will be reduced. Freight rates for grain from the River Plate have been easier lately, and are likely to show a continued easy tendency should the demand for British coal from South America become of large proportions.

Sir Alexander Kennedy, president of the Shipbuilding Employers' Federation, seized the occasion of the launching of a new oil tank steamer for the Argentine government to refer to the need for decreased costs in shipbuilding. He said that less than two years ago it was believed or at least hoped that the boom in shipbuilding and allied trades would continue for a few years. As events had proved the conditions then prevailing were economically unsound, and a slump, sharp and severe, came upon the shipbuilding industry. Instead of facing facts as they found them and suiting themselves to the altered circumstances, the cost of production was maintained at a level altogether disproportionate to market values. The attempt to adjust the difference led to industrial unrest, which in its turn delayed the completion of work. Some people seemed to think that the coal strike came just at a moment when trade was recovering. He was quite optimistic as to the future of British trade, but so far as shipbuilding was concerned, he was afraid there were no signs of recovery. Indeed, the indications were all in the opposite direction. He did not see how any of the great British industries could have recovered with the price of coal as it stood prior to the strike. With greatly cheapened coal there would be a chance for some of the large industries to get their productive costs down. At the same time until all costs fell considerably there would be no recovery. Costs in shipbuilding had undoubtedly fallen within the past few months, but they would need to fall still further before the acute depression in shipbuilding could be substantially relieved. Unemployment in shipbuilding at present was approximately 40 per cent.

Chamber of Shipping and Pilferage

There has now been issued the second interim report of the Chamber of Shipping and Pilferage committee, which deals with matters discussed by the committee since the first report was issued some weeks ago. Incidentally the present report throws light on one aspect of the phrase "Received for Shipment," sometimes employed in bills of lading in place of the time-honored phrase "Shipped in Apparent Good Order and Condition." The committee recommends that "The custom of issuing bills of lading for goods 'received for shipment,' except where the circumstances make no other form appropriate, should be discouraged, as it gives scope for pilferage, and in no case should shipowners, under whatsoever pressure from merchants, issue a 'shipped' bill of lading until the goods are on board the steamer, as the difficulties of protecting the steamer against claims for pilferage which may have happened before shipment are thereby greatly increased."

Conditions at the Ports

A number of other matters dealt with by the committee include the acceptance by the London lighterage trade of the principle of some responsibility for the safety of goods carried; the institution of a special dock police scheme in London; the need for the better packing of cargo; and the revising of instructions to masters and officers of ships concerning the supervision of cargo confided to their care.

Emphasis is laid on a certain lack of assistance from harbor authorities throughout the world in checking the evil of pilferage. In this connection the committee writes: "In particular there is great difficulty at many ports in obtaining for the ships' officers a satisfactory account of the condition in which the goods are delivered out of their steamers, owing to the practice with many harbor authorities of intervening between the steamship and the consignee and taking the goods into shed or warehouse without any receipt or tally being taken or given until the goods are eventually delivered out of the shed to the consignee, which usually takes place some time after the steamer has left the port. The committee is collating exact information, with a view to seeing whether the chamber can take or promote any action to get a better state of affairs."

In conclusion, the committee, of which L. C. Harris is chairman, writes that "General proposition underlying our recommendations is the responsibility of the deck officers for the proper reception, carriage, and delivery ex-ship of their cargoes in good condition, and of the shipowners for giving every facility to the officers to perform these duties."

Australia's Merchant Fleet

W. M. Hughes, while in London for the Empire Conference, has the task prescribed him of investigating the position and outlook of the Commonwealth merchant fleet. When Mr. Hughes induced his cabinet to adventure in state trading by purchasing the nucleus of a fleet of ocean-going steamers which should develop trade between Europe and America and Australia the headquarters of the fleet were located in London, and H. G. B. Larkin, then in charge of shipping affairs under the High Commissioner, was appointed general manager. Mr. Larkin has done splendid work in London in expanding the service.

When the five new boats now nearly completed, three at Barrow and two on the Clyde, are added to the rest the fleet will consist of over forty splendid modern cargo steamers fitted with the most improved mechanism for refrigeration, and effectually designed for carrying perishable produce to Europe from the Antipodes.

But private enterprise in shipping in Australia has opposed the state experiment all along and now the shippers have joined the shipowners on the ground that this state trading is too expensive and that freight rates are too high. The result just now is that Mr. Larkin has handed his resignation to Mr. Hughes in London. If the resignation is accepted it is probable that the Hughes government will sell the boats and abandon the state enterprise. I am informed, however, that Mr. Hughes, never deficient in pugnacity and daring, is unlikely to accept Mr. Larkin's resignation, and that he may endeavor to place the Shipping Department at Australia House on a stronger and more permanent basis than before during his visit. Mr. Hughes is now both Premier and High Commissioner.

German Shipping

The German merchant fleet in course of reconstruction is the subject of an article which appears in a recent issue of the Bergwerks Zeitung from a correspondent, who points out that it is recognized in Germany that the economic life of the country will be lacking in vitality so long as the nation does not possess a large merchant fleet. In his opinion the latter can only be restored by the construction of new ships in the native yards, as the German exchange is too unfavorable to permit of the purchase of foreign vessels, which are being offered in large numbers owing to the freight crisis, and it is mentioned in this connection that it was impossible for the German shipping companies to buy the ships recently offered by Scandinavian countries because the vessels were still too dear in view of the depreciated condition of the mark.

Under the circumstances every effort is being put forth to accelerate the construction of ships in the native yards, as the shipping companies despite the loss of their original sphere of activity are endeavoring to place new lines composed of German owned and built ships at the disposal of the foreign trade of the country. In this connection it is stated that the German East Africa Line will place a combined freight and passenger steamer in service in the coming autumn of a tonnage of 8000, which will be followed by two further cargo steamers by the end of the year, while the Woermann Line will also be able to incorporate in its fleet this year some new ships which are now in course of construction.

In addition a new ship has just been launched at the yard of the Deutsche Werft at Hamburg for the Hamburg-American Steamship Company; a freight ship has also been put in the water by Blohm and Voss at Hamburg for the German Australian Steamship Company, which has a number of vessels building to be placed in service jointly to be organized with the Kosmos Steamship Company; and the first freight ship built at the new yard of the Flender Company at Lubeck has also been launched for the Levant Steamship Company. All these shipbuilding schemes are being actively assisted by the various coal and iron and steel companies which are connected with the shipping companies of the shipbuilding companies either directly or indirectly.

Shipbuilding Decline

Shipping under construction in the United Kingdom on June 30 last was represented by 789 vessels of 3,530,047 tons, according to the returns of Lloyd's Register of Shipping. Of these vessels 715, representing 3,284,912 tons, were steamers, and 57 of 241,003 tons, were motorships. Seventeen vessels, of a total of 4132 tons, were sailing ships. The tonnage now under construction is less by about 268,000 tons than that being built at the end of the March quarter, and about 48,000 tons less than that under construction 12 months ago. The Register points out that under the present conditions, the figures can only be regarded as, to a large extent, nominal. As in the previous quarter, the total includes a considerable amount of shipping on which work has been suspended owing to the decline in the demand for tonnage, and also a large quantity of shipping the completion of which has been postponed owing principally to the stoppage of work by the joiners and the coal dispute. The tonnage on which work has been suspended amounts to 735,000 tons and the shipping which has been delayed in completion amounts to about 444,000 tons. These two totals, representing 1,179,000 tons, equal to one-third of the whole of the tonnage under construction, have to be deducted in order to enable a comparison to be made with the figures for normal times. There is thus given a real total of 2,351,000 tons under construction in the United Kingdom.

Attention was called in the two previous quarterly returns to the fact that, although the total tonnage returned as under construction was large, the amount completed compared very unfavorably with pre-war times. Whereas in 1913 the average amount of tonnage completed during each quarter was over 23 per cent of the total work in hand at the beginning of the quarter, the corresponding figures for 1920 fell below 13 per cent. There was a still further reduction during the past six months, the output for the period having fallen as low as 8½ per cent.

CONVEYORS

(Continued from page 532)

tion of these floor conveyors is about 300 feet long and is driven independently by a 10-horsepower motor. These conveyors are known as the west floor conveyors and they deliver to an inclined conveyor which takes the sugar up an incline of 24 degrees and delivers it to the north main belt conveyor. These same west floor conveyors by a short connecting conveyor can deliver sugar to another inclined conveyor which, ascending at 26 degrees, delivers to the south main belt conveyor.

The first mentioned inclined conveyor, known as the West, is about 42 feet from center to center of the sprockets. The other, known as the East, starts in warehouse number 5, runs parallel with the floor for a distance of about 130 feet and thence ascends at 26 degrees for 34 feet, making a total length of 164 feet between centers.

The east floor conveyor is set in a trough about 24 inches below the floor so that it may be covered over and sacks of sugar piled above it and still keep in operation.

This system of conveyors for discharging the warehouse can very readily handle 2000 tons of sugar in twenty-four hours or the maximum capacity of the refinery.

NEW STANDARD OIL TANKERS

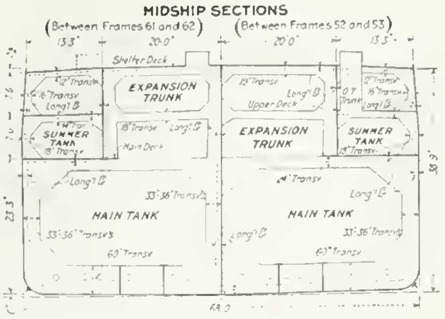
THE Federal Shipbuilding Company is fast completing the five shelter-deck bulk oil tankers building for the Standard Oil Company of New Jersey. These tankers, while modern in every particular, are of a fairly well standardized type and arrangement and are chiefly interesting in that they represent first-class present practice in this type of vessel.

They are 516 feet 5 inches in overall length, 68 feet molded breadth, with a loaded summer draft of 28 feet ⅜ inch. The block coefficient is 0.803, the displacement tonnage 21,835, and the deadweight capacity in tons 15,320. The vessels are built on the longitudinal system to Lloyd's 100 A-1 special survey.

They are powered with three single-ended Scotch boilers 16 feet in diameter, 11 feet 6 inches in length, arranged for oil fuel with forced draft, having a total heating surface of 9618 feet. The working pressure of the steam is 210 pounds. The normal fuel consumption per day in tons is estimated at 41.25. These boilers deliver steam to two 3-cylinder triple expansion reciprocating engines (20½ by 35 by 60 inch cylinders by 42 inch stroke), developing a normal horsepower of 3320 at 90 r. p. m. The normal fuel consumption per horsepower works out at 1.16 pounds.

The engines drive twin-screws of the built-up type with semi-steel hub and three bronze blades. These screws have a diameter of 15 feet, a pitch of 14 feet 2 inches, and propel the vessel at 11½ knots an hour trial speed.

For auxiliary work one coal-burning donkey boiler is provided, designed for natural draft, and for steam at a working pressure of 180 pounds. This boiler has 1234 square feet of heating surface.



Typical midship section of new Standard Oil tankers

The hull is divided into ten main tanks, each tank 28 feet in length. There is a cargo hold forward 56 feet in length, and below it a deep tank for fuel oil. Aft of this cargo hold is No. 1 cofferdam; then follow three main cargo oil tanks; No. 2 cofferdam; three main cargo oil tanks; pump room; four more cargo oil tanks; cofferdam No. 3; fuel oil tank; cofferdam No. 4; and aft of cofferdam No. 4 the boiler and engine rooms.

As will be noted, in the midship section summer tanks are carried outboard of the expansion trunks. The total capacity of the ten main cargo oil tanks is 110,441 barrels. The total capacity of the six summer tanks is 11,014 barrels, giving a grand total on summer freeboard of 121,455. The cargo hold has a total cubic space of 75,514 cubic feet for grain and 67,983 cubic feet for baled cargo. The fuel oil tanks have a capacity for 12,488 barrels, giving at the trial a speed of 11½ knots a cruising radius of 11,400 nautical miles.

The auxiliary equipment and machinery includes three steel pole masts, two steel derrick posts, three 5-ton booms, and two 3-ton booms, served by three steam winches. There is one double steam windlass 16 by 12, and one steam tiller with telemotor. For pumping cargo two 3000 barrel per hour steam driven compound horizontal duplex pumps are provided and one duplex drainage pump 10 by 6½ by 16 inches with 6-inch auxiliary discharge.

The main tank suction consists of a 14-inch main line on each side of the center line bulkhead with 10-inch suction to each tank. This main line is cross-connected at the pump room. The main tank discharge consists of a 12-inch main on the port side extending from the pump room aft along the upper and shelter decks to abaft the end of the engine room casing.

Ample accommodations are provided for a crew of fifty-one men, with one spare stateroom, a fully equipped hospital, adequate electric light installation, refrigeration rooms for galley supplies, and efficient fresh water, sanitary, and steam heating systems.

ANNOUNCEMENT

THE official report of the Eighth National Foreign Trade Convention is now ready for distribution. This volume forms the most convenient encyclopedia of up-to-date authoritative material on foreign trading matters from the American viewpoint. It is, therefore, highly important as a reference work for every American merchant because in the present condition of world finance the business of every American merchant is necessarily affected by world trading conditions, and he should thoroughly acquaint himself with these conditions.

Standard Oil tanker E. T. Bedford just after launching

BOOK REVIEWS

Merchant Vessels, by Robert Riegel, assistant professor of insurance and statistics, University of Pennsylvania; 260 pages, with numerous diagrams, maps, tables and cuts, completely indexed, bound in red cloth with gold stampings. Published by D. Appleton & Company. Price $4 net.

This is the fourth volume of a series dealing with the business of ocean shipping and transportation and is designed as a textbook basis of ocean traffic. Part 1 deals with the construction, type and uses of merchant vessels. Part 2 deals with the measurement of merchant vessels. The book makes no pretense to being in any way a treatise on the theory and practice of naval architecture. The treatment is intended to be economic. In other words, the forms and types of merchant vessels are analyzed in this book with regard to the manner in which they fit into the present economy of the management of ocean traffic. The book therefore should be used in connection with the other volumes of the series.

The second section, dealing with measurement of merchant vessels, is a very important contribution to the literature connected with that subject, which has in the past been largely confined to government documents and to works in foreign languages. This part of the book will be found of great use by students of ocean traffic and by others whose business it is to ship freight on board American vessels. The principles underlying American measurement rules are treated very exhaustively and the differences between American rules and those applying on ships of other nationalities is plainly set forth.

On the whole this book is a decided addition to American literature on ship management.

Johnson's Steam Vessels. The 12th annual edition (1921) of Johnson's Steam Vessels has just been received.

This publication, which made its initial appearance in 1910, and at that time and for several subsequent years gave a list of steam vessels in New York harbor, has grown until now, in the 1921 edition, it covers the Atlantic, Gulf and Pacific Coasts and Great Lakes.

It gives, in such form as to be convenient and instantaneously available, the owner, name, age, material, type, hull dimensions, tonnage, engine and boiler dimensions, and classification society of practically every steam vessel of American registry, and should prove of inestimable value to all interested in ships or shipping.

Johnson's Steam Vessels, the price of which is $10 per copy, is published by Eads Johnson, M.E., Inc., 115 Broadway, New York.

A Well Deserved Honor

IT will be of great interest to marine electrical engineers to learn that the Albert medal of the Royal Society of Arts has recently been awarded to Dr. John Ambrose Fleming.

Dr. Fleming for the last forty-two years has been closely associated with practical and scientific developments in the application of electricity. As far back as 1879 he was scientific advisor to the Edison Telephone Company of London, and during the decade from 1882 held a similar position in connection with the Edison Electric Light Company in London. During 1882 he installed electric lights on an Indian troopship for the Royal Navy. This is said to have been the first marine installation.

In 1899 he was intimately connected with the practical development of the Marconi system of wireless telegraphy, and in 1904 he invented the first form of the thermiotic valve, which in its later improved forms has effected such a revolution in wireless telegraphy and telephony.

Dr. Fleming has always been a voluminous contributor to transactions of scientific and engineering societies. He is the author of sixteen text-books on electrical subjects, and for thirty-six years has held the chair of electrical engineering in the University of London.

Just recently he has completed and is publishing a book entitled, "Fifty Years of Electricity—The Memoirs of an Electrical Engineer," which is on the press now at the Wireless Press, Limited, London. This book should prove of great interest to all who keep abreast of modern development of electrical science.

Marine Equipment Association

AT a meeting of the executive committee of the Marine Equipment Association of America held in the office of the president, Colonel Edward A. Simmons, Woolworth Building, New York City, on July 21, it was decided to hold the first annual exhibit at the Central Mercantile building, New York City, during the week beginning November 14 next.

The Central Mercantile building, more familiarly known as the Greenhut building, is located on the east side of Sixth avenue, between Eighteenth and Nineteenth streets. For some years it was occupied by retail dry goods store and during the war taken over by the War Department and used as a hospital for sick and wounded soldiers returned from overseas. Each floor of the building contains more than 80,000 square feet of space with a floor load of 190 pounds per square foot. The first floors have been laid out by the Manufacturers' Exhibition Company, Inc., for permanent exhibits of machinery and mechanical appliances much like the one that has existed in the Bourse building, Philadelphia, for several years. The marine show will be held on the third floor, and all exhibits will be installed under the direction of the exhibits committee of the association, of which W. M. Wampler of the Coen Company is chairman. Applications for space as well as for membership in the association should be addressed to the secretary, K. L. Ames, Jr., American Steel Foundries, McCormick building, Chicago, Illinois.

The by-laws of the association provide that only members may exhibit. The annual dues are $25 a year, and each exhibiting member will be charged a given price per square foot for such space as he may contract. The cost for this year has not yet been determined.

It is the plan of the association to lay out the exhibit spaces in given standard units of uniform design, which may be easily put up, taken down and stored, and to buy and own all of the material for use in future years.

The action of the Marine Equipment Association in deciding to exhibit during the week in which the Society of Naval Architects and Marine Engineers will hold its annual convention, and the appointment by the council of that society of a committee consisting of Captain C. A. McAllister, chairman; J. Howland Gardner, W. H. Todd, H. H. Raymond and F. L. DuBosque, to act with a like committee of the Marine Equipment Association in laying out a joint program for a big "American Marine Week," will mean much to the shipbuilding industry of this country directly, and will also stimulate public interest in the American merchant marine. Also the American Society of Marine Draftsmen have changed the date of their annual meeting to November, and it is believed that other organizations in the marine field will decide to meet during that week.

The members of the executive committee are: New England district: E. B. Williams, manager marine department, B. F. Sturtevant Company, Boston, Massachusetts, and F. L. Andrews, vice-president, Hyde Windlass Company, Bath, Maine. New York and New Jersey district: M. L. Katzenstein, manager marine department, Worthington Pump & Machinery Corporation, New York; W. M. McFarland, manager marine department, Babcock & Wilcox Company, New York; H. C. Davis, treasurer, Row & Davis, Engineers, Inc., New York, and Frank Hatch, vice-president, Shepard Electric Crane & Hoist Company, Montour Falls, New York. Pennsylvania, Maryland, Delaware, District of Columbia, Virginia and West Virginia district: G. W. Selby, secretary-treasurer, Marine Decking & Supply Company, Philadelphia, Pennsylvania; J. C. McQuiston, director of publicity, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania; William Stayton, president, Baltimore Steamship Company, Baltimore, Maryland, and W. P. Smith, superintendent of sales, William Cramp & Sons Ship & Engine Building Company, Philadelphia. South Atlantic and Gulf States district: Paul Jahncke, vice-president, Jahncke Dry Docks & Shipbuilding Company, New Orleans, Louisiana. Great Lakes district: F. C. Bradbury, manager marine department, Crane Company, Chicago, Illinois; J. D. Sarles, manager marine department, Pyle-National Company, Chicago, Illinois; H. L. Hibbard, manager marine department, Cutler-Hammer Manufacturing Company, Milwaukee, Wisconsin, and J. H. Redhead, assistant manager of sales, National Malleable Castings Company, Cleveland, Ohio. Pacific Coast district: W. M. Wampler, Eastern manager, Coen Company, San Francisco, California, and H. F. Alexander, president, Pacific Steamship Company, Seattle, Washington.

The finance committee consists of W. M. McFarland, Babcock & Wilcox Company, chairman, and J. R. Tiebout, Jr., of W. & J. Tiebout.

MARINE RULES

Recommended Practice for Electrical Installations on Shipboard

THE differences between the requirements of various classification societies and insurance companies in regard to electrical installations on shipboard and the lack of any accepted standard engineering practice for marine installations led the American Institute of Electrical Engineers in 1913 to appoint a committee on the use of electricity in marine work, now known as the Marine Committee. This committee besides arranging for papers to be read at the meetings of the institute to increase the interest of electrical engineers in marine problems, also took up the preparation of the standardization rules which would represent good engineering practice, and which might be accepted by the classification societies. As a result, a set of rules was prepared covering two important divisions; namely, fire protection requirements, and marine construction requirements. The first part related primarily to dangers that might arise from fires, and the second part had to do purely with the preservation, maintenance and operation of the electrical plant in its exposure to the conditions existing on ship board.

These rules were adopted by the committee of the American Bureau of Shipping and were published as Section 37 of the rules for building and classing vessels, issued by that bureau.

The first edition of the rules did not cover the entire field of the use of electricity on ship board, and the committee was, therefore, continued in force, and a more nearly complete set of marine rules has now been prepared. The committee has made a careful comparison of the rules issued by the American Bureau of Shipping, the National Board of Fire Underwriters, the Steamboat Inspection Service of the United States Department of Commerce, Lloyd's Register of Shipping, the Institution of Electrical Engineers, Bureau Veritas, Germanischer Lloyd, and Verband Deutscher Elektrotechniker. With several of these associations correspondence and personal conferences were carried on.

Certain mechanical signaling systems are included, as it is the custom of many shipyard electrical engineers to supervise the installation of mechanical signaling equipments as well as the electrical plant.

To insure a careful consideration of these rules sub-committees were appointed to cover various branches of the work, and after each sub-committee had considered its own rules, they were submitted for discussion to the entire committee, after which they were referred to an editing committee of four members to arrange them in suitable form for publication. It is not to be expected that this edition of the rules contains everything that might be of value to electrical installations on ship board, and it is expected that later editions will be prepared which will be more complete and will include electric propulsion.

In the meantime, any questions concerning rules, which appear to be of doubtful meaning, may be referred to the chairman of the Marine Committee of the American Institute of Electrical Engineers, 33 West Thirty-ninth street, New York City, and the committee invites suggestions for improvements or amplifications of these rules.

No definite arrangements have yet been made for the approval of apparatus and accessories, but it is expected that through the co-operation of the underwriters' laboratories, arrangements will be made later by which apparatus or appliances used on shipboard may be inspected and approved.

In the absence of approved standards for merchant ships appliances approved by the Navy Department will in general be satisfactory.

Bound copies of the rules may be obtained at $1 per copy by addressing American Institute of Electrical Engineers, 33 West Thirty-ninth street, New York, N. Y.

MARINE INSURANCE

(CHARLES F. HOWELL, Eastern Contributing Editor)

Collapse of Hull Agreement

When the British Joint Hull Agreement was abrogated in the majority of its essentials a short time ago, underwriting of hulls received the most staggering blow it has had to stand up under for many years. The agreement has been the mainstay of British marine insurance for the past decade and represented the culmination of countless conferences and experiments; to restore it, now that it has been formally scrapped, is going to be just about as difficult a bit of diplomacy as securing it in the first place. Among its cardinal advantages was a maintenance of rates and valuations.

Shipowners had been centering an attack upon the agreement for the better part of a year, and they came near to finishing it six months ago, when a temporary compromise was effected that turned out to suit nobody, but staved off defeat for the time being. In spite of those concessions friction had been present right along in the London market between the insurance companies and the underwriters at Lloyd's, and at last the break has come.

Everything is now wide open as respects rates, values and the famous "lead"—which is the first name on the broker's slip of acceptances. It is an ill wind that blows nobody good, and the shipowners are going to reap a harvest, as the keenness of competition among marine insurers guarantees their getting just about all they want in the line of low rates and valuations. Indeed, this has already come about. The more conservative underwriting offices are preferring to let old-established business go off their books rather than fall in line with the reckless new-comers and long-chance takers in the mad scramble for premiums. In the absence of much in the way of reserves, the newer offices have to gather in the premiums if they are to keep going, and they are certainly sticking at nothing. About all that is left of the old agreement is the 30-day return period arrangement and the 15 per cent disbursement clause. The old-timers are pinning their sole hope to the disbursement clause in the fight for adequate valuations in these days of heavy repair charges.

Load Line Agitation

No one subject has been receiving closer attention at the hands of underwriters and shipping interests during the past month than that of the determination of adequate load lines for American vessels. Bills on this important phase of our maritime development are before the House and Senate, the latter body waiting upon preliminary action by the former. These legislative proposals are practically identical with those introduced in Congress last year, when the House passed its bill and the Senate defeated it. Interest during the past month has been centered in the hearings before the House committee that has the bill in hand, the merchant marine and fisheries. Representatives of every interest affected have been on hand, presenting their sides of the case. Commissioner of Navigation Chamberlain opened the hearings by stating that the bill is a department measure and accordingly thoroughly approved in that important quarter. Marine insurance was then given its day in court, with accomplished spokesmen in the persons of S. D. McComb, manager of the Marine Office of America; W. D. Winter, third vice-president of the Atlantic Mutual Insurance Company; and Galloway C. Morris, third vice-president of the Insurance Company of North America. It was pointed out that the majority of the civilized nations of the world already have load line regulations covering vessels arriving at and leaving the ports of those nations, and that such agreements carry with them reciprocity features under which each government respects the regulations of the other. America having no load line laws whatever, is without this reciprocity protection for its seamen and maritime property and lies supinely subject to whatever action foreign nations may feel disposed to exercise toward our nationals. During the war England entered into a temporary agreement to keep hands off our ships in this respect, but the war is over and so is the agreement. This reciprocity feature is embodied in the pending bill.

The real function of freeboard legislation and of freeboard rules and regulations is to find and enforce a just mean in the loading of vessels, holding in due regard on the one hand safety to life and property, and on the other the natural and proper desire on the part of the owners to realize the maximum of service from a given ship. The dilemma has two horns: undue limitation in loading entails restriction in a ship's earning capacity, and, consequently, a national loss in tonnage capacity; but, on the other hand, reduction in freeboard within the reasonable limits of safety to life and property becomes a national asset because of the increase in tonnage capacity. The question therefore is: What is a reasonable regard for life and property? This is really an actuarial problem; lack of freeboard is only one of many causes that contribute to the sum total of marine casualties. This contributory hazard should be reduced to the lowest limits compatible with a reasonable regard for the functioning of a ship as a tonnage carrier. The basis is a strength calculation, precisely as in the case of girders, for example. It most certainly should not lie with the discretion of ship masters, as some opponents of the bill maintain, any more than an elevator starter should decide how much weight his elevator can carry. The scientific experts who built the elevator are the only ones who know that, and they stipulate it in placards that hang in every lift. Thus the bill would protect careful owners against competitive advantages secured by unscrupulous owners; the latter, by over-loading, can make more money through more rate on cargo carried, and so put the former out of business, as the overhead of running a vessel is the same no matter how loaded. In a word, it equalizes the earning capacity of similar boats. Nor should the owner object, because there is a provision in the bill for his appealing against the regulations in his case should they prove unsatisfactory.

The measure states that the regulations are to be provided by the secretary of commerce, so no man knows just what they are to be, except that they will have to conform with the general recommendations of the bill. That an international conference on load lines is desirable and certain to come in a few years is apart from the substantial facts that if we wait until then we will not only remain subject to the whims of other nations in restraining our men and ships when in their ports with no recourse on our part, and that we are without this protection

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

to American life and property in the interval, but, what is of equal importance, we should have to enter such a conference with no load line laws of our own and with nothing practical to submit for our side of the case and be compelled to accept a pre-arranged set of regulations submitted by foreigners and nicely suited to their particular requirements. For there are differences between the conditions that surround vessels of the American mercantile marine and those of the leading European nations; and the major and minor departures from the rules and methods of procedure, as set forth in the British Blue-book, such as will, if this bill is passed, be introduced into our load line laws, may be depended upon to be not only fully justified but to represent distinct advances of a character worthy of the deepest consideration from the point of view of the commerce of the world.

Harter Act Under Fire

Interest in the progress of the load line bill is but slightly greater than that taken in the broadside attack upon the Harter Act, still in progress. Marine underwriters, shippers and shipowners have been down to Washington and had their say before the House committee on merchant marine and fisheries, the subcommittee of which has a revision of the measure under consideration. The ostensible subject of the hearings is the enormous losses to waterborne cargoes in the matter of theft, pilferage, breakage and short deliveries; but it did not take long to uncover the Harter Act as the real cause of all the trouble. Congress proposes a sweeping inquiry into shipping losses through thievery, and the introduction of remedial legislation, a resolution to that effect having been adopted at the instance of Representative Edmonds of Pennsylvania.

In the very first days of the hearings more than sufficient evidence was introduced by marine underwriters and shippers to establish a serious case against the Harter Act. "Passing the buck" to the underwriters, under the working of this extraordinary piece of legislation, has not got anybody anywhere. The demand is persistent that it be amended so as to hold shippers and shipowners liable for full amount of damage done; at present it merely grants owners exemptions that they never could have had under common law, which holds employers liable for the negligence of their servants. A sub-agreement is regularly made by the owner with the shipper naming the former's liability at the nominal figure of $100, and there is no redress by way of the courts. This was proved once and for all in the celebrated suit brought before the Supreme Court by the International Mercantile Marine a few years ago. The owners frankly acknowledged that they were liable under the Harter Act, but stood on their right to make a sub-agreement with the shipper fixing the financial responsibility at a definite figure. The Supreme Court could do nothing more than O. K. such an arrangement, and the Harter Act became a joke. It has been styled the bulwark of all shipowners in contesting liability for cargo losses. Samuel Bird, Jr., of the New York firm of Talbot, Bird & Company, puts the situation in a nutshell when he says: "If Congressman Edmonds can possibly enact legislation that will place the responsibility on the common carriers and prohibit them by law from limiting their liability, the committee on merchant marine and fisheries will do something that will assist greatly in relieving the situation. If the Department of Justice will follow up depredations under the Federal laws, this also will be a helpful factor."

Court interpretations and decisions, along with state statutes, have completely divested the act of its initial benefits to shippers and underwriters. It has been a surprise to many to note with what unanimity the shippers followed one another in denouncing the effect of the act upon their interests. Among the underwriters who appeared before the committee were President Benjamin Rush of the Insurance Company of North America; F. H. Osborn, Eastern marine manager of the Fireman's Fund; William D. Winter, third vice-president of the Atlantic Mutual Insurance Company; Samuel D. McComb, manager of the Marine Office of America; and Wade Robinson, of Wade Robinson & Company. President Rush summarized the situation admirably as follows:

> When the common carriers were held to their strict responsibility, and were not allowed to indirectly evade it by means of reduced valuation clauses, notice of loss clauses, and various other bills of lading clauses which have been introduced by them for the express purpose of avoiding their full responsibility to the shipper, they took very good care to see that they had honest employes and to enforce discipline on their vessels, and in the men engaged in loading and unloading cargo, but under the law as interpreted by the courts at present, it is very much cheaper for them to pay the small nominal damage, provided in the released bill of lading, in the event of a claim, rather than put in effect an adequate system of supervision and care, which would result in the elimination of the theft, pilferage, breakage and non-delivery which is now sustained by merchants, who are forced to ship under the various terms of the released bill of lading, or not ship at all.

American Bureau Appointment

Commander Frank D. Baldwin, a retired engineering officer of the United States Navy, has been ap-

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING

F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

pointed exclusive surveyor of the American Bureau of Shipping at the port of Valparaiso, Chile. He was the first American naval officer sent to France during the late war. Retiring from the service eight years ago, he has since secured a varied and successful business experience. He was formerly assistant to Robert L. Hague, head of the marine department of the Standard Oil Company, when the latter was superintendent of construction and repairs for the Shipping Board. He is rated as a first-grade authority and the Bureau is to be congratulated upon securing his services.

Inland Liability Decision

Justice McAvoy of the New York Supreme Court has rendered an important decision in a suit brought by Guy M. Walker vs. The Liverpool & London & Globe Insurance Company, and the same vs. The Western Assurance Company, on the question of liability under an inland form of marine policy when the damage has been unrepaired. Underwriters regard this as a decision of the first importance. The opinion of the justice was as follows:

The vessel involved was damaged as a result of a marine peril and defendants, her assurers, contest payment of the estimated damages found upon a survey because of this clause in the marine policy: "No claims for loss or damage shall go beyond the extent or cost of actual repairs rendered necessary in consequence of disaster insured against." If this be construed as a clause conditioning liability upon the actual making of repairs and thus reaching a definite determination of their cost, the plaintiff must fail, for concededly there never were actual repairs made of the damage to the vessel. Per contra, if construction be that the words taken in their collocation with other phrases anterior import merely a limitation of the sum of loss beyond which liability will not be incurred, the finding must award the conceded survey estimate as judgment damages. The rule of maritime jurists as to liability of insurers is that the vessel's owners or the assured should receive the amount of estimated damage at the port of distress regardless of the fact that actual repairs might be made for a lesser sum at another port to which the vessel could be towed or proceed upon her own motivation (Pitman v. Universal Marine Ins. Co., 9 Queen's Bench Div., 192; Ins. Co. v. Southgate, 5 Peters, 604.) This rule, of course, may be averted by specific agreement of the assured and assurer to adopt another media of liquidating damage, and such a change, it is asserted here, has been accomplished. This upon a mere reading of the clause quoted would appear plausible, but on the whole policy's purpose of indemnity it is unsound. The theory that an assured is limited to the amount paid for actual repairs would lead to the absurdity that if he made no repairs at all and used the vessel in her damaged condition he could recover nothing (The Keeler, 194 Federal, 342). The survey provided for in case of damage in such an instance would be useless; else why survey when actual cost of actual repairs is the sole criterion?

Salvage Association Appoints

Appointments of agents to act on behalf of Syndicate A of the American Marine Insurance Syndicates and/or its successor, the United States Salvage Association, are announced as follows by Charles R. Page, manager:

Alexandria, Egypt, Gill & Company, No. 4 Rue Adib. Gill & Company is a partnership consisting of Henry C. Gill, American; William Yale, American, and Felix Cohen, an Egyptian. They are engaged in the general business of steamship agency brokerage and the exporting and importing of American merchandise. The two American members of the firm have been highly endorsed to us from very responsible sources.

Naples, Italy, J. P. Spanier, Spanier building, via Marina Nuova. Mr. Spanier is a native American who has been engaged in the shipping business in Naples for a great many years; is a man of unusually high standing with the Italian people, and is agent for many different American enterprises, including that of several shipping firms.

Port-of-Spain, Trinidad, Grell & Company, Ltd., Port-of-Spain, Trinidad. This firm has been, for a number of years, agents of the Board of Underwriters of New York.

Honolulu, T. H., Bruce Cartwright, 35 Merchant street. Mr. Cartwright has been the agent of the Board of Underwriters of New York, and the National Board of Marine Underwriters, for several years past.

Poznan Libel Stands

Judge Learned Hand of the United States District Court has rendered a decision in the libel suit brought by several score shippers against the steamer Poznan, which returned from Havana last year without discharging the cargo she had taken out of New York, although she stopped thirty-three days in the Cuban port. Full damages were allowed, in the total sum of $1,500,000, the claims being for non-delivery of cargo, defective loading, and theft and pilferage losses at the Brooklyn wharf after the vessel's return. The ship and its charterers, the Acme Operating Company, were held for the theft and pilferage losses, and damages also were assessed against ship, charterers and the owners, the Polish-American Navigation Company, on the theory that the latter caused the return of the vessel. This decision has given the underwriters immense satisfaction, as, unless it is reversed on appeal, they will receive a refund of at least a portion of the amount which they have advanced in settlement of the Poznan claims. Judge Hand held that even though the bill of lading contained a stipulation giving the charterers the privilege of returning with the cargo to the home port, nevertheless such a radical deviation constituted an abandonment of the voyage.

A Bad Month

During the first few days of August the Pacific was the scene of casualty after casualty, the aggregate of which ran into large sums, although no individual loss was half so large as that of the steamship Governor in April. From all standpoints the most serious disaster was the sinking of the Alaska Steamship Company's Alaska, under charter to the San Francisco & Portland Steamship Company, which struck Blunts Reef, near Eureka, California, August 6, with the loss of thirty-eight lives. Three days later, on August 9, the Pacific Mail steamship San Jose struck on Asuncion Island, off the coast of Lower California, and will be, from an underwriter's standpoint, a total loss. The third large vessel sunk was the C. G. M. M. Canadian Exporter, which grounded at Willapa Harbor July 31 and broke in two a few days later.

$334,000 on Alaska

Pacific Coast underwriters did not suffer a severe loss on the Alaska, as only $30,000 of a total of $334,000 was placed in the West, the remainder being carried in New York and London. The amount of cargo insurance was of course more difficult to ascertain, especially in view of the loss of the manifest. Advertisements published in the newspapers invited attention to a large quantity of flour, which would have a good salvage value but which probably would not be worth the expense of recovery. The vessel foundered in eighteen fathoms, which is by no means deep for diving, men from the Brooklyn Navy Yard having gone to fifty-two fathoms in salving the U. S. S. submarine F-4, lost off Honolulu in 1915. The Alaska was an iron and steel vessel of 3709 tons gross and was built by the Delaware River Company, Chester, Pennsylvania, in 1889.

A great deal of discussion appeared in the newspapers regarding the loss of the Alaska, with a consequent and immediate reaction on coastwise passenger business, which slumped badly. The principal criticism made of Captain Harry Hobey, who was among the lost, and of the Alaska & Portland Steamship Company was that the vessel was purposely run close to the reef in a heavy fog in order to save time and fuel. Other charges made by passengers and crew were that no soundings had been taken, although one of the officers had asked the master whether they should be, and that the crew was undisciplined and inefficient. The four surviving deck officers were charged with inefficiency and unskillfulness by the local inspectors at San Francisco. The British steamship Anyox, commanded by Captain S. Snoddy, saved most of the passengers and crew by steaming at full speed through a heavy fog.

15,000 Bags of Coffee

The San Jose was operated in the Panama service of the Pacific Mail. She was an iron vessel of 2135 tons gross and was built at the Roach yard, Chester, Pennsylvania, in 1882. All her passengers were taken off and the steamship Griffdu took 1911 bags of coffee and 48 bales of hemp. Indications were, however, that cargo loss would exceed $200,000, as the vessel had 15,000 bags of coffee besides hemp and concentrates. No hull insurance had been placed on the Pacific Coast and the amount carried was not stated. About $120,000 was spent on the vessel a year or so ago. Captain C. Zastrow was in command.

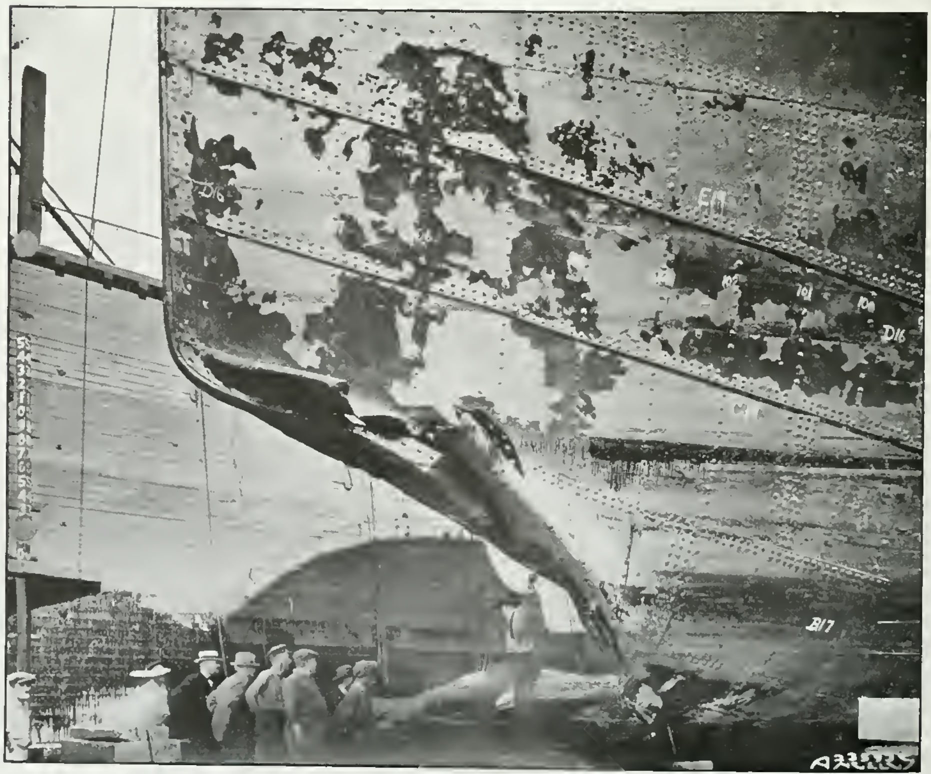
The loss of the Canadian Exporter at Willapa was the first major disaster of the Canadian Government Merchant Marine. Details of her cargo loss were not clear, but only a small amount, from $5000 to $10,000, had been placed in San Francisco. Lumber was the principal item. She was close inshore when she struck, although a contributing factor may have been faulty compasses, of which Captain William Bradley said he had complained.

Some Other Casualties

Among other casualties, all unimportant when compared with the three listed, are: U. S. S. B. Effingham, aground in the Columbia River July 20, repairs $35,632, about 800 tons of flour damaged; ship Golden Gate, owned by Mayor James Rolph, San Francisco, aground near Cristobal, pulled off, damage undetermined; schooner Ottillie Fjord, ashore near San Francisco, pulled off and libelled for $20,000; steam schooner Multnomah, propeller lost off Blunts Reef; Canadian Pacific steamship Princess Ena, aground north of Vancouver; U. S. S. B. Hawkeye State, boiler damage, for which her engineers were suspended after trial.

Repair Costs Lower

A grain of comfort (and a large grain indeed) for the underwriter is discoverable in the case of the United States Shipping Board steamship Effingham, which was operated by Williams, Dimond & Company in their European-Pacific Line. She grounded in the Columbia River in July. In addition to minor repairs, the following major repairs were necessary: renewal of four shell plates on the port side, seven on the starboard; fairing of two shell plates on the port side, three on the starboard; renewal of keel plate to first butt aft of the stem; renewal of forefoot; renewal of stem from forefoot to first scarph as originally fitted; renewal of all floors forward of the forepeak except one, which was to be repaired; renewal of centerline longitudinal girder forward of the forepeak bulkhead.



Side view of damaged bow of the U. S. S. B. Effingham, repaired for $35,632

A contract for this work was awarded to the Albina Marine Iron Works of Portland for $35,632, which was the most satisfactory bid, although not the lowest. The same job a year ago probably would have cost between $50,000 and $60,000. A marked reduction in repair costs is thus apparent; not only that, but the disparity between low insurance valuations and high repair costs tends to become less.

Other bids ranged from $25,382, Todd Drydocks, Seattle, the Shipping Board to move the vessel to Puget Sound and bear insurance during the voyage, to $55,680 of the Pacific Marine Construction & Repair Company. The Todd yard bid $38,288, the contractor to move the vessel and assume insurance.

A New Firm

J. A. Mathews, Pacific marine general agent of the Aetna Insurance Company, and S. A. Livingston, appointed his assistant in June, have organized the partnership of Mathews & Livingston. This firm will act as Pacific Coast marine agent of the Universal Insurance Company, Newark, New Jersey, and of the Franklin Fire Insurance Company, Philadelphia. In organizing the firm and taking the Universal and Franklin agencies, Messrs. Mathews and Livingston wished to increase their lines so as to be able to compete more successfully with other agencies of San Francisco, some of which represent many companies and accordingly are in a situation to accept large risks, of which a one-company agency could take only part. The Aetna agency is not affected. Offices of Mathews & Livingston are at 340 California street, where the Aetna offices also are located.

The Universal Insurance Company has capital of $400,000, surplus of $200,000, and surplus to policyholders of $600,000. Talbot, Bird & Company, New York, are general managers of the Universal and also represent the Aetna in New York. Samuel Bird is president of the Universal. The Franklin company has not been represented in the marine field in San Francisco prior to this time.

Governor Decision

Captain William Fisher, supervising inspector of the Steamboat Inspection Service for Washington and Oregon, has handed down a decision suspending for two years the license of Captain John Alwen, master of the steamship West Hartland, which rammed and sank the Pacific Steamship Company's liner Governor in Puget Sound April 1. This decision is at direct issue with that of the local board, which exonerated Captain Alwen. Said Captain Fisher:

The Effingham from ahead

Having delayed giving a signal until too late, Captain Alwen blew one blast signifying that he would hold his course and speed and then immediately put his engines full speed astern. In other words, having claimed his right of way and immediately receiving a signal from the Governor that she was backing full speed, Captain Alwen, instead of keeping his signified course and speed, also backed up and thus kept the two vessels in the same relative situation. As justification for his action, Captain Alwen and his counsel cite the rule applicable "in extremis," which permits disregard of rules when collision is imminent. He is, however, in this dilemma: As heretofore noted, his whistle and signal to the engine room were almost simultaneous. If the ships were then "in extremis" there remained no opportunity to maneuver after the first whistle was blown, and Captain Alwen stands self-convicted of unwarranted delay in sounding some signal. Contrary to this is the testimony of Captain Alwen that he was backing for nearly two minutes before the collision, had taken about a knot off his speed and had time to signal the Governor of his changed intention. If this be true, then Captain Alwen went contrary to his expressed intention, failed to signify a change and thereby contributed to the disaster.

The privileged ship is not free to proceed into a dangerous situation or act in disregard of the maxim—"Safety First."

The decision of the local board puts, it seems to me, too broad an application on the well known rule that the ship having the right of way shall hold her course and speed. Even should it be conceded that a ship whose speed is constantly accelerating comes within the rule, though the nature of her maneuver is unknown to the burdened ship, yet it cannot be said that "all she (the privileged ship) need do is do nothing." Such a rule would encourage disregard of the sacred obligation to preserve human life, and would, if literally pursued, result in an attitude on the part of those inclined to recklessness which would constitute a menace to safe navigation. While this proceeding is not in any sense a lawsuit—on the contrary, it pertains solely to a license issued by this department—yet it is proper to note that the highest legal authority has frequently recognized that the privileged ship, as well as the burdened, is bound to use all possible skill and prudence to avoid putting human life in danger; and when danger looms ahead the officer in charge must exert caution and skill in the discharge of his important duties. In this case every consideration demanded that an understanding be had as to the Governor's intention before the point of danger was reached. From a background of high land with many bright lights and deep shadows, Captain Alwen was putting out with his deep laden 8800-ton turbine ship; she was down by the head 1 foot 3 inches; she steered sluggishly; the Governor appeared and took a course that put him in doubt; a situation of danger was developing. Would she cross in front or behind him? The mere sounding of his whistle would determine it, yet he kept on until a position was reached when the immediate answering of his one whistle put him "in extremis." The opportunity for prudence was then passed; he indicated that he would hold his course and speed; the Governor reversed to comply if possible with his signal, and then he reversed and the two ships came together.

C. H. Williamson Co.

C. H. Williamson, manager of the San Francisco office of Frank B. Hall & Co., has organized the firm of C. H. Williamson Co., Inc., which has taken over the Hall representation on the Pacific Coast and which will be represented in New York and London by the Hall company. Mr. Williamson is president; Harlow Hewett, who has been associated with Mr. Williamson in the Hall agency, is vice-president, in direct charge of the fire insurance department; J. W. Croseley, who was with the Canadian Bank of Commerce for several years prior to joining the Williamson staff in March, is secretary-treasurer. T. P. Kehoe is in charge of the marine department.

Organization of C. H. Williamson Co. and the assumption of the Hall representation is from August 1. Quarters will be maintained at 322 California street.

Steamship Operations

China Mail vs. U. S.

After more than a year of uncertain maneuvering, issue at length has been joined between the China Mail Steamship Company and the government. The source of the disagreement and the legal action consequently impending is to be found in Section 38 of the Merchant Marine Act, which prohibits any corporation or partnership engaging in United States coastwise trade unless a minimum of 75 per cent of its stock is owned by American citizens. When this section of the Merchant Marine Act was brought to public attention more than a year ago there was general recognition of the fact that the China Mail necessarily would be involved, because the company admittedly could not fulfill the conditions laid down. For several months nothing whatever was done by the Shipping Board to shut the China Mail out of the San Francisco-Honolulu trade; in fact, a contrary course was pursued, and the company was permitted to carry passengers on the British steamship Nile by permission of the board. In March, however, all privileges were withdrawn from the Nile and the Japanese-registry vessels of the Toyo Kisen Kaisha, and in addition the board denied to the China Mail the right to engage in the San Francisco-Honolulu trade with the American-flag China and Nanking, and at the same time stopover privileges were refused, so that a through passenger on a China Mail or T. K. K. vessel could not stop in Honolulu and continue his voyage to or from the States in another liner of either company.

Fine of $5000

In this manner the stage has been set for the present act. Determined to bring the situation to a head, and holding to the belief that it would not be interfered with, the China Mail dispatched twenty-five cabin passengers to Honolulu by the American-built, American-registered steamship Nanking, formerly the Congress. At Honolulu a fine of $5000, at the fixed rate of $200 a passenger, was imposed. The issue having been joined as regards the Nanking, the China Mail instructed its Honolulu agency to accept one passenger for transportation by the China, due in San Francisco early in September, so as to make the case complete.

In some quarters, among which, according to report, were government agencies, the opinion had been held and expressed that the inhibitions of Section 38 were intended to apply only to freight and not to passenger business. Such an opinion certainly is buttressed by Section 27 of the act, which specifically applies to the transportation of "merchandise" between points embraced within the coastwise laws. On the other hand, much could be cited to prove that the intent of Congress always has been to close the passenger trade also to foreign vessels and, under the Merchant Marine Act, to certain American shipping as well.

American for 23 Years

But the most perplexing phase of the affair is this: newspaper dispatches from Washington say that Attorney General Dougherty ruled that the China was prohibited from engaging in coastwise business because owned by a corporation in which American citizens hold less than 75 per cent of the stock (which is admittedly true) and also because she was foreign-built. That she was constructed abroad also is admittedly true, but the question arises as to whether she was built in a foreign yard under the meaning of the Merchant Marine Act. In view of the 75 per cent clause, the foreign build of the China probably is quite academic; certainly it is unless and until the question of ownership should be settled against the government, in which event the China's build might become of paramount importance; nevertheless, to those who know the China's story, the fact that her build is brought up at this late day comes as a distinct surprise. A bit of history will make this matter clear.

When the Republic of Hawaii and the United States concluded negotiations for annexation of the mid-Pacific archipelago in 1898, Hawaiian vessels naturally were admitted to complete American registry, just as citizens of the little republic were granted American citizenship. Among ships thus affected was the China. She was built at Glasgow in 1889 and in ordinary circumstances would have found admission to American registry about as difficult as going through the eye of a needle; but the circumstances, as stated, were extraordinary. (And some of the incidents relating to her transfer from British to Hawaiian registry and thence to American, which occasionally form a topic of discussion on the Honolulu waterfront, are not without interest). Having thus gained American registry the China was placed on a basis of complete equality with all other United States vessels and was operated in conjunction with the Siberia, Korea, Mongolia and Manchuria, all American-built, in the service of the Pacific Mail until that company withdrew from the Oriental trade in 1915. She was bought by the newly-organized China Mail; for a time was the only American-flag vessel in the trans-Pacific trade, and has continued in the same service since.

Our Registry Laws

It is, of course, well known that practically the only vessels that flew the American flag prior to 1912 were built in yards of the United States. The exceptions almost could have been counted on one's fingers. There were two foreign-built vessels of the American Line, admitted by special act of Congress; prizes of war and vessels wrecked in American waters and repaired under prescribed conditions, in addition to former Hawaiian ships. All this shipping was on a basis of complete equality; American registry having been granted, the place where a vessel was built never was called into question.

In 1912 the Panama Canal Act admitted certain foreign vessels; the Ship Registry Act of 1914 let in others; but shipping brought in under these laws was forbidden to engage in coastwise trade, and it would have been shut out today had not Section 22 of the Merchant Marine Act provided that "all foreign-built vessels admitted to American registry, owned on February 1, 1920, by persons citizens of the United States . . . may engage in the coastwise trade so long as they continue in such ownership, subject to the rules and regulations of such trade."

Apparently, the attorney general's opinion places the China in the same category as other foreign-built vessels. But should she be so placed? Has Congress the power, or at least did it have the intent, to overturn the status created by the annexation of Hawaii, a status enjoyed by the China for twenty-three years, during which she regularly engaged in the San Francisco-Honolulu trade? Is not Section 22 purely permissive; that is, does it not clear the way for foreign-built vessels acquired during the war to enjoy all rights of home-built vessels, without prejudicing other rights gained prior to the passage of the act? To the layman these questions could be answered in the affirmative only.

Of course, as was stated above, this question, in the absence of a victory for the China Mail in regard to Section 38, must be considered as academic; nevertheless, it is full of interest and may become quite important. American registry of foreign-built vessels acquired during the war is something that may arise to vex the courts. For example, Section 22 of the Merchant Marine Act, in addition to admitting to American registry foreign-built vessels owned by American citizens on February 1, 1920, also covers "all foreign-built vessels owned by the United States at the time of the enactment of this act." So far, so good. But how about such vessels as Oriental, Mandarin, Cathay, Celestial, ordered of the Kiangnan yard, Shanghai, years ago but delivered after June, 1920? How about Japanese-built vessels completed late last year? Is a vessel "owned" when she is not even in existence? Is a contract for the construction of a vessel equivalent to ownership at the time of the passage of the Merchant Marine Act? Any person who contemplates the purchase of recently-delivered foreign-built vessels would do well to go rather deeply into these questions, for the ways of the United States government in enforcing registry and coastwise laws are exceedingly dark and devious. A few years ago, to make that point clear, the United States Navy owned an old collier called the Justin. When she was sold in 1915 she could not engage in coastwise trade because she was British-built. That foreign vessels could not and cannot now engage in the coastwise trade was notorious; yet in spite of the law the Navy Department formerly transported supplies to Mare Island, Bremerton and Pearl Harbor in foreign-built and foreign-flag bottoms.

Finally, in the case of the China, we discover a government agency, the Shipping Board, owning competing steamers and at the same time having power to grant or withhold suspensions of the coastwise laws so far as passenger service is concerned. To the layman that appears peculiar. The China Mail may be wrong in both the letter and spirit of the Merchant Marine Act, but the question may be asked whether it has had a hearing before an unbiased tribunal. What would the railroads of the United States say if the Interstate Commerce Commission owned a competing line?

Notice to Mariners

In all suits for mariners' wages, the libellant may proceed against the ship, freight, and master, or against the ship and freight, or against the owner or the master alone in personam.—Rules of Practice for the Courts of the United States in Admiralty and Maritime Jurisdiction, on the Instance Side of the Court, in Pursuance of the Act of the 23rd of August, 1842, chapter 188, quoted in Hughes on Admiralty.

Although persons versed in admiralty law doubtless have been well aware of the fact that proceedings could be instituted against a master for unpaid wages of a crew, the average layman, afloat and ashore, certainly will open his eyes at hearing that an action actually has been brought against a master for no less an amount than $9000, with prospects, as this is written, that other members may join in, increasing the total to $19,000.

Captain Tory Hedmark, former master of the wooden steamship Agron, is the victim of this rule. Eight seamen have brought the action in the United States District Court, Seattle. To make the captain's situation more unfortunate, "he is in the position," says the Seattle Times, "of not being able to collect his own wages." The Times goes on:

"The rule of admiralty law under which the suit was filed in the Federal Court is so ancient that its origin is lost in the mists of antiquity. The case filed in the Seattle court is the third of the kind in the history of the United States and the first filed in more than fifty years. The first two cases were obscure suits in the courts of Massachusetts. They were tried in the fore part of the last century. . . . When the rule had its inception, ships were so small that on a long voyage the wages of the crew might easily exceed the total value of the vessel."

A condensed history of the Agron case follows: She was purchased of the Shipping Board by the National Oil Transport Company of New York early in 1920. Capt. Hedmark was engaged by oral contract at the Shipping Board office and signed a crew for a twelve-month voyage to Sydney and elsewhere. On the same day, June 7, 1920, the vessel was documented at Seattle as of Shipping Board ownership.

From Seattle she proceeded to Sydney; thence to Newcastle, and thence with coal to Antofogasta and Iquique. Upon arriving on the West Coast in October, Captain Hedmark was directed to sell or charter the vessel; he was unable to do either, and in December was ordered to Galveston. At the Panama Canal he found himself without coal or supplies or funds with which to pay wages and tolls. He cabled home, but without relief, for both the National Oil Transport Company and the Shipping Board disclaimed ownership.

The shipping commissioner at Balboa took off the crew and advised the men to libel. This they did, with the result that the vessel, which cost $750,000, was sold for $16,000, less than half the crew's claim. Captain Hedmark, being master, had no rights corresponding to those of the men and accordingly received none of the proceeds of the sale. He contends that the Shipping Board actually was owner, despite the sale contract to the oil company.

That Captain Hedmark's assertion is not without foundation is borne out by the circumstances of documentation of the vessel and his own employment. The Shipping Board, moreover, although it permitted the Agron to be sold, as it has done recently in the case of the Victor S. Fox sailing vessels, yet in other instances, such as that of the United States Transport Company, has been quick to assert its claim and to seize vessels and to collect freight money, despite the fact that some shippers had prepaid charges. In short, the board evidently has assumed the position that a vessel belongs to the government when seizure is worth while, but that it belongs to the purchaser when nothing is to be gained by returning the craft to the board's possession.

Panama and the Japanese

Under the title of "Japanese Shipping and the Panama Canal" the Panama Canal Record publishes the first of a series of articles on trade through the canal under different national flags during the fiscal year 1921. The article follows:

During the fiscal year ending June 30, 1921, 136 Japanese vessels passed through the Panama Canal carrying 767,608 tons of cargo. Their aggregate net tonnage under the Panama Canal rules was 613,245. One Japanese vessel passed through the canal four times during the year, 11 three times, 25 twice, and 49 once only. The following table shows the number of vessels under the Japanese flag which have passed through the canal in either direction during each of the last seven fiscal years, or since the canal was first opened to traffic on August 15, 1914:

Year	Atlantic to Pacific	Pacific to Atlantic	Total
1915	4	2	6
1916	19	5	24
1917	54	18	72
1918	33	20	53
1919	47	40	87
1920	84	34	118
1921	86	50	136
Total	327	169	496

It is remarkable that in each of the years covered by the table more Japanese vessels passed through the canal from Atlantic to Pacific than in the opposite direction. For the entire seven-year period the proportion is nearly two to one. A similar preponderance of vessels in one direction has been noted in studying other features of canal traffic. It is apparently due to the fact that cargo steamers in the trade with the Orient commonly find it more profitable to move from port to port around the world, going out via Suez and returning via Panama, or vice versa, than to turn back over the same route followed in the outward voyage.

Japanese Vessels Using the Panama Canal During the Fiscal Year 1921
Segregation by Trade Routes

Trade Routes	Vessels	Tons cargo
Atlantic and Gulf ports of United States to Far East	63	337,785
Far East to Atlantic and Gulf ports of United States	31	165,105
United States to west coast of South America	10	63,167
West coast of South America to U. S. and Europe	15	99,414
Cuba to Far East	5	35,135
Far East to Cuba	1	7,612
Atlantic and Gulf ports of U. S. to Australasia	3	20,063
Miscellaneous voyages, Atlantic to Pacific	5	23,840
Miscellaneous voyages, Pacific to Atlantic	3	15,487
Totals	136	767,608

(One vessel in ballast included in first and last classes.)

The great majority of Japanese vessels using the Panama Canal in 1921 (94 out of 136) were in the trade between Atlantic and Gulf ports of the United States and the Far East, carrying general cargo. Five more loaded sugar and general cargo in Cuba for the Far East, and one discharged a cargo of rice in Cuba which was loaded in Saigon.

Ten Japanese vessels carried coal cargoes from Chesapeake Bay to the west coast of South America, and returned with nitrate for the United States or Europe. Five additional vessels, which had not passed through the canal going south, came north with nitrate cargoes from Chile.

Of the voyages described as miscellaneous, two were from Buenos Aires to Kobe, one from Hamburg to Kobe, one from Nuevitas to San Francisco, one from Tampico to Los Angeles, one from Portland to Alexandria, one from Kobe to Petrograd, and one from Vaparaiso to Tampico.

Only two of the 136 Japanese vessels using the canal passed through in ballast. One of these was bound from New Orleans to the Orient via San Francisco, and presumably picked up a cargo at the latter port. The other was bound from Valparaiso to Tampico and returned seventeen days later with an oil cargo from Tampico for Los Angeles.

The principal Japanese steamship companies passing vessels through the canal in 1921 were: Osaka Shosen Kabushiki Kaisha with 38 vessels; Nippon Yusen Kakushiki Kaisha with 26 vessels; Kokusai Kisen Kabushiki Kaisha with 25 vessels; Toyo Kisen Kabushiki Kaisha with 10 vessels; and Mitsui Bussan Kaisha with 7 vessels. The remaining 30 vessels in the list of 136 were distributed among 13 other owners.

A.-H. to Europe

Williams, Dimond & Company, operators of the Shipping Board European-Pacific Line and Pacific Coast agents of the United American Lines (American-Hawaiian Steamship Company), announce that beginning with October sailings the American-Hawaiian will open a Pacific Coast-European service with its own steamships and that the Shipping Board vessels with which Williams, Dimond & Company have maintained a service will be turned back to the government. Ports of call will be Liverpool, London, Hamburg and Antwerp, and Glasgow, Rotterdam, Havre and such others as may offer sufficient business. The first sailing from the Pacific Coast will be that of the Alaskan, October loading, and fortnightly sailings will be maintained thereafter.

Within the last few months competition on the Pacific-Europe route has become quite vigorous, and to the number of strong foreign lines engaged in the trade the Campagnie Generale Transatlantique recently was added.

Announcement also has been made by Williams, Dimond & Company of a new American - Hawaiian service from Philedalphia to the Pacific Coast, the first sailing to be that of the Floridian, scheduled for September 10, and other vessels to follow at intervals of two weeks. Biweekly sailings will be maintained from Boston and the New York-Pacific service will be increased from one vessel every ten days to one every week. The schedule will alternate New York sailings between Boston and Philadelphia, which means that all westbound steamers will call at New York and at one other port, either Boston or Philadelphia.

The American-Hawaiian has absorbed the Coastwise Transportation Company and now has twenty-eight ocean - going vessels. Ninety - eight per cent of the Coastwise stock was held by American-Hawaiian stockholders.

Labor on the Pacific

The Pacific American Steamship Association and the Shipowners' Association of the Pacific Coast have opened an employment office in San Pedro, in charge of Captain J. J. Meany, former inspector of hulls, San Francisco, at which all men for positions afloat and ashore will be recruited, stevedores, of course, being included. The San Francisco agency has been moved from 41 Drumm street to 84 Embarcadero, where the headquarters of the Waterfront Employers' Association also is situated.

Efforts of the associations to bring about a complete open shop on the Pacific are being centered on Portland longshore work, the marine strike being practically a thing of the past.

Wages of longshoremen and warehousemen of Seattle were reduced by agreement August 1, the average cut being 10 per cent, from 90 cents an hour, $1.35 for overtime, to 80 cents and $1.20 for longshoremen, and from 80 cents and $1.20 for warehousemen to 70 cents and $1.05. The new agreement expires April 1.

Furness-Withy Coming

Announcement is made of the addition of another important shipping company to the Pacific Coast-European service. Furness, Withy & Company will place four steamships in the service, the first of which, the 9500-ton Mongolian Prince, will load in late September, the others following at intervals of one month. The Cordobes, one of the four, has refrigerator space for 4500 tons of cargo and will be able therefore to take large shipments of fruits. Intimations were given that the company's intention was to build up a large refrigerator service.

Competition in the Pacific-European trade is becoming very keen, for Furness-Withy follows the French Line by a month in announcing its service, and the American-Hawaiian will supplant the European-Pacific Line of Williams, Dimond & Company, maintained with Shipping Board vessels. All these developments indicate clearly that shipping companies see in the Pacific-Europe trade a promising future.

Books for Ships

Announcement is made that the trustees of the Carnegie Foundation have taken up the needs of American sailors for reading on shipboard and have authorized a gift of $5000 from the funds of the foundation to the Social Service Bureau of the Merchant Marine, an organization devoted to the welfare of American sailors, of which Mrs. Alice S. Howard of Cleveland and Boston is the head. The money is to be devoted to the administration of a project for supplying books to merchant ships through the American Merchant Marine Library Association, together with other funds to be raised by the association.

This association, recently organized under the laws of the State of New York, is to take over the work done during the war by the American Library Association in supplying libraries to merchant ships. The library chests employed in this work contain books worth nearly half a million dollars. These are distributed to the ships from leading American ports and renewed each voyage.

A meeting to complete the organization of the new association, held recently at the Seamen's Church Institute, New York, resulted in the election of officers representing a wide range of interests in the welfare of seamen, the roster being as follows: Mrs. Alice S. Howard, president; Winthrop L. Marvin, first vice-president; Captain F. A. Gainard, second vice-president; C. C. Smith, secretary-treasurer; and following executive committee: Mrs. Mabel Dean Bacon, Percy J. Pryor, Reverend Archibald R. Mansfield, D.D., Alfred Gilbert Smith, Franklin F. Hopper, Frank C. Munson and Bert L. Todd.

Shipping Briefs

In order to satisfy both Portland and Seattle, each of which objected to being made the second port of call, vessels of the North Atlantic & Western hereafter will give priority to the two ports alternately, one vessel going up the Columbia before proceeding to Puget Sound and the next going to Puget Sound first.

* * *

The San Francisco-Los Angeles service of the Los Angeles Steamship Company was fully inaugurated in August, when the Harvard made her maiden voyage since her reconditioning.

* * *

The Honolulu agency of Hind, Rolph & Company, San Francisco, has been closed and the company's business in Hawaii turned over to the Henry Waterhouse Trust Company. John K. Clarke, manager of the Hind-Rolph branch in Honolulu, has become secretary and director of the Waterhouse company.

* * *

By mutual agreement between the waterfront employers and their employes in Puget Sound ports, the wages of longshoremen and warehouse workers were reduced an average of 10 per cent August 1. The agreement, which runs to April 1, was drawn up by committees representing the employers and the employes. This is the first time in the history of the Sound ports that wages of waterfront labor have been reduced without a fight. The old scale for longshore work was 90 cents an hour for straight time and $1.35 an hour for overtime. Under the new scale, the longshoremen will receive 80 cents for straight time and $1.20 an hour for overtime. Working conditions and rules remain unchanged.

* * *

An additional vessel, the Glenora, has been placed in the intercoastal trade by the Atlantic-Gulf & Pacific, which now has seven steamships in that service. She sailed from Philadelphia for Mobile and the Pacific Coast in August.

* * *

The Northwest Shipping Company has been appointed Portland agent of the Latin-American Line, which was recently established by A. O. Lindvig. Lindvig steamships were engaged in the West Coast trade during the war, but were withdrawn in 1920.

* * *

The Canadian Pacific Ocean Services has bought the 19,300-ton Tirpitz, which will be renamed Empress of China and placed in the Pacific trade. The Prinz Friedrich Wilhelm was to be renamed Empress of China but she will remain on the Atlantic for a few months in the Cunard service, taking the place of the damaged Mauretania. The Tirpitz sale was made by Lord Inchcape.

* * *

G. S. Coppell & Brother, Mazatlan, have announced a new steamship service between San Francisco and the West Coast of Mexico. Six new steel steamers of 1500 tons deadweight, owned by the Clan Line, will be used. The Coppell firm will act as agent in Mexico.

* * *

The Compania Mexicana de Navegacion (Mexican Navigation Company) announces that the Mexican steamship Mexico will be operated between San Francisco and Mazatlan, Guaymas, San Blas (if inducements offer) and Manzanillo, and, cargo offering, Acapulco and Salina Cruz. Arrangements are being made to extend the service to Central America and to employ one more steamer, sailings being monthly. The Anglo-Southern Company, Balfour building, San Francisco, is agent.

* * *

The Inter-Island Steam Navigation Company of Honolulu has purchased the holdings of the Demosthenes Lycurgus estate in the Volcano House, Kilauea, Hawaii. In addition to the hotel property, about $51,000 in cash, accumulated for new buildings, was involved. New officials of the hotel company are: J. M. Dowsett, president; J. W. Waldron, vice-president; W. A. White, treasurer; O. C. Scott, secretary, and G. P. Wilcox, auditor.

* * *

In May, 1920, American vessels were carrying practically half of the total foreign trade tonnage of the

United States. In the subsequent twelve months about 3,000,000 gross tons of vessels were added to the American sea-going tonnage, substantially a gain of about 30 per cent. Despite this, however, the share of the American merchant marine in its own carrying trade has declined sharply until now only a shade more than a third of the total exports and imports move in American ships. Slightly more than 50 per cent of the total value of American sea-borne imports were American carried in May, 1920, but in May of this year the proportion had declined to 35.6 per cent. In the same period the proportion of imports in United States vessels dropped from 44.1 per cent to 32.8 per cent, or less than one-third of the total. During the year the share of the total trade moving in American bottoms decreased from 46.4 to 33.7 per cent.

* * *

Announcement has been made in San Francisco of the incorporation of the Australian Dispatch Line as a subsidiary of J. J. Moore & Company. The line had been operated for many years as the charter business of the Moore company and the incorporation will entail no radical departures. J. B. Blair is president, V. H. Pinckney is vice-president, William Mainland secretary-treasurer, and Claude Daly general manager. Headquarters of the company are at 233 Pine street, San Francisco.

* * *

The Australian Commonwealth government line of steamers has announced an extension of the line's activities so as to provide for a service between England and Fiji, by way of the Panama Canal. The service will be maintained regularly, provided the cargo position offers sufficient inducement. Negotiations for the service, which have been in progress for some months, have been completed in London.

* * *

The Shipping Board 535 Empire State, the second of her class to be assigned to the Pacific Mail, arrived at San Francisco from Baltimore July 24 and sailed on her first trans-Pacific voyage July 30.

* * *

The management of the Suez Canal announces a reduction of 25 centimes in the canal tolls beginning October 1, after which the tolls will be 8 francs a net ton on ships with cargo and 5 francs 50 centimes on ships in ballast. During the six months ended June 30, 1921, the canal tolls on 1870 ships passing through the canal were 70,150,000 francs; during the corresponding six months of 1920 tolls were 70,600,000 francs on 1868 ships; and during the corresponding six months of 1919 they were 61,760,000 francs on 1772 ships.

* * *

On her first voyage between Seattle and Honolulu, the Matson Navigation Company's new 14,000-ton freighter Manukai made the run in 7 days, 14 hours and 3 minutes, a record. She was built by the Moore Shipbuilding Company.

* * *

Fager & Wood have opened a custom house brokerage and freight forwarding business with offices in the I. W. Heilman building, Los Angeles. The senior partner was formerly with the foreign trade department of the American Express Company, Los Angeles and Seattle, and was export and import manager for the Union Pacific Railway at Seattle. Mr. Wood was Seattle manager of the Republic Forwarding Company and export manager of J. T. Steeb & Company, Tacoma.

* * *

On her maiden voyage across the Pacific, the U. S. S. B. Silver State, operated by the Pacific Steamship Company, made the voyage from Seattle to Yokohama in 10 days and 6 hours.

* * *

The Alaska Commercial Company announces that it has constructed at Unalaska tanks having a capacity of 20,000 barrels of fuel oil. Distillate also will be carried. The company has had a coaling station at Unalaska heretofore.

* * *

The commissioner of immigration reports that 15,543 alien seamen deserted in United States ports during the fiscal year ending June 30, 1921, as against 3388 in the preceding year.

* * *

On her August westbound voyage the White Star liner Olympic made the run from the Lizard to Ambrose Channel lightship, New York, 3055 miles, in 5 days, 18 hours and 18 minutes, at an average speed of more than 22 knots. Her best day's run was 559 miles.

* * *

Handling charges on cargo received from or delivered to trucks at Los Angeles, which were lifted by the Luckenbach Line July 1 and later by the Isthmian and Williams companies, are being reimposed, following protest of competitors, but the question cannot be regarded as definitely settled and a vigorous effort is being made in Los Angeles looking toward general abrogation.

* * *

The San Francisco Tugboat Company has been organized to take over the tugs of the Rolph Navigation & Coal Company and of Henry C. Peterson, Inc. Arnold Foster, assistant treasurer of the Bethlehem Shipbuilding Corporation, is president. Captain Clem Randall will be secretary and manager. The new company owns seven vessels, marked by black stacks bearing the letters S. F. in black on a white band.

* * *

The U. S. S. B. 535 Hawkeye State, operated by the Matson Navigation Company in the Baltimore-Pacific-Hawaii service, will make one voyage to the Orient for the Pacific Steamship Company while the Wenatchee is undergoing repairs.

* * *

In order to expedite the adjustment of freight claims and to further the relations of shippers and consignees, more than fifteen San Francisco steamship companies have formed a new organization to be known as the Pacific Steamship Claim Association. G. C. Keiber, freight claim agent of the Pacific Mail Company, has been named chairman, and H. M. Woodruff, claim agent of the Parr-McCormick Company, has been elected secretary.

* * *

Mississippi Service

Announcement is made by the Mississippi-Warrior Service of the War Department, Swayne & Hoyt, operators of the Pacific-Caribbean-Gulf Line, and the Luckenbach Steamship Company of eastbound through rates from ports of the Pacific Coast to St. Louis, East St. Louis, Illinois, and Memphis, effective August 4. Although Swayne & Hoyt had worked in conjunction with the War Department's barge service for a year, the new arrangement is a considerable advance in several particulars over the old, and the Luckenbach Line, moreover, has become a party.

All Pacific Coast ports except Astoria and San Diego are covered. Vancouver and Victoria take arbitraries of 12½ cents, and arbitraries probably will be imposed on Northern ports as compared with San Francisco rates. Class rates average about 25 per cent less than those of the railroads.

Luckenbach Expansion

In addition to establishing its own office in Portland, the Luckenbach Steamship Company also has opened an office in the L. C. Smith building, Seattle, under R. S. James as manager. Mr. James was formerly with the Pacific Steamship Company. H. G. Tiefel has been appointed auditor and cashier of the Seattle office and H. E. Troyer contracting freight agent.

The Luckenbach Line has been assigned Pier 39, San Francisco, growth of business having necessitated more room than was given by Pier 41. Offices to house departments closely connected with the operation of vessels will be built at the wharves.

Not Always Friends

Conferences of the Far East, in common with those of the United States, are having their difficulties. Comes now the Osaka Shosen Kaisha with the threat that it will increase its service between Japan, Java and Calcutta in competition with the Calcutta Freight Conference if its request for admission to that organization is denied. Denied it apparently will be, for the N. Y. K., British India Steam Navigation and Indo-China manifest a desire to keep the trade to themselves. In so doing they have an effective weapon in the form of a 10 per cent deferred rebate, the like of which is not to be seen on this side of the water, not openly, at any rate, since Senator Jones got in his work last year. The O. S. K. cannot gain admission to the Calcutta conference even though it is a member of the Bombay organization, other adherents of which are the N. Y. K. and P. & O. But the fact that the O. S. K. and N. Y. K. are playmates in one pasture does not signify that they like each other when they climb the fence. The O. S. K. extended its Java-Calcutta service to a Japan - Java - Calcutta in February, 1920.

In Pacific Also

Reports from the Orient say that the eastbound trans-Pacific organization is near the rocks. Although the conference rate on general cargo was $9, outside companies were bidding $3 and $4, which forced down the conference rate to $6, and some conference members were suspected of secret rate-cutting. When that suspicion gets abroad, the end is in sight.

"Shagaisen" vessels, or those belonging to companies other than the subsidized lines of the O. S. K., N. Y. K. and T. K. K., engaged in ocean services, at the beginning of June numbered 160 of 726,435 tons, a decrease of 43 vessels of 149,000 tons since the first of April. Declines were registered as follows: European service, 3 vessels; Mediterranean, 10; South American, 2; Australian, 3; Malaysia, 15; but the North Atlantic and the North Pacific increased by one each. Coasting and near-sea trades absorbed some of the withdrawn tonnage. During June, however, the following changes were made: decreases, North Atlantic, 6 vessels of 44,805 tons; North Pacific, 2 of 7665; East Coast of South America, 5 of 27,593; Australia, 4 of 14,393; increases, Europe, 7 of 50,142; West Coast of South America, 1 of 9422. At the end of June, total Japanese shipping, vessels of less than 1000 gross tons excluded, was 795 ships of 2,725,557 gross tons.

On June 15 tied-up tonnage in Japan ports aggregated 392 vessels of 218,196 tons, a decrease of 4 of 33,274 tons in the month. Of the idle vessels, 224 of 194,001 tons were steamers, 49 of which exceeded 1000 gross tons.

Business Improves

An increase in cargoes is observed in the Far East. The Pacific Mail liner Golden State sailed from Shanghai in July with more than 3000 bales of raw silk, valued at about $3,000,000, which would have been a large shipment even in 1919, when not to have a silk shirt was to display one's poverty. Rice shipments from Korea and Formosa have been stimulated by the high prices of domestic grain; Dairen is dispatching much foodstuffs to Europe; a contract for the transportation of 130,000 tons of coal from Japan to India has been awarded to the Yamashita Kisen Kaisha; shipments of glassware, porcelain and cotton goods to South America are growing; a fair-sized tonnage of Kamchatkan herring will be sent to Europe; and, probably most important, Javan and Formosan sugars are ready for transportation to Europe and Japan. Nevertheless, shipowners are not convinced that the improvement is permanent and they are loath to return tied-up vessels to service.

Passenger business shows a decline, according to figures of N. Y. K. business for May, during which the company transported 19,459 persons as against 22,227 in May, 1920. Travel to North America, however, increased 65 per cent.

The Yamashita Kisen Kaisha has opened a service between Kobe, Saigon and Bangkok, and is reported to be considering a Yokohama-Tsingtao line.

Old Vessels in Demand

The Japan Advertiser notes an increased demand for old vessels and explains it thus:

In the case of a ship of 2000 tons, built in 1910, the price may be estimated at yen 50 per ton, the total price being yen 100,000. Registration and other fees amount to yen 5000, so that the aggregate cost is yen 105,000. The cost of the ship may be written off to the extent of yen 7500 a year, the interest rate being calculated on a compound 8 per cent. Monthly wages and the cost of food amount to yen 2300, repairs to yen 5000, insurance to yen 6000, articles for consumption to yen 3600 and taxes and miscellaneous expenses to yen 2400. Assuming that yen 105,000 paid for the ship and fees has been borrowed, yen 8400 must be paid as interest at the rate of 8 per cent per annum.

When calculations are made in this way the annual expenses amount to yen 60,500 or yen 5260 a month, the year being taken as 11 months and a half. Daily expenses work out at yen 175.36.

If this steamer is used between Muroran and Yokohama for the shipment of coal, the expenses for one voyage will amount to yen 2700. Assuming that the coal freight rate is yen 1.80 per ton, as compared with the ruling quotation of between yen 1.90 and yen 2, the proceeds for one voyage will amount to yen 3150. Thus the net gain amounts to yen 450 for one voyage between Muroran and Yokohama or about yen 1200 per month.

This is why old ships have begun to attract attention.

Ex-German to White Star

Homeric will be the new name of the 35,000-ton German-built liner Columbus, recently purchased from the Reparations Commission for the White Star Line.

In the race for building big liners that was in progress when the war broke out, the White Star had laid down at Belfast the keel of a 35,000-ton ship, which was to be named Homeric. At the same time the Germans had under construction at Danzig a 35,000-ton ship, which they named Columbus. Pressure of war construction made it advisable to halt work on the Homeric, and the materials intended for her hull were used in the building of other vessels. The Columbus was farther advanced, and now, having been completed to order of the Reparations Commission, becomes the Homeric.

The International Mercantile Marine Company states that definite plans for the ship's route are now under consideration. It is probable that she will make a few voyages between Liverpool and New York this fall, but it is planned to put her on the run to Southampton later with the Olympic.

Shipbuilding

Pacific Building

On August 1, according to returns compiled by Pacific Marine Review, there were 17 steel ocean-going steamships of an aggregate deadweight tonnage of 200,290 under construction in yards of the Pacific Coast of the United States, as compared with 23 of 259,890 tons July 1. Deliveries during July were of 6 vessels of 59,600 tons, and no new contracts for ocean-going vessels have been let. Of the July deliveries, 1 vessel of 11,000 tons was a freighter for the Shipping Board; 4 of 40,200 tons were Shipping Board tankers, and 1 of 8400 tons was a tanker for foreign private account. No deliveries were made of tankers for private American owners. Only one tanker for the Shipping Board remains to be completed.

August promised to witness the delivery of a greater volume of tonnage than did July, 6 vessels of 62,540 tons being scheduled for completion.

There has been no change in the status of vessels under construction in Canadian yards.

The following table shows work under way August 1:

American Yards	No. Vessels	Agg'te D. W.
Freighters, USSB	3	33,000
Tankers, USSB	1	10,000
Tankers, private	7	83,690
Freighters, private	2	40,000
Tankers, foreign	4	33,600
Totals	17	200,290
Canadian Yards		
Freighters, gov't	4	33,480
Freighters, private	1	600
Totals	5	34,080

July Deliveries

The Bureau of Navigation, Department of Commerce, reports 106 sailing, steam, gas and unrigged vessels of 84,918 gross tons built in the United States and officially numbered during July. Three vessels of 27,994 gross tons were built for the Shipping Board, and one of 5718 gross tons was for foreign owners. During the same month 9 small vessels totaling 346 gross tons were transferred to foreigners with the approval of the board. From other sources than construction, two vessels of 30 gross tons and one of 7030 gross tons were admitted to American registry.

Fewer Employes

The principal shipbuilding companies on the Atlantic and Gulf employed approximately 37,000 less shipyard workers on July 1 than they did one year previous. The following table on shipyard employment conditions has been prepared from working force reports received from the more important yards covering a territory extending from Maine down the Atlantic seaboard and along the Gulf of Mexico to Louisiana. The figures show the maximum totals of workmen in the employ of the various companies exclusive of supervisory forces, office help and employes engaged in erecting or installing work at outside points:

Date	Number of Shipyards Reporting	Number of Workmen Employed	Perctge. of Dec. since July 1, 1920
July 1, 1921	21	49,101	43.1
April 1, 1921	22	65,914	23.6
January 1, 1921	20	79,808	7.4
October 1, 1920	21	83,656	3.1
July 1, 1920	22	86,232	.....

New Work

Bids have been requested of American and British shipbuilders by the Western Union Telegraph Company for the construction of a cable vessel. She will be of steel, of the combined long poop and bridge and separate top-gallant forecastle type, with continuous upper and main decks and a lower deck tier of beams. She is to have an elliptical cruiser stern, with a clipper bow, and is to be schooner-rigged with two steel masts, having four 10-ton booms on the foremast and two 5-ton booms on the mainmast. Her dimensions will be: length, 340 feet 6 inches; breadth, 42 feet 6 inches; depth molded to upper deck, 25 feet. She will be propelled by four Diesel engines driving direct-current generators, and a direct-current motor on each propeller shaft.

Nine of the largest American shipyards submitted bids for the construction of two 4300 deadweight ton freight and passenger steamers designed for service between New York and Venezuela for the Red D Line. It is reported that bids were received from the New York Shipbuilding Corporation, Newport News Shipbuilding & Drydock Company, William Cramp & Sons Ship & Engine Building Company, Bethlehem Shipbuilding Corporation (Sparrows Point), Merchant Shipbuilding Corporation, Federal Shipbuilding Company, Sun Shipbuilding Company, Bath Iron Works, and the Todd Shipbuilding Corporation (Tacoma). There is keen interest among the shipbuilders, as there have been no large contracts awarded within the past year for a passenger vessel. It will require from eleven to fourteen months to build the vessels.

As an indication of the importance attached by manufacturers to the all-water route between the Great Lakes and New York, it is interesting to note that Henry Ford is considering the operation of a fleet of self-propelled freight barges between Detroit and the seaboard via the Erie Canal. It is reported that the barges, which will soon be constructed, will be designed to handle the entire Atlantic seaboard freight of the Ford company.

Plans of a combination vessel for the Inter-Island Steam Navigation Company of Honolulu will be completed about September 15 by Pillsbury & Curtis, San Francisco. There is a good prospect that bids will be called soon thereafter.

The Bethlehem Shipbuilding Corporation, San Francisco, has received a contract for the construction of two steel ferries for the Six Minute Ferry Company, details of which will be found in yard notes.

Pacific Yard News

Bethlehem

Bethlehem, San Francisco, has been awarded a contract for two steel ferryboats for the Six Minute Ferry Company, San Francisco Bay, with prospects that a third will be ordered later. The vessels will be 230 feet over-all, 63 feet 6 inches beam over guards, 42 molded; depth of 19 feet 6 inches; and they will be powered with three watertube boilers and triple-expansion engines developing 1400 horsepower. They will have propellers at both ends. Dates of keel-layings have not yet been set.

The Potrero plant has been awarded a contract for repairing the U. S.

S. B. 535 Golden State at a cost of $91,600, the work consisting of rearrangement of crew's quarters, installation of a new ventilating system and making other changes.

The Alameda Works launched the 15,000-ton tanker F. H. Hillman for the Standard Oil of California on July 28.

Cholberg

The Dominion government will complete three barkentines under construction at the Cholberg yard, Vancouver, for the Victoria Shipowners, Ltd. A contract has been awarded to the Victoria Machinery Depot Company for completion of the first of these vessels, the S. F. Tolmie, which was reported completed but which needs rigging, finishing, cleaning and painting. Tenders will be invited for the three now under construction by Cholberg.

Los Angeles

Los Angeles has delivered the 11,000-ton freighter West Faralon, the second of five building for the Shipping Board, and has launched the West Prospect, the fourth vessel. The West Chopaka, the last of the five, is scheduled to be launched early in September.

Moore

Within a few weeks after the Bethlehem Shipbuilding Corporation, San Francisco, delivered its last Shipping Board vessels, the Moore Shipbuilding Company, Oakland, also completed its program, the 10,000-ton tanker Tustem having been delivered July 29 and the sister Lubrico August 10. With the completion of these vessels the Moore yard was left with the 4750-ton motorship H. T. Harper for the Standard Oil of California, delivery scheduled for September 1; the 16,340-ton tanker Tamiahua for the Southern Pacific Atlantic Line, scheduled for August 20, and the 10,100-ton tanker Birkenhead for Vacuum Oil, scheduled for September 5.

The Lubrico was the last tanker under construction for the Shipping Board on the Pacific Coast.

The Birkenhead is a sister of the Vacuum and Gargoyle, both of which were added to the Vacuum fleet last year. The fleet now consists of five 10,000-ton steamers, one of 9000 tons, a motorship of 5090 and another of 1750, besides a steam lighter.

Navy Yard, Mare Island

At 12:45 o'clock, August 10, the battleship California was commissioned at the Mare Island Navy Yard, which built her. Captain H. J. Ziegmeier assumed command, with Captain W. A. Smead as executive officer. Pursuant to the policy of the Navy Department, to man capital vessels with natives of the states for which named, the California has an all-California crew, and in addition, of course, was built in that state. She was taken to the Hunters Point graving dock of the Bethlehem Shipbuilding Corporation for installation of propellers and later in the year will make her first cruise to Hawaii. She will then become the flagship of the Pacific fleet.

The Navy Yard has been instructed by Washington to discontinue construction of the dreadnought Montana during the current fiscal year. This will curtail the yard's work greatly, inasmuch as destroyers are the only other vessels building.

Pearl Harbor

A marine railway of 3000-ton capacity and costing $230,000 will be constructed at the Pearl Harbor naval station, Hawaii. The Hawaiian Construction Company has the contract.

Prince Rupert

The name of the second 8400-ton steamship building at the Prince Rupert yard for the Canadian Government Merchant Marine has been changed from Canadian Thrasher to Canadian English. She was due to be launched in August. The first, Canadian Scottish, was to be delivered about the end of August.

Southwestern

The 8400-ton tanker Silvanus, built by the Southwestern Shipbuilding Company for Dutch Shell, was delivered August 10, and the sister Semiramis was scheduled for delivery August 31. She was launched August 6. Besides these vessels one other, La Purisima, a 7500-ton tanker for Union Oil, was under construction. She is scheduled for September delivery.

Todd

The Todd Drydocks, Seattle, have been awarded a contract for alterations and improvements of the U. S. S. B. 535 Wenatchee on a bid of $149,600, insurance included; time limit, 45 days. Other bids, submitted by California yards, were higher, and some were materially higher when the bidder agreed to assume insurance. Inasmuch as the Wenatchee was at Seattle the Todd yard's position was impregnable.

Union Construction

Union Construction launched the 8400-ton tanker Amalthus for Anglo-Saxon Petroleum August 11 and delivered her sister, Ampullaria, a few days later. These were the last merchant vessels under construction at the yard.

Advices from Washington state that three of the Coast Guard vessels building by Union Construction, the cutters Mojave and Haida and tug Shawnee, will be assigned to the Pacific Coast and Alaska and that the other two, the cutters Modoc and Tampa, probably will go to the Atlantic. The Tampa is named for a Coast Guard cutter lost in the war. She had her trial August 10. The second sister, Haida, will be delivered about September 3; and the third and fourth, Mojave and Modoc, will be launched about the same time, to be followed a few days later by the Shawnee.

On Atlantic and Gulf

Bath

The Bath Iron Works delivered the Thomas P. Beal, a 9600-ton freigter, to Crowell & Thurlow in August. She was the last vessel building at the yard.

Bethlehem

The Harlan plant, Bethlehem, has received a contract to build a 2600 deadweight ton tanker for the Atlantic Refining Company. The vessel will be used to serve ports in which the water is too shallow for large tankers. She will be 266 feet between perpendiculars, 39 broad, and will have a loaded draft of 17 feet, a loaded speed of 8½ knots, and will be equipped with turbine engines developing 750 indicated horsepower. The boilers will be built by Babcock & Wilcox.

Sparrows Point launched the 20,000-ton combination ore and oil carrier G. Harrison Smith, built for the International Petroleum Company on July 12. Three sisters, all for the Ore Steamship Company (Bethlehem Steel Corporation), are under construction.

Crandall

The Crandall Engineering Company of Boston is the designer and constructor of a 1200-ton railway drydock being built for the Sydney Foundry & Machine Works, Sydney, Nova Scotia. Vessels displacing up to 1200 tons will be accommodated on this new dock, which measures 200 feet over the keel blocks; 50 feet wide, and gives 10 feet of water forward and 16 feet aft over the blocks. The construction will be completed and the dock in operation early in October.

Doullut & Williams

Six oil-carrying steel barges are under construction by Doullut & Williams, New Orleans, for their own account. Two were launched in July and four in August. The yard recently completed its Shipping Board work.

Federal

Two tankers, the Victolite and the J. A. Moffett, Jr., have been delivered by the Federal Shipbuilding Company to the Standard Oil Company of New Jersey, the former having been turned over July 8 and the latter August 5. They are sisters of 15,000 tons deadweight. Three 9400-ton freighters for United States Steel Products remain under construction.

Foundation

The French High Commission is offering for sale the Foundation Company Shipyard No. 12, located at New Orleans, where several 6000-ton steel vessels of the LeParmentier type were built. The yard covers an area of 90 acres with a launching basin of 20 acres, the latter having a minimum depth of 25 feet. There are three ways.

Job

The shipyard established in Machias, Maine, in 1918 by the Job Shipyard Corporation has been abandoned by the owners, who have gone out of business, and the buildings, machinery and other property have been disposed of at auction. The mill building, 37 by 70 feet, two and one-half stories high, has been sold to the Machias Valley Co-Operative Association, and will be used as a blueberry cannery.

Johnson

Two steel barges and one steel tug were added to the Mexican oil fleet in the Tampico district by recent launchings at the Bayou St. John yard of the Johnson Iron Works, New Orleans. On June 23 the company launched for the New England Fuel Oil Corporation a steel oil barge 200 feet long, 42 feet wide and 8 feet 3 inches deep. This barge is equipped with a Bumbo-Buster pump connected with a 12-foot suction pipe, and is capable of loading 1300 barrels of oil an hour. On June 16 the Mex 42, a steel tug, was delivered to the Gulf Refining Company. She was designed for towing barges of the copmany in the Tampico district. Another barge, the Mex 43, was launched June 9, also for the account of the Gulf Refining Company.

McDougall-Duluth

Motorship No. 101, constructed by the McDougall-Duluth Shipbuilding Company, Duluth, is reported to be the first motorship of a fleet of five cargo carriers to be operated on the Great Lakes and the New York barge canal. This craft recently visited the port of New York on her maiden voyage and attracted considerable attention. She is operated by the Interwaterways Line. She arrived with a cargo of 83,000 bushels of oats at a carrying cost of 60 per cent below the rail rate, and did it in six days of actual running time. The motorship made the trip across the Great Lakes from Duluth to Buffalo, thence through the Erie barge canal to Troy, then down the Hudson to New York. She is 254 feet long with a 36-foot beam and a molded depth of 14 feet, and is by far the largest boat that has ever gone through the barge canal.

Merchant

The Merchant Shipbuilding Corporation has been awarded a contract for an all steel fire boat by the city of Philedalphia. The contract price is $212,490, the lowest bid of those submitted. The Pensacola Company's $212,500 came next. The boat is to be completed in seven months. It will be 120 feet 9 inches long overall, 28 feet beam, 12 feet 9 inches in depth, and will have a draft of 9 feet. It will be equipped with a vertical compound engine developing 500 indicated horsepower, steam for which will be supplied by two Babcock & Wilcox boilers equipped for oil burning.

Fire apparatus will consist of four turbine driven fire pumps, one main water tower 30 feet above the main deck, and two small towers 15 feet above the same deck. On top of each tower and atop the pilot house will be mounted a 3000 gallon monitor nozzle made to operate at a working pressure of 250 pounds. These four nozzles will be capable of throwing 12,000 gallons of water a minute. This is the first contract received by the company since the end of the war.

Merchant delivered the 10,000-ton tanker LaPlaya to the Union Oil Company in July and launched a sister ship, Robert E. Hopkins, for the Tidewater Oil August 6.

Morse

The Fort Morgan, a fruit ship damaged almost beyond recognition by a peculiar collision in which her superstructure was swept into a tangled mass of wreckage by the bowsprit of the schooner Nancy Hanks, has been repaired by the Morse Drydock & Repair Company.

The Fort Morgan was a sorry looking vessel when she was towed to the Morse yard for repairs. Her officers' quarters were smashed, part of the rail gone, her smokestack and ventilators looking like accordions and lying in a wreck of tangled metal and splintered wood. In ten days from the time the work began the Fort Morgan steamed away, newly-painted and looking like a new ship. The officers' quarters had been rebuilt, the rail renewed, a new smokestack erected, eight ventilators repaired or renewed, and the entire vessel put in a seaworthy and shipshape condition.

Of the ten or more bids ranging from that of the Morse Company, $8615 in ten days, to that of another company, $14,850 in fourteen days, the average was far below what it would have been a year ago, when the cost would have been probably $25,000.

Newport News

Two tankers under construction by the Newport News Shipbuilding & Drydock Company for the Standard Oil Company of New Jersey appear to be the largest merchant vessels of their class ever laid down. Each is of 20,300 tons deadweight, or 300 tons more than the large combination vessels of International Petroleum and Bethlehem Steel. The first of the two, the John D. Archibold, was scheduled for August launching and October delivery. The second, the William Rockefeller, probably will be launched in October and delivered in December.

New Jersey

The fire boat Rudolf Blankenburg, named for the late Mayor Blankenburg of Philadelphia, was launched at the yard of the New Jersey Drydock Company August 9. The vessel is 129 feet 9 inches in length, with a beam of 28 feet and a depth of 12 feet 9 inches. It has a displacement of 350 tons, draws 9 feet of water aft and 8 feet forward, and is fitted to burn fuel oil. The fuel-storage capacity is 40 tons.

New York

New York Shipbuilding Corporation launched the 9870-ton tanker Eurana, built for its own account, July 16, and the 12,550-ton tanker Levant Arrow, building for Standard Transport, July 25. The latter vessel is scheduled for fall delivery instead of winter, as formerly. The Shipping Board 535 Lone Star State is scheduled for fall delivery instead of summer.

Pensacola

The Pensacola Shipbuilding Company, Pensacola, Florida, was the lowest of seventeen bidders for constructing a steel drillboat for the United States Engineers' office, 15 Whitehall street, New York, the boat to be 140 feet long and 50 feet beam. The equipment includes two watertube boilers, fitted with oil burning system. The Pensacola bid was $368,000, and the high bid was made by the Bath Iron Works at $620,000.

Portsmouth

The submarine S-12 was launched at the Portsmouth Navy Yard August 4. The vessel, 235 feet long and of 600 tons displacement, is the last but one of the S class to be constructed by the navy. This makes the tenth submarine of the S-12 type to be built at the yard. Her keel was laid January 8, 1921.

Standard

The fireboat John Purroy Mitchell, built by the Standard Shipbuilding Corporation for the City of New York, was launched August 6. She is named for the former mayor of the city who was killed in an aviation accident during the war. The vessel is the ninth fireboat of the city and is the first to burn fuel oil.

Sun

The Sun yard, Chester, launched the 12,500-ton tanker Agwimex for the Atlantic, Gulf & West Indies August 6.

Staten Island

President Roosevelt was the name selected for the ferryboat under construction by the Staten Island Shipbuilding Company for the City of New York, which was launched July 16. She will be used between St. George and the municipal pier at South Ferry.

Union

The tanker Gulf Prince, constructed by the Union Shipbuilding Company for the Gulf Refining Company, which was launched recently with her machinery completely installed, will soon be ready for delivery. She is the second tanker built by the Union Shipbuilding Company for the Gulf Refining Company, the first being the Gulf King. The vessel is 419 feet long, 66 feet 6 inches beam, and has a draft of 26 feet 9 inches. She is to carry 10,000 tons deadweight, representing 3,000,000 gallons of crude oil.

Virginia

The Virginia Bridge & Iron Company, Roanoke, Virginia, with branch plant at North Memphis, Tennessee, has acquired about ten acres on the Wolfe River, formerly occupied by the Anchor Saw Mills, for the production of all-steel barges. Preliminary work has been commenced; existing buildings will be remodeled and improved to accommodate the new industry and machinery installed at once. The steel to be used in construction of the barges will be fabricated at the North Memphis plant. Orders have been taken for the construction of four barges, 30 feet wide and 125 feet long, for oil service in the vicinity of New Orleans.

Pacifiic Coast Reports

United States

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Purchasing Agent: O. W. Street.

Submarines USN: S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145; launch Jan5/21; S-41, hull 146.

Alameda Works

Chilore, hull 5309, combination ore and coal carrier Ore Steamship Co; 571-6 LOA; 550-1 LBP; 72 molded beam; 44 molded depth; 32-4 loaded draft; 11½ loaded speed; 20,000 D WT; Curtis turbines with Falk reduction gears, 5000 SHP; 3 Scotch SE boilers, 17-6x12, each 4287 sq ft; oil burners.

Lebore, hull 5310, combination ore and coal carrier Ore Steamship Co; sister to above.

F. H. Hillman, hull 5311, tanker Stand Oil Co of Cal; 500 LBP; 68 beam; 25-11 loaded draft; 11 loaded speed; 15,000 DWT; rec engs, 4000 IHP; 3 Scotch marine boilers, 16x 12-9; keel Jan10/21; **launch July 28/21.**

H. M. Storey, hull 5312, tanker Stand Oil Co of Cal; sister to F. H. Hillman; keel Jan19/21.

W. S. Rheem, hull 5313, tanker Stand Oil Co of Cal; sister to F. H. Hillman; keel Mar1/21.

No name, hull 5314, ferryboat Six Minute Ferry Co; 230 LOA; 63-6 beam over guards, 42 molded; 19-6 molded depth; TE eng, 1400 IHP; propeller drive; 3 WT boilers.

No name, hull 5315, ferryboat Six Minute Ferry Co; sister to above.

HANLON DRYDOCK & SHIPBUILDING CO., OAKLAND

Purchasing Agent: R. Barker.

Dan F. Hanlon, hull 89, steam schr. D. J. Hanlon; 2500 DWT; 1400 IHP engines; 2 B&W boilers.

LOS ANGELES SHIPBUILDING & DRYDOCK CO., SAN PEDRO

West Faralon, hull 32, steel cargo USSB; 430 LBP; 54 beam; 28-2 loaded draft; 10½ loaded speed; 11,000 DWT; TE engs, 3500 IHP; 3 Scotch single end, 15-9; keel Sept27/20; launch Apr19/21; deliver July 21.

West Greylock, hull 33, steel cargo USSB; sister to above; keel Nov10/20; launch June/21; deliver Aug 9/21 est.

West Prospect, hull 34, steel cargo USSB; sister to above; keel Dec31/20; **launch July30/21;** deliver Sept 14/21, est.

West Chopaka, hull 35, steel cargo USSB; sister to above; keel Feb24/21; launch Sept6/21, est; deliver Nov25/21, est.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: W. E. Hostetter.

Tustem, hull 2863, tanker USSB; 425 LBP; 57 beam; 26 loaded draft; 10,000 DWT; rec eng; 3 Scotch boilers, 15-2x11; keel Nov24/20; launch June15/21; **deliver July 29/21.**

Lubrico, hull 2864, tanker USSB; sister to above; keel Jan/21; launch June15/21; **deliver Aug/21.**

H. T. Harper, hull 163, tanker Standard Oil Co of California; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engs; keel Oct/20; launch June16/21; deliver Sept1/21, est.

Tamiahua, hull 165, tanker S. P.-Atlantic S S Co; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; rec engs; 3 Scotch boilers, 15-9x12; keel Feb28/21; launch July2/21; deliver Sept/21, est.

Birkenhead, hull 166, tanker for Vacuum Oil Co; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec engs; 3 Scotch marine boilers, 15-2x 12; keel Dec9/20; launch July9/21; deliver Sept5/21, est.

NAVY YARD, PUGET SOUND

Medusa, repair ship for government; 460 LBP; 70 beam; about 19 loaded draft; 17-5 loaded speed; turbine eng, 7000 IHP; 2 WT express type boilers; 10,000 tons disp; keel Jan2/20; launch and deliver dates not set.

Holland, submarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K loaded speed; turbine eng, 7000 IHP; two WT express type boilers; 10,000 tons disp; keel Apr11/21.

NAVY YARD, MARE ISLAND

California, battleship USN; 600 L BP; 97-3½ beam; 30-3 loaded draft; 21 loaded speed; 32,300 disp; turbo-electric engs, 26,800 SHP; 8 Bu's express boilers, 50,984 sq ft; keel Oct 25/16; launch Nov20/19; **commissioned Aug10/21.**

Montana, battleship USN; 660 LB P; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 disp; turbo-electric engs, 60,000 SHP; 12 Bu's express boilers, 74,040 sq ft; keel Sept 1/20; work suspended.

Wasmuth, destroyer USN; 310 LB P; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 disp; geared turbine eng, 26,000 SHP; 4 Normand boilers, 27,000 sq ft; keel Aug12/19; launch Sept15/20.

Trever, destroyer USN; sister to above; keel Aug12/19; launch Sept 15/20.

Perry, destroyer U S N; sister to above; keel Sept15/20.

Decatur, destroyer USN; sister to above; keel Sept15/20.

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

La Purisima, hull 23, Isherwood tanker Union Oil Co; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engs, 2800 IHP; 3 Scotch boilers, 14x12; keel Dec22/20; launch Sept7/21, est; deliver Sept/21, est.

Silvanus, hull 25, Isherwood tanker Nederlandsch - Indische Tankstoomboot Maatschappij; 412 L B P; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engs, 2700 IHP; 3 Scotch boilers, 15-6 x 11-7; keel Oct20/20; launch June 30/21; **deliver Aug10/21.**

Semiramis, hull 26, Isherwood tanker Nederlandsch-Indische Tankstoomboot Maatschappij; same as above; keel Nov 5/20; **launch Aug6/21**; deliver Aug31/21, est.

TODD DRYDOCK & CONSTRUCTION CORP., TACOMA

Purchasing Agent: C. L. Bankson.

Omaha, hull 100, scout cruiser US N; 555-6 LOA; 550 LBP; extreme beam 55-4; molded beam 54-9; depth molded 26; mean loaded draft 13-6; disp 7100 tons; Westinghouse Parsons turbines and reduction gear, 105,000 IHP; designated speed 34; 12 Yarrows WT boilers; keel Dec6/18; launch Dec14/20.

Milwaukee, hull 106, scout cruiser USN; sister to above; keel Dec13/18; launch Mar24/21.

Cincinnati, hull 107, scout cruiser USN; sister to above; keel May15/20; launch May23/21.

UNION CONSTRUCTION CO., OAKLAND

Purchasing Agent: A. J. Farnesworth.

Tampa, hull 16, cutter USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engs, 2600 IHP; 2 WT boilers; keel Sept27/20; launch Apr16/21; **deliver Aug/21.**

Haida, hull 17, cutter for USCG; same as the above; keel Sept27/20; launch Apr19/21; deliver Sept3/21, est.

Mojave, hull 18, cutter U S C G; same as the above; keel Apr16/21; launch Sept1/21, est.

Modoc, hull 19, cutter USCG; same as above; keel Apr19/21; launch Sept1/21, est.

Shawnee, hull 20, cutter USCG; 150 L O A; 30 beam; 13 - 6 loaded draft; 12½ loaded speed; 1000 DWT; rec engs, 1000 IHP; 2 WT boilers; keel June1/21; launch Sept1/21, est.

Ampullaria, hull 22, oil tanker Anglo-Saxon Pet Corp, Ltd; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec engs, 2600 IHP; 3 Scotch marine boilers, 15-6x11-7; keel Feb5/21; launch July 2/21; **deliver Aug 21.**

Amalthus, hull 23, oil tanker Anglo-Saxon Pet Corp, Ltd; sister to above; keel Mar12/21; **launch Aug 11/21**; deliver Sept20/21, est.

All cutters on transverse system; others on Isherwood system.

Canadian

CHOLBERG SHIPYARD, VANCOUVER, B. C.

Purchasing Agent: W. Meed.

(These vessels to be completed by Dominion government.)

Sir Henry Drayton, hull 5, 4-masted barkentine Victoria Shipowners, Ltd; 250 LOA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel; shaft logs fitted for auxiliary but no machinery installed; keel May 15/20.

No name, hull 6, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel June4/20.

No name, hull 7, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel Feb/21.

J. COUGHLAN & SONS, LTD. VANCOUVER, B. C.

Purchasing Agent: J. Joseph.

Canadian Transporter, hull 20, steel freighter Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE eng, 3000 IHP; 3 Scotch boilers, 15-6 x11-6; keel Jan6/21.

Canadian Freighter, hull 21, steel freighter Canadian government; sister to above; keel Jan6/21.

PRINCE RUPERT DRYDOCK & ENGINEERING COMPANY PRINCE RUPERT

Canadian Scottish, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Sept27/19; launch May17/21; deliver Aug/21, est.

Canadian English, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Oct20/19; launch Aug 15/21, est.

These vessels are being completed by the Wallace Shipbuilding & Drydock Co, North Vancouver. The terms are time and material plus 8 per cent.

WALLACE SHIPBUILDING & DRYDOCK CO., VANCOUVER, B. C.

Coastwise steamship Canadian Pacific; 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel Oct/20.

From the East

Atlantic and Gulf

AMERICAN BRIDGE COMPANY, PITTSBURGH, PENN.

Purchasing Agent: W. G. A. Millar.

Twenty-five coal barges Carnegie Steel Co; 175 LBP; 26 beam; 8 loaded draft; 17 launched.

Three car floats undisclosed interests; 285 LBP; 38 beam; 8 loaded draft; keel June/21; 1 delivered; 2 launch Aug/21, est.

Two tow boat hulls Carnegie Steel Co; 149-2x34 4-5 loaded draft; launch and deliver Oct/21.

BALTIMORE DRYDOCKS & SHIPBUILDING CO., BALTIMORE

Purchasing Agent: J. G. Miller.

Elsie Jean, hull 125, tanker builder's account; 340 LBP; 49 beam; 23-6 loaded draft; 10 loaded speed; 6000 DWT; rec eng, 2000 IHP; 2 Scotch boilers, 15-3; keel Nov24/20.

J. Macy Willis, hull 126, tanker builder's account; 430 LBP; 59 beam; 25-4½ loaded draft; 10 loaded speed; 10,250 DWT; turb eng, 3000 IHP; 3 Scotch boilers, 15-3; keel Sept 27/20.

Torrent, hull 128, fireboat City of Baltimore; 115-6 LBP; 28 beam; 9-6 loaded draft; 12 loaded speed; rec eng, 1000 IHP; 2 B&W WT boilers; keel July15/21.

BATH IRON WORKS, BATH, MAINE

Purchasing Agent: J. L. P. Burke.

Thomas P. Beal, hull 86, freighter Crowell & Thurlow; 395-6 LBP; 55 beam; 27-1 loaded draft; 10 loaded speed; 9600 DWT; Parsons geared turbine, 2100 SHP; 3 Scotch boilers, 15-6x11-6; keel Nov/20; launch June 16/21; **deliver Aug/21.**

BETHLEHEM SHIPBUILDING CORP., FORE RIVER PLANT, QUINCY, MASS.

Lexington, hull 1300, battle-cruiser U S N.

Raleigh, hull 1382, scout cruiser U S N.

Detroit, hull 1383, scout cruiser U S N.

Massachusetts, hull 1400, battleship USN.

And the following nineteen submarines USN: AA-2, hull 1270; hulls 1309 to 1320 inc, submarines S-18 to S-29 inc; hulls 1389 to 1394 inc; submarines S-42 to S-47 inc.

J. Fletcher Farrell, hull 1496, tanker Sinclair Nav Co; 430 LBP; 59 beam; 25-5 loaded draft; 11 loaded speed; 10,600 DWT; rec eng, 3200 IHP; 3 Scotch boilers, 15x11-9; launch June10/21.

William Boyce Thompson, tanker Sinclair Nav Co; sister to above; keel Nov11/21; launch July/21.

BETHLEHEM SHIPBUILDING CORP., HARLAN PLANT, WILMINGTON, DEL.

No name, hull 3477, tanker Atlantic Refining Co; 266 LBP; 39 beam; 17 loaded draft; 8½ loaded speed; 2600 DWT; turb eng, 750 IHP; B & W boilers; keel not laid.

BETHLEHEM SHIPBLDG. CORP., SPARROWS POINT PLANT, SPARROWS POINT, MD.

Pine Tree State, hull 4195, combination USSB; 518 LBP; 72 beam; 30-7 loaded draft; 16 loaded speed; turb eng, 10,000 IHP; 8 Yarrows boilers; keel Feb15/19; launch Mar 19/21.

Palmetto State, hull 4196; combination USSB; sister to above; keel Feb19/19; launch June4/21.

Nutmeg State, hull 4197, combination USSB; sister to above; keel July29/20.

G. Harrison Smith, hull 4210, ore and oil Internat'l Pet Co; 550 LBP; 72 beam; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; rec eng 4600 IHP; 3 Scotch boilers, 17-6x12; keel July22/20; **launch July12/21.**

Bethore, hull 4211, ore and oil Ore SS Co; sister to above; keel Feb24/21.

Marore, hull 4212, ore and oil Ore SS Co; sister to above, except turb eng; keel May2/21.

Steelore, hull 4213, ore and oil Ore SS Co; sister to above; keel not laid.

CONSOLIDATED SHIPBUILDING CORPORATION, MORRIS HEIGHTS, N. Y.

Purchasing Agent: Wm. Rayner.

Oak, hull 251, US lighthouse tender; 160 LOA; 30 beam; 9-6 loaded draft; 875 DWT; TE eng, 700 IHP; 1 Scotch boiler, 14 diam; keel Nov 22/20; launch June18/21.

Hawthorn, hull 252, US lighthouse tender; sister to above; keel Nov 22/20; launch June28/21.

No name, hull 246, US lightship; 146-3 LOA; 30 beam; 12-7 loaded draft; 825 DWT; comp eng, 400 IHP; 2 Scotch boilers, 10-6 diam; keel Mar4/21.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO., PHILADELPHIA

Purchasing Agent: Ed. C. Geehr.

Richmond, hull 448, scout cruiser USN; keel Feb16/20; launch Aug15/21, est.

Concord, hull 449, scout cruiser USN; keel Mar29/20; launch Oct1/21, est.

Trenton, hull 501, scout cruiser USN; keel Aug18/20; launch Nov1/21, est.

Marblehead, hull 502, scout cruiser USN; keel Aug4/20; launch Dec 1/21, est.

Memphis, hull 503, scout cruiser USN; keel Oct14/20; launch Feb1/22, est.

DOULLUT & WILLIAMS SHIPBUILDING COMPANY, NEW ORLEANS

Purchasing Agent: Roland A. Thomas.

Six oil-carrying steel barges for builder's account; 40x175x9; 1000 DWT; two launched in July; four in August; no heating coils, piping or propelling machinery.

FEDERAL SHIPBUILDING CO., KEARNY, N. J.

Purchasing Agent: J. L. Hastings.

Victolite, hull 49, tanker for Standard Oil of NJ; 500 LBP; 68 beam; 27-6 loaded draft; 11 loaded speed; 15,000 DWT; rec engs, 3500 IHP; 3 Scotch boilers, 16 diam; keel July22/21; launch June14/21; **deliver July8/21.**

J. A. Moffett Jr, tanker Standard Oil of NJ; sister to above; keel July 23/20; launch July 14/21; **deliver Aug5/21.**

Steel Seafarer, hull 43, freighter US Steel Products Co; 425 LBP; 56 beam; 25-10 loaded draft; 12 loaded speed; 9400 DWT; turb engs, 3100 IHP; 3 Scotch boilers, 15 diam; keel May25/21; launch Oct15/21, est; deliver Nov5/21, est.

Steel Pathfinder, hull 44, freighter US Steel Products Co; sister to the above; keel June1/21; launch Nov 12/21, est; deliver Dec3/21, est.

Steel Pioneer, hull 45, freighter US Steel Products Co; sister to the above; keel July/21; launch Dec10/21, est; deliver Dec31/21, est.

GLOBE SHIPBUILDING & DRYDOCK CO. OF MARYLAND, BALTIMORE

Purchasing Agent: H. B. McCauley.

San Leopoldo, hull 101, oil carrier Eagle Oil Transport Co; 401 LBP; 54 beam; 25-1 loaded draft; 10½ loaded speed; 8600 DWT; TE engs, 2800 IHP; 3 Scotch boilers, 15-3x11-6; keel Sept/20; launch June25/21; deliver Aug15/21, est.

San Leonardo, hull 102, oil carrier Eagle Oil Transport Co; sister to above; keel Sept/20; launch July8/21; deliver Aug15/21, est.

LAKE TORPEDO BOAT CO., BRIDGEPORT, CONN.

S-48, hull 48, submarine USN; launch Feb26/21.

S-49, hull 49, submarine USN; launch Apr23/21.

S-50, hull 50, submarine USN; launch June18/21.

S-51, hull 51, submarine USN.

MERCHANT SHIPBUILDING CORPORATION, CHESTER, PENN.

Vice-President: J. L. Ackerson.

Playa, hull 382, tanker Union Oil Co; 424 LBP; 58 beam; 25-5 loaded draft; 10½ loaded speed; 10,000 DWT; TE engs; 3 Scotch boilers, 15-3 x11-7; keel July22/20; launch June 4/21; **deliver July/21.**

Robert E. Hopkins, hull 383, tanker Tidewater Oil Co; sister to above; keel Aug30/20; **launch Aug6/21.**

Samuel Q. Brown, hull 384, tanker Tidewater Oil Co; sister to above; keel Oct1/20.

No name, hull 385, freighter American-Hawaiian SS Co; 445 LBP; 59-8 beam; 28-6 loaded draft; 11½ speed; 11,000 DWT; 2 6cyl, 4-cycle Diesel engs, 4500 metric; 1 vertical donkey, 400 sq ft HS; keel Feb5/21.

No name, hull 386, freighter American-Hawaiian SS Co; sister to above; keel Feb10/21; launch July 21, est.

No name, hull 387, fireboat City of Philadelphia; 120-9 LOA; 28 beam; 12-9 deep; 9 loaded draft; comp eng, 500 IHP; 2 B&W WT boilers, oil; 4 turbine fire pumps, 1 30-foot tower, 2 15-foot towers; capacity 12,000 gals a minute.

NAVY YARD, BOSTON

Pecos, fuel ship No. 18, USN; 455 LBP; 56-2 beam; 26-8 normal draft; 14 loaded speed; 14,800 normal disp; rec eng, 5200 IHP; 4 Ward WT boilers; keel June2/20; launch Apr23/21; deliver Sept/21, est.

Whitney, destroyer tender No. 4 USN; 460 LBP; 60-11 beam; 21 normal draft; 16 loaded speed; 10,600 normal disp; geared Parsons turbs, 7000 SHP; 2 WT exp small tube boilers; keel Apr23/21; launching indefinite.

NAVY YARD, PHILADELPHIA

Dobbin, hull 7, destroyer tender USN; 460 LBP; 60-10 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp; Parsons geared turb single screw engs, 7000 SHP; 2 WT boilers; keel Dec23/19; launch May 5/21; deliver date not determined.

Constitution, hull 8, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive, 180,000SHP; 16 WT boilers; keel Sept 25/20; launch and deliver dates not determined.

United States, hull 9, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive, 180,000 SHP; 16 WT boilers; keel Sept25/20; launch and deliver dates not determined.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY, NEWPORT NEWS

Purchasing Agent: James Plummer, 233 Broadway, New York City.

West Virginia, hull 211, battleship USN; 600 LBP; 97-3½ beam; 30-6 mean draft; 32,600 normal disp; 21 speed; GE turbo-elec drive, 28,900 SHP; 8 B&W WT boilers, oil, 41,768 sq ft plus 4168 superheat; keel Apr 12/20; launch Nov/21, est; deliver Dec/22, est.

Constellation, hull 215, battle-cruiser USN; 850 LBP; 101-8¼ beam; 31 mean draft; 43,500 normal disp; 33¼ speed, est; Westinghouse turbo-elec drive, 180,000 SHP; 16 WT boilers, oil, 198,000 sq ft plus 18,000 superheat; keel Aug18/20; launch and deliver dates not est.

Ranger, hull 215, battle-cruiser USN; sister to above; **keel June23/21;** launch and deliver dates not est.

Iowa, hull 258, battleship USN; 660 LBP; 105 beam; 33 mean draft; 43,200 normal disp; 23 speed; GE turbo-elec drive, 60,000 SHP; 12 White-Forster WT boilers, oil, 82,800 sq ft plus 8940 superheat; keel May17/20; launch and deliver dates not est.

John D. Archbold, hull 261, tanker Standard Oil NJ; 555 LBP; 75 beam; 30 loaded draft; 10¾ loaded speed; 20,300 DWT; twin screw, TE eng, 3800 IHP; 3 Scotch boilers, 17x12; keel Dec15/20; launch Aug 21, est; deliver Oct/21, est.

William Rockefeller, hull 262, tanker Standard Oil NJ; sister to above; keel Dec15/20; launch Oct/21, est; deliver Dec/21, est.

NEW YORK SHIPBUILDING CORPORATION, CAMDEN, N. J.

Purchasing Agent: L. G. Buckwalter.

Southern Cross, hull 241, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs, 12,000 SHP; 8 WT boilers; keel Aug/18; launch July20/19; deliver fall/21, est.

Bay State, hull 251, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs, 12,000 SHP; 8 WT boilers; keel Oct15/19; launch July17/20; deliver winter/21, est.

Peninsula State, hull 252, combination USSB; sister to above; keel July20/20; launch July6/21; deliver spring/22, est.

Lone Star State, hull 255, combination USSB; sister to above; keel May 13/19; launch Oct23/20; deliver fall/21, est.

Hoosier State, hull 256, combination USSB; sister to above; keel May20/19; launch Oct23/20; deliver fall/21, est.

Yankee Arrow, hull 260, bulk oil Standard Trans Co of NY; 468 LBP; 62-6 beam, 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs, 3200 SHP; 3 SE Scotch boilers, 15-2x11-6; keel Aug17/20; launch Apr10/21; deliver summer/21 est.

Empire Arrow, hull 261, bulk oil Standard Trans of NY; sister to above; keel Sept14/20; launch May 24/21; deliver summer/21.

Levant Arrow, hull 262, bulk oil Standard Trans Co of NY; sister to above; keel Nov4/20; **launch July 25/21**; deliver fall/21, est.

No name, hull 263, combination Munson SS Co; 414 LBP; 57-6 beam; 23 loaded draft; 15½ loaded speed; 4950 DWT; geared turbs, 5800 SHP; 5 SE Scotch boilers, 16-4x12-3; keel Sept30/20; launch fall/21, est; deliver winter/21, est.

Eurana, hull 264, bulk oil stock; 419-3 LBP; 56-3 beam; 25-9¼ loaded draft; 10¾ loaded speed; 9870 DWT; 3 cyl TE engs, 3000 SHP; 3 SE Scotch boilers, 15-10x11-4; keel Jan17/21; **launch July16/21**; deliver winter/21.

No name, hull 265, bulk oil stock; sister to above.

Dixie Arrow, hull 266, bulk oil Standard Trans Co of NY; 468 LBP; 62-6 beam; 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs, 3200 SHP; 3 SE Scotch boilers, 15-3 x 11-6; keel Aug11/20; launch fall/21, est; deliver winter/21, est.

Saratoga, hull 199, battle cruiser USN; 874 LOA; 850 LBP; 105-5¼ extreme beam; 31 mean draft; 43,500 normal disp; 33¼ loaded speed; GE turbo-electric drive; 180,000 SHP; 16 WT boilers, 198,000 sq ft plus 18,000 superheat; keel Sept25/20.

Colorado, hull 200, battleship USN; 624 LOA; 600 LBP; 97-3½ beam waterline; 30-6 mean draft; 32,600 normal disp; 21 loaded speed; Westinghouse turbo-electric drive, 28,900 SHP; 8 B&W WT boilers, 41,678 sq ft plus 4169 superheat; keel Mar29/19; launch Mar22/21.

Washington, hull 201, battleship USN, sister to above; keel June30/19; launch Sept/21, est.

Hull 267, fuel ship Japanese Navy; 497-8 LOA; 67 beam; 28 designed draft; 15 loaded speed; 13,000 DWT; elec drive, 8000 SHP; 4 B&W boilers; keel fall/21, est.

STANDARD SHIPBLDG. CORP'N, SHOOTERS ISLAND, MARINERS HARBOR, N. Y.

Purchasing Agent: Jamie Cortada.

John Purroy Mitchell, hull 32, fireboat City of New York; 121 LBP; 27 beam; 14-9 deep; 12 loaded speed; comp eng, 900 IHP; 2 B&W WT boilers, oil burning; keel Mar31/21; **launch Aug6/21.**

STATEN ISLAND SHIPBUILDING COMPANY, STATEN ISLAND, NEW YORK

Purchasing Agent: R. C. Miller.

Dixiano, hull 726, sugar ship Am Sug Ref Co; 360 LBP; 50 beam; 23 loaded draft; 10 loaded speed; 6300 DWT; TE eng, 2000 IHP; 2 Scotch boilers, 15x11; keel Sept9/20; launch May21/21.

Hell Gate, hull 728, dredge C. R. Browning; 140 LBP; 48 beam; 15 loaded draft; keel Aug28/20; launch Feb23/21.

Socony 114, hull 734, barge Stand Oil of NY; sister to above; keel Jan 10/21; deliver July9/21, est.

Socony 115, hull 735, barge Stand Oil of NY; sister to above; keel Feb 26/21; deliver July30/21, est.

Hull 736, tugboat Staples Trans Co; 136½ LBP; 27 beam; 16½ loaded draft; 10 loaded speed; 1 TE eng 700 HP; 1 Scotch boiler, 16x11½; keel May16/21; launch July30/21, est; deliver Sept15/21, est.

President Roosevelt, hull 737, ferryboat City of New York; 247 LBP; 66 beam; 19½ loaded draft; 15 loaded speed; 1 F&A comp eng, 3500 HP; 4 B&W WT boilers, 13,000 sq ft; keel May23/21; **launch July16/21.**

Northwestern, tanker Am Pet Co; 242 LBP; 42 beam; 23 loaded draft; 10 loaded speed; TE eng; 2 Scotch boilers; lengthening job, additional 56 ft, making 2 new cargo tanks, 1000 DWT additional capacity. Vessel considered total loss by fire; raised; and now undergoing general repairs and at the same time lengthening. Job started May31/21; estimated time 4 months.

SUN SHIPBUILDING COMPANY, CHESTER, PENN.

Purchasing Agent: H. W. Scott.

J. N. Pew, hull 39, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs, 4300 IHP; 3 SE Scotch boilers, 15-10x11-11¼; keel Nov5/20; launch Apr 23/21.

Agwiharve, hull 40, tanker A. G. W. I. S. Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 12 loaded speed; 12,500 DWT; single screw QE engs, 4300 IHP; 4 SE Scotch boilers, 15-10 x11-11¼; keel Nov26/20; launch Apr 2/21.

Agwimex, hull 41, tanker A. G. W. I. S. Co; sister to above; keel Dec8/20; **launch Aug6/21.**

Agwiscot, hull 42, tanker A. G. W. I. S. Co; sister to above; keel Dec23/20; launch July2/21, est; deliver July 30/21, est.

Agwistates, hull 43, tanker A. G. W. I. S. Co; sister to above; keel Jan3/21; launch July16/21, est; deliver Aug15/21, est.

No name, hull 46, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs, 4300 IHP; 3 SE Scotch boilers, 15x11-11¾; keel Apr/21; launch Aug30/21, est; deliver Sept30/21, est.

No name, hull 47, tanker Sun Oil Co; sister to above; keel Apr/21; launch Sept3/21, est; deliver Oct 3/21, est.

TERRY SHIPBUILDING CORP., SAVANNAH

Purchasing Agent: H. A. Bittner.

Hull 69, oil-barge builders' acct; 285 LBP; 44 beam; 21 loaded draft; 3500 DWT.

Hulls 70, 71, 72; sisters to above; work suspended.

TEXAS STEAMSHIP COMPANY, BATH, MAINE

Purchasing Agent: A. R. Weber.

No name, hull 32, tanker Texas SS Co; 415-10 LBP; 56 beam; 25-7¾ loaded draft; 11½ loaded speed; 9600 DWT; TE engs, 3000 IHP; 3 Scotch boilers, 15-3x11; keel Nov 9/20.

Canadian

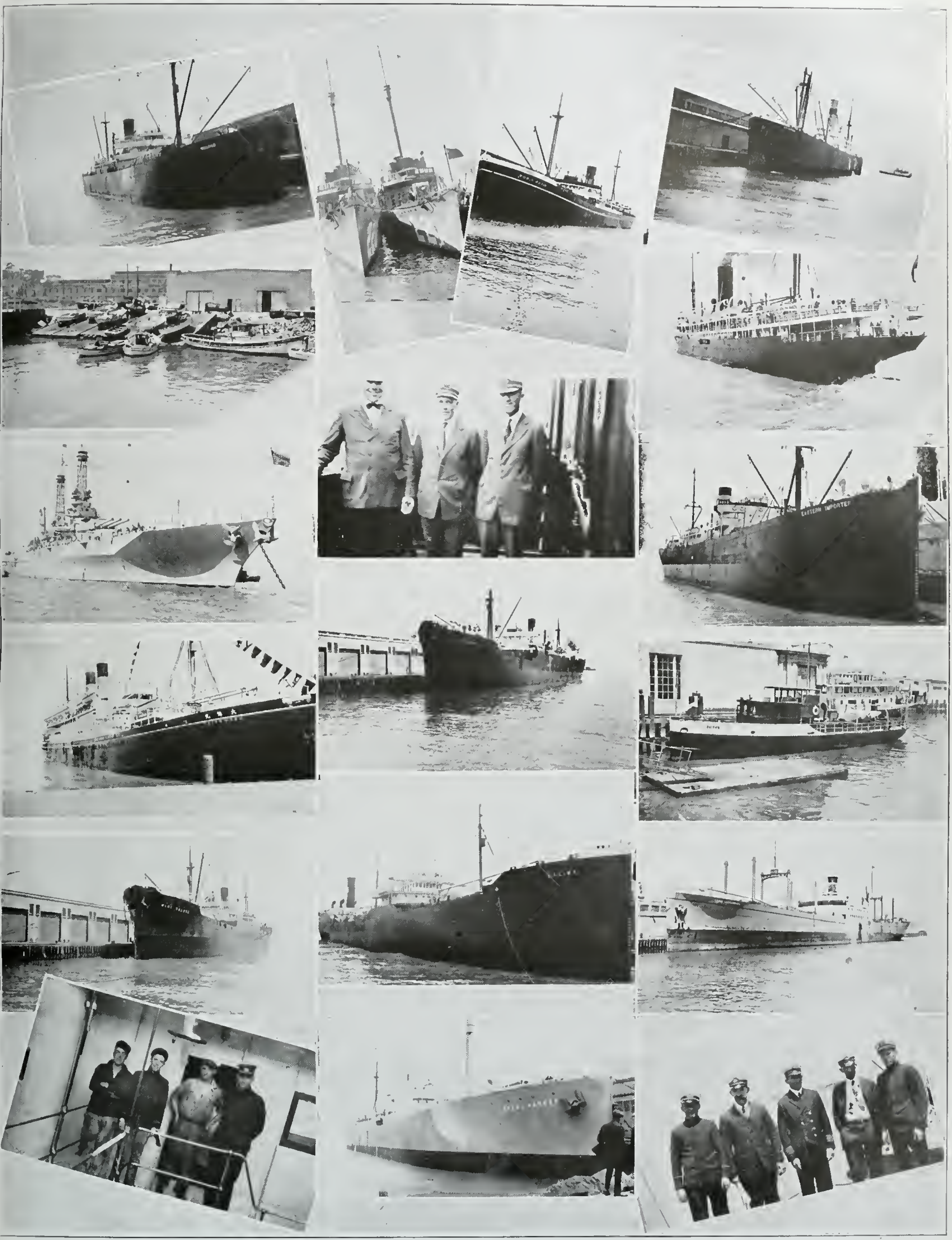
CANADIAN VICKERS, LTD., MONTREAL

Topdalsfjord, hull 82, single-screw steel 2-deck cargo Norwegian-America Line; 365 LBP; 49½ beam; 29 loaded draft; 11½ loaded speed; 6400 DWT; TE engs, 2600 IHP; 3 Scotch boilers, 14-9 with superheaters; keel July29/20; launch May5/21.

DAVIE SHIPBUILDING & REPAIRING COMPANY, LTD., LAUZON LEVIS, P. Q., CANADA

Purchasing Agent: N. W. Van Wyck.

SNAPS ALONG THE WATER FRONT



Photos by Crotty

Left row, top to bottom—Willhilo, Williams Line; Fishermen's Wharf; U. S. S. New Mexico; Taiyo Maru, Toyo Kisen Kaisha; West Calera, Struthers & Dixon; engineers, Steel Ranger, Isthmian Line. Center row—Ddestroyers Sicard and Sigourney; Robin Adair, Isthmian Line; deck officers, Robin Adair; West Henshaw, Struthers & Dixon; Salina, Struthers & Dixon; Steel Ranger, Isthmian Line. Right row—Arizonan, American-Hawaiian; Maramo, Union Steamship Company of New Zealand; Eastern Importer, Pacific Mail; Suisun, U. S. Engineers; Lewis Luckenbach, Luckenbach Line; deck officers, Steel Ranger.

Canadian Challenger, hull 476, single-screw cargo Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; $11\frac{3}{4}$ loaded speed; 8350 D WT; TE surface cond engs, 3000 I HP; 3 Scotch marine boilers, 15-6x 11-6; keel May14 20; launch July 7 21.

NOVA SCOTIA STEEL & COAL CO., TRENTON, N. S.

Purchasing Agent: A. M. Seely.

Sea King, hull 9, exploring yacht Baron Bliss, Nassau, Bahamas; 137-10 LBP; 28-6 beam; 6 loaded draft; 7 loaded speed; semi-Diesel 440 BH P, twin-screw eng; keel Aug24/20; launch Aug18/21, est; deliver Sept 30 21, est.

Drydocking and Repairs

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Miscellaneous repairs, drydocking, painting: Santa Fe Barges 3 and 4, Standard Oil Barge 7, Despatch 3, Helen P. Drew, Yorba Linda, West Honaker, Echo, Water Nymph, El Dorado, Golden State, Shabonee, West Ira, Newport, Katherine McCall, Namasket, Captain A. F. Lucas, West Carmona, Narcissus. Miscellaneous repairs: Kokai Maru, Lewis Luckenbach, Phoenix, Hawkeye State, Empire State, Coquille River, Arctic, Brunswick, Sonoma, Speaker, Tofuku Maru, Plaudis, Author, Indien, S. C. T. Dodd (also drydocking for examination). Repairs to feed pump: Colusa. Installing discharge strainer: Wm. G. Warden. Engine, boiler, hull repairs: Orowaiti, Cape Henry (not hull), Marama, Frank H. Buck. Miscellaneous repairs, turbines, boilers: Alaska. Installing new condenser: Coalinga. Renewing Fidley top: Col. E. L. Drake. New slide valve for main engine: Royal Arrow. Engine, boiler, hull repairs, drydocking and painting: W. S. Porter (also removing and repairing rudder), Mazatlan, Arab, Frank G. Drum. Drawing tailshaft, retubing boilers, miscellaneous repairs, drydocking, painting: Mexico. Repairing dynamo engine: Caddo. Repairing whistle: Rose City. Repairing capstan: Carlos.

Alameda Works

Miscellaneous repairs: W. S. Miller, San Diego, Avalon. Miscellaneous repairs, drydocking, painting: Resolute, Ranger, Daisy (also repairing stack), Daisy Putnam, Daisy Gadsby, Daisy Matthews, Hornet and and Vanguard (also new tailshaft), Malahat. Fred J. Wood, Acme, Trident. Miscellaneous repairs, drydocking, painting, removing and replacing propeller: Oregon, Davenport, Tahoe (installing new propeller). Drydocking and painting: F. S. Loop.

FEDERAL SHIPBUILDING COMPANY, KEARNY, N. J.

Miscellaneous repairs: Santa Veronica, Steel Mariner, Steel Voyager, Birmingham City and Steel Engineer (also painting), Santa Eulalia, Santa Isabel, S. V. Harkness and Josiah Macy (also installation of new reduction gears). Miscellaneous repairs, cleaning, painting: Bantu (also new deck winches), Steel Maker, Steel Exporter, Mobile City, Ensley City, Sutermco and Suholco (underwater repairs), Tugs Federal 1 and 2.

MOORE SHIPBUILDING COMPANY, OAKLAND

Drydocking, cleaning, painting and miscellaneous repairs: El Aquario, Anne Hanify, Santa Barbara, Wilmington, Coalinga, Santa Fe Barges 1 and 2, Edward T. Jeffery, Westport, Santa Cruz, Pedro Costa, Luzon, South Coast, Columbia, Fred Baxter (no painting). Engine repairs: West Togus, Sonoma, Ventura, West Lewark, Hawkeye State (also boiler). Drydocking, cleaning, painting, miscellaneous hull repairs: Saleier (also engine), Crolona, Forester, Commerce, Thomas, Janelew, Horace Baxter. Miscellaneous repairs: Granite State, Golden State, West Momentum (also drydocking). New propeller blades: Atlas. Installing oil burning system: Celestial.

NAVY YARD, PUGET SOUND

Drydocking, cleaning bottom, miscellaneous repairs: Texas (also painting bottom), Coal Barges Nos. 158, 172, 370, 371, 374, 376, 389, 391. Miscellaneous repairs: Idaho, Mississippi, New York, Arkansas, New Mexico, Wyoming, Ammunition ship Pyro, Destroyers Rathburne, Waters, Dorsey, Talbot, Roper, Zane, Bailey, Thornton, Morris, Meade, Swasey, Tingey, Minesweeper Swallow, Radio repair ship Saturn. Docking, renewal of stern frame, miscellaneous repairs: West Jessup. Miscellaneous repairs incident to operation as district craft: Patrol boat Eagle 57, Tugs Pawtucket, Sotoyomo, Iroquois, Tatnunck, Mahopac. Care and preservation: Oregon (out of commission), Seattle, Missoula, Charlotte, Patrol Boat S. C. 310.

PORT ARTHUR SHIPBUILDING CO., LTD., PORT ARTHUR, ONTARIO, CANADA

Repairs to bow: Laketon. Repairs to bottom: Kyro Scow. Repairs to rudder: J. H. G. Hagarty, Jas. Whalen, Empire. Miscellaneous repairs: Canadian Harvester, Sarnia, A. F. Bowman.

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

Miscellaneous repairs: Cuba, West Calera, Lompoc. Turbine repairs: Hawkeye State. Repairs to main steam pipe: Stanley Dollar.

TODD DRY DOCKS, INC., SEATTLE

Drydocking, cleaning, painting: Yosemite, Admiral Farragut, Redwood, Lyman Stewart (painting only), Eldridge, Roosevelt. Miscellaneous repairs: Barge Commodore, Westerly, Sioux, Silver State, Wenatchee and Keystone State (also betterments), Aquilo, Forest T. Crosby, Andrea Luckenbach, Teucer, C. M. & St. P. barge 6, W. T. & B. Co.'s barges 6, 30, 44, 43, 46, Chliicothe, West Ison. Installing lower half stern frame: West Jester. Voyage repairs: Major Samuel Ringgold, Effingham. Hull repairs: Norwood. New wheel: Kingston. Inspection of turbine bearings: Lewis Luckenbach.

THE WINSLOW MARINE RAILWAY & SHIPBUILDING CO., INC., SEATTLE

Drydocking, cleaning, painting: Barge Granco, Alicia Haviside, Santa Inez, Skookum (no docking). Drydocking, cleaning, painting, general repairs: Barge Baroda, Mindinao. Docking, cleaning, painting, renewing shoe, caulking butts and seams, repairs to donkey boiler: Bainbridge.

New combination vessel Rakuyo Maru of the Toyo Kisen Kaisha's South American line. She is equipped with 5 Scotch boilers and Parsons geared turbines, which drive her at 16 knots, half-loaded draft; she is shelter-decked, twin-screw, 460 feet between perpendiculars, 60 feet in molded beam, and 32 feet 6 inches deep to the upper deck. Her gross is 9418 tons and her net 5678; her cargo capacity is 12,428 tons measurement and 12,660 deadweight. Passenger accommodations are provided for 46 first, 51 second and 612 steerage. The Rakuyo Maru was designed by N. Ichioka of the T. K. K. and was built by the Nagasaki works of the Mitsubishi Shipbuilding Company.

The Japanese Strikes

Of late the outstanding development of the Orient has been the unusual labor disturbances of Japan, which center in the Kawasaki and Mitsubishi shipyards at Kobe. These strikes have passed the stage of being merely shipbuilding news and have become instead international news of great consequence, inasmuch as correspondents of American papers and press associations are inclined to see in them the harbingers of a new order of things in the Sunrise Kingdom. Such they may be; nevertheless, it would be easy to attribute far too much importance to them, and it certainly would be absurd to deduce from them the existence of any revolutionary trend. So long as the Emperor of Japan occupies his unique position in the hearts and minds of his subjects, a position that can truthfully be said to be that of both Pope and Kaiser magnified, just so long will Japan remain steady, even though premiers rise and fall and some form of socialism succeed the old order.

Winches of the T. K. K. steamship Rakuyo Maru

An Emotional People

Such events are by no means near. The strikes appear grave because they are practically of unprecedented magnitude. What of it? The Kobe rice riots of 1918, if duplicated in the United States, would be exceedingly serious symptoms of popular unrest; in Japan they meant nothing more than that an emotional people had run amuck and had quieted almost immediately. For the fact remains that the Japanese is emotional and excitable. As for the Kobe strikes, other factors have entered in, among which is the narrow margin between earning power and cost of living. Moreover, the occupation of factories by Italian workers unquestionably has had its effect on Japan. "The Italians did it; why can't we?" one can imagine the Kobe strikers saying to themselves; and forthwith they imitated the Occidental example. This they were prone to do because labor organizations especially look to the West for example and guidance in details the most petty. For example, in 1919 typesetters of Tokyo bethought themselves that a union would be desirable, and in order to have all as it should be they sought advice from Americans as to where a copy of the constitution of the International Typographical Union might be had. Other instances doubtless could be related by different individuals. In this there is little strange, because Japan is only now emerging from a home-production, semi-fuedal system, one of the prominent features of which is a paternal attitude on the part of the employer, manifested in the granting of benefits when workmen have to discharged.

First-cabin lounge, Rakuyo Maru

"Fires of Straw"

An editorial of the Japan Advertiser contains a summary of the situation, in part as follows:

"Labor was not, until yesterday, regarded as a commodity in Japan. The relation of employer and employe was not that of buyer and seller, united only by the cash nexus and submitting to the law of supply and demand. It was a relation of master and servant, and was interpreted by the relations of the family. The old conception is dying with the displacement of the individual master by the limited company, but it still survives, and capitalists as well as worers are to be found arguing that the Japanese onjyo shugi (kindness principle) should govern the relations of capital and labor instead of the soulless individualism of supply and demand. To turn faithful servants out of the workshops where they spend their lives in your service seems to the simple Japanese workman about as mean an action as turning a child out of the house. In going to the workshops they are not thinking of taking possession of them in order to acquire the ownership; they are merely making use of the place where they earned their daily bread in the past and hope to earn it again when the 'unfortunate affair' is over. . . . . Whether it (the labor movement in Japan) develops safely or dangerously depends entirely upon the method in which labor is dealt with. The main Japanese industry is still agriculture and the family system makes it easy to absorb the margin of unemployed when crises occur in the factory industries. If the government has not shown any special anxiety to guide labor it has not specially persecuted it. Police stupidity has been expended upon a few intellectuals. The Japanese populace is capable of sudden flares of anger like the political riots of 1912 and the rice riots of 1916, but they are fires of straw. The instincts of the people are submissive and loyal. The subversive idea that Jack is as good as his master has made little head way in Japan. The rise of labor, if the situation is wisely and liberally dealt with, need involve no danger to the state. That will be as it will be, but at present there is no reason for alarm."

Statement of Strikers

The following statement was issued by the Kawasaki strikers when they seized the shipyard:

"If, because the company has been insincere and arrogant, we should continue our strike as a protest, Japan's industry will decline and it will cause a social unrest. We therefore shall do our duty at our respective posts until our demands are granted and shall jointly control the plant and keep its work going.

"1. An industrial commission shall exercise control over all the service.

"2. Each worker is expected to do his duty at his post assigned by the commission. In case of necessity he shall be requested to serve on the commission.

"3. Wages shall be paid as before by the management of the company.

"4. The hours of labor shall be six hours at present. In that time, as much efficiency as shown in eight hours shall be shown. In case the commission deems it necessary, the hours may be shortened or lengthened.

"5. Any one violating the general peace of the plant or impairing the efficiency of the work shall be turned over to the disciplinary committee to be properly punished."

Chronology of Events

The principal steps of the strike were as follows:

June 24—Employes of the motor department of the Mitsubishi Company demand that organization of a union be permitted; that wages be increased 50 sen (25 cents) or more; that half-wages be paid while employes are in the army; that no workman shall be dismissed as a result of the demands; that an eight-hour system supplant an nine-hour; that dismissed workmen receive four months' extra wages. Company declines to grant demands.

July 5—Demands for recognition of a union are made by Kawasaki workmen. One thousand men of the electrical department first affected. Kobe Iron Works also involved. Mitsubishi again refuses to accede. Strike at works of Takekawa Rubber Company.

July 7—Mitsubishi works closed.

July 8—Twenty thousand Kawasaki workmen strike and parade with red flags. Workmen and private police of the company fight.

July 12—Kawasaki workmen enter plant and expel foremen and superintendents. Executive committee assumes control. Riots at Mitsubishi yard.

July 14—Battalion of infantry sent to Kawasaki yard. Company announces closing of works for three days, half-pay to be granted the men. Strikers prevented by police and troops from entering yard. Kawasaki plant at Fukiai closed for three days.

July 19—Employes of government arsenals in Tokyo reported to be forming union. Light cruiser building at Mitsubishi yard flooded with salt water.

July 20—Mitsubishi president, Baron Iwasaki, refuses to meet strike committee.

July 21—Three hundred Kawasaki foremen join strikers. Mitsubishi closing extended indefinitely. Rubber strike in Kobe settled; victory for men.

July 22—Strike leaders of Kubota iron works, Osaka, discharged.

July 24—About one-third of the Kawasaki strikers return to work unconditionally. These men granted increase in wages. Mitsubishi yard reopened, but with few employes.

July 26—About 3500 employes of the Ishakawajima yard, Tokyo, organize union, a principal object being an eight-hour day.

July 27—An additional 4800 Kawasaki strikers return to work.

Japanese Building

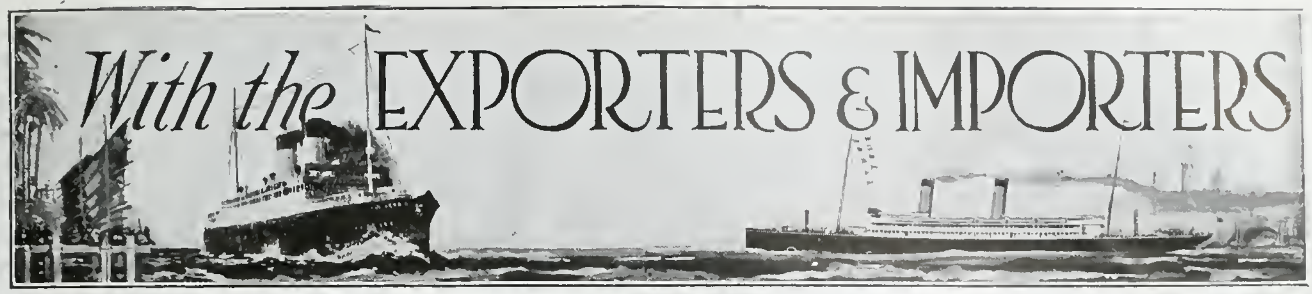
Seven million yen, approximately $3,500,000, is being expended by the Imperial Japanese Railways on new ferryboats. Two for the Shimonoseki-Fusan service are under construction at the Mitsubishi yard, Kobe, one to be launched in March, 1922, and the other in December of the same year. In these vessels Sperry gyroscopic stabilizers will be installed. Other and smaller vessels are building for the Aomori-Hakodate, Shimonoseki-Moji and Uno-Takamatsu services.

Two vessels of 1000 gross tons or more were launched during June, one of 2600 tons by the Osaka Iron Works for the Osaka Shosen Kaisha and the other of 6500 tons by Kawasaki. Ten vessels of 42,470 tons gross were launched during June, 1920. In the first six months of 1920 sixty vessels of 283,755 were launched, as against twenty-seven of 144,250 in the corresponding period of 1921. One vessel exceeding 1000 tons was to be launched in July and none in August and September.

The Iron and Steel Industry Encouragement Law passed by the last Diet became effective July 20. In spite of the Diet's action in remitting duties on shipbuilding materials, bounties are being granted on various kinds of domestic steel used in shipbuilding, the rate being 12 per cent ad valorem on billets and 15 per cent on different plates, shapes, tubes, etc. Values will be fixed by the minister of agriculture and commerce on the basis of import prices.

Should disarmament or restriction of naval construction be attained by the Washington conference, Japanese shipyards will be affected greatly. The depression in merchant shipping and shipbuilding has made naval work of much larger importance than it was a few years ago. The principal yards affected would be: Kawasaki, Mitsubishi, Uraga, Ishikawajima, Fujinagata, Osaka Iron Works, Yokohama Dock, Asano.

The Asano Shipbuilding Company, Tsurumi, has completed the electric-drive steamship Biyo Maru for the Toyo Kisen Kaisha. She is 400 feet by 53 by 22; has a loaded draft of 25 feet 9 inches, a gross tonnage of 5479 and a sea speed of 11 knots. She is of the shelter-deck type with machinery amidships. The Ljungstrom turbines drive a generator each, and the current is supplied to two induction motors that drive the propeller shaft through single gearing of the double helical tooth pattern. The turbines are of the radial-flow, double-rotation design and work with steam at 225 pounds, superheated to 650 degrees. The generators are three-phase alternating.



With the EXPORTERS & IMPORTERS

Steel and the Pacific

Business men of the Pacific Coast who are interested in reviving the movement of steel through their ports to the Orient apparently have only one course open. That is to obtain a railroad rate from Chicago to the Pacific Coast of about 60 cents as against today's rate of 71. Even a 9-cent reduction might not be permanently efficacious, but nothing less, in existing circumstances, offers hope. At the same time, while working for a 60-cent rate from Chicago, Pacific Coast exporters might as well reconcile themselves to the loss of all business originating in Pittsburgh. In the more remote future steel from that city might seek the overland route again, but not today or tomorrow.

$5 a Ton Trans-Pacific

At the present time the trans-Pacific steel rate is $5, a reduction of 88 cents having been made a few weeks ago. This rate approaches too closely to the cost of transportation for steamship lines to make any additional reductions, especially in view of the fact that Singapore and Saigon, which are not, in the old meaning of the phrase, Oriental ports, also are covered by the tariff. The overland railroad rate from Chicago is 71 cents, or $14.20 a short ton, the total being $19.20, plus various charges at Pacific ports. The Pittsburgh overland charge would be 80 cents a hundred, plus $5 trans-Pacific, or $21. These costs are to be compared with the following: Pittsburgh to New York, $7.60 a short ton, plus $12 steamship rate a long ton, or $10.70 a short ton, the total being $18.30. Pittsburgh to Philadelphia, $7 a short ton, the total rail and water being $17.70. Pittsburgh to Baltimore, $6.70 a short ton, the total being $17.40.

Even a cursory examination of these figures discloses the commanding position of Baltimore, to which not enough attention has been paid by trans-Pacific operators, most computations having been based on New York. But even in the case of New York it is evident that Pittsburgh steel enjoys a rate $2.70 cents less than that offered by the transcontinental-Pacific Coast routing; and for Philadelphia and Baltimore the differential is greater. These figures tell briefly why Pittsburgh must be foregone at this time.

Chicago Is Different

Chicago, however, is situated differently. Something might be accomplished in that district, in which are the great mills of South Chicago and Gary. The Chicago-Pacific Coast rate is $14.20 a short ton, the total rail and water charge being $19.20. Against this is to be set a Chicago-New York rate of 63 cents, or $12.60 a short ton; and the total is no less than $23.30. In brief, the differential against Chicago steel moving via a Pacific port is 90 cents a ton and via New York the differential is $5, Pittsburgh steel moving via New York being the basis of comparison in both cases.

What opportunity has Chicago steel to move to the Orient in these circumstances? Practically none. The United States Steel Corporation might choose to fill an order at Gary and absorb the freight differential, inasmuch as all quotations are on a Pittsburgh basis; but it is evident that such a course would be dictated by unusual circumstances and could not be expected often. The normal event would be for Gary to supply the domestic markets and for Pittsburgh to meet whatever foreign demand there might be.

The Only Hope

But if Pittsburgh is to fill all Oriental orders, the Pacific Coast is shut out of the business completely. Therefore, the Chicago rate structure must be rectified, so as to equalize its mills, as well as those of Birmingham, with Pittsburgh producers. In any such change Baltimore must be taken as the standard Atlantic port, since its railroad rate from Pittsburgh is the lowest. As was stated before, the total cost of moving a ton of steel via Baltimore is $17.40. If the present trans-Pacific rate of $5 is to be maintained, the transcontinental railroads could equalize Chicago-Pacific Coast steel with Pittsburgh-Baltimore by reducing their tariff to 62 cents, which, however, would leave the trans-Pacific lines with no leeway whatever short of cutting the $5 rate. For that reason 60 cents is suggested as giving a margin of 2 cents a hundred, or 40 cents a short ton, within which the trans-Pacific operator might move.

If the railroads can make a 60-cent rate, or even less, and then say in so many words to the steamship lines: "We have gone as far as we can go," in such an event the situation would be clarified and the Pacific Coast would know precisely what it could do in the face of any changes brought about by the Atlantic-Orient lines. If the ruling direct rate of $10.70 a short ton were reduced by an amount greater than the margin allowed by the railroad tariffs, then the trans-Pacific steamship lines would cease all effort to get business, knowing that the railroads could go no lower. To this scheme the objection might be made that the direct steamship lines would be aware of the irreducible minimum existing, and therefore would cut their rates again. So they might; and the Eastern railroads also might slash that Chicago-New York rate of 63 cents. What if either possibility developed into an actuality? The Pacific Coast would be in no worse a situation than today, when it gets no Pittsburgh steel.

$1 a Ton at Panama

Even the Atlantic-Orient steamship lines, however, cannot reduce their rates indefinitely. They have approached bedrock about as closely as have the trans-Pacific companies. Their steel tariff, North Atlantic to Far East, is $10.70 a short ton, from which must be deducted an average Panama Canal toll of about $1 a cargo ton, the net receipts from each ton of steel being $9.70. In order to earn this amount the steamship company must transport the steel 10,000 miles to Yokohama and even farther to Hongkong or Singapore, whereas the direct distance from Seattle to Yokohama is 4200 miles and from San Francisco to Yokohama 4600. In other words, the North Atlantic lines are receiving less a ton-mile than are the trans-Pacific carriers, although the latter are delayed longer in port to the mileage steamed at sea and port dues, etc., would be heavier in proportion to the cargo carried, inasmuch as voyages are shorter and calls therefore more frequent. (With reference to the Panama tolls a cargo ton: for June the average for all vessels was $1.02, for May 97 cents and for April 93 cents, although the Isthmian Line's Steel Ranger, which passed through the canal in June en route from New York to San Diego, paid only 48 cents tolls for every ton of cargo carried.)

In this discussion no account has been taken of tolls at the different ports, of greater or less marine insurance, of quicker dispatch or of delay in receiving ocean bills of lading when shipment is made via the Pacific Coast. All these elements would have to be weighed in any given case, but their interactions and reactions are too complicated for consideration here.

While practically no cargo is moving from Pittsburgh via the Pacific Coast, the Atlantic is shipping great tonnages. The following table shows the number of long tons moving from the Atlantic to the Orient via Panama during the first six months of the year:

Month	Long Tons
January	22,000
February	22,000
March	40,000
April	32,000
May	18,000
June	20,000
Total	154,000

Rail Rate Reductions

In connection with import and export rail rate reductions, details of which were published in Pacific Marine Review for August, the Western Pacific Railroad through T. Noel, foreign freight agent, has issued the following notice, dated August 12:

Proposed changes in import rail rates effective September 1. Tariff 30-G:

Rate basis 2 rates named in Tariff 30-G applying to Chicago and west will be amended so that they will also apply to Rate Basis 1 points, east of Chicago, on the following items: 325A, oils; 80, brooms; 106, cigars; 155, eggs; 250, hides; 335, palm kernels; 375, sago, tapioca; 415 skins and hides, rugs; 440, tallow; 460, tea dust; 501, wool, in grease; 40, antimony, metal or regulus; 85, bulbs; 135, copra; 175, fibre; 315, peanuts; 360, rattan; 405, silk waste, wild silk; 416, skins—sheet (dried); 455, tea; 480, toys; 502, wool, scoured.

Proposed changes in export rail rates effective September 1. Tariff 29-H:

Rate basis 2 rates, Chicago and west, named in Tariff 29-H, will be amended so that they will also apply from Rate Basis No. 1 points, east of Chicago, in the following items: 40, agricultural implements; 47, bottles; 55, canned goods; 60, chocolate; 65, dry goods; 70, glass; 75, glass; 85, road machinery; 87, ink; 150, lime; 155, machinery; 160, sewing machines; 172 motorcycles; 180, oil well supplies; 185, paint; 190, paper; 198, pianos; 200, plumbers' goods; 205, railway equipment; 210, railway equipment; 220, railway equipment; 225, roofing; 235 rope; 240, soap; 255, starch; 260, heating apparatus; 265, tires; 270, tobacco; 275, tobacco; 280, vehicles; 285, vehicles;; 290, vehicles; 292, vehicles; 315, all commodity.

Effect of Rail Reductions

The California Pacific Westbound Conference, through M. J. Mayfield, secretary, has compiled a comparison of through rates on various commodities as affected by the application of Rate Basis 2 to points east of Chicago, which will become effective September 1. This comparison discloses that of twenty-one principal commodities considered the advantage lies with New York in eleven and with San Francisco in ten. Generally speaking, the same condition would obtain if Seattle were set against Philadelphia.

In the following summary the amounts shown are the differentials a short ton enjoyed by New York or San Francisco on shipments originating in the interior cities named and destined to ports of the Far East. In order to ascertain the differentials, Mr. Mayfield added the rail and water rates of New York and San Francisco; the differences between the sums are the figures given:

Canned goods, Buffalo, San Francisco	$11.71
Dry goods, Carolina cities, San Francisco	10.55
Plate glass, Pittsburgh, New York	7.60
Road machinery, Indianapolis, San Francisco	3.87
Road machinery, Cleveland, San Francisco	1.07
Acetate of lime, Bay City, San Francisco	7.50
Machinery, Indianapolis, San Francisco	1.07
Machinery, Cleveland, San Francisco	1.07
Sewing machines, South Bend, San Francisco	14.27
Paint, Cleveland, New York	1.00
Paper, Franklin, New York	4.45
Paper, Wachusett, N. Y.	4.25
Paper, Holyoke, New York	7.05
Paper, Hamilton, New York	2.05
Railway cars, Berwick New York	7.35
Soap, Cincinnati, S. F.	6.90
Automobile tires, Akron, New York	2.98
Cigars and plug tobacco, Richmond, S. F.	9.40
Unmanufactured tobacco, Richmond, New York	19.70
Automobiles, Detroit, New York	26.06
Automobile chassis, Detroit, New York	17.72

That is, canned goods moving from Buffalo to Kobe could go over a transcontinental rail line through San Francisco and thence by water for $11.71 a ton less than by rail to New York and thence by steamship; and so on. Any exporter of either coast may see at a glance whether he has any opportunity of commanding certain business.

Rail Rates Cut

The Southern Pacific has issued the following:

Announcement is made by G. W. Luce, freight traffic manager for the Southern Pacific Company, that the company will publish a rate of 75 cents per 100 pounds on imported copra, and vegetables, cocoanut and fish oils, both import and domestic, from the Pacific Coast to all Eastern territory, Cincinnati, Ohio, and west. This is the second reduction in these commodities since June 1. This adjustment represents a reduction of from 30 to 50 per cent less than the present rate and will be of material benefit to oil importers and copra-crushing firms located on the Pacific Coast. The rate will be made effective as soon as the concurrence of the lines east of Chicago and the Mississippi River to this adjustment is received. There is a large volume of these commodities moving through Pacific ports, but the importers were threatened with loss of the business on account of Canal competition. The rate announced by Luce is expected to keep the bulk of the movement moving through Pacific ports.

Important reductions in rates on smelter products from Arizona points and Cananea, Mexico, to Baltimore and New England points via New Orleans or Galveston in connection with the Southern Pacific-Atlantic Steamship Lines (Morgan Line) have been published to take effect September 12. The rate to New England points has been reduced from $21.10 to $17.60 per ton and to Baltimore the rate is reduced from $20 to $16.50 per ton. These reductions apply only on shipments forwarded via the Sunset-Gulf route.

Conference Disbanded

After a life that was stormy if short, the Seattle Pacific Westbound Conference was disbanded August 15 and its office was closed. After that day there was no formal rate-making body in the Northwest. During the first few days following the dissolution, however, no rate-cutting was reported, although the situation had all the necessary potentialities of a tariff war. The Portland and California conferences remained unaffected, but they cast rather a dubious eye upon New York and the the North Atlantic-Far East Conference, which had not been enthusiastic about the Pacific Coast conferences for several months. Indications were, therefore, that trouble probably would arise in the Atlantic first, if it arose anywhere.

Fell Apart in May

As has been chronicled in these pages, the Pacific Westbound Conference fell apart in May, when the San Francisco committee disbanded. Although the latter was reorganized it refused to do more than work in harmony with the Northwest in rate-making, reserving to itself the right to fix its own tariffs. Seattle failed to persuade the San Francisco operators to return to the idea of one conference for the whole Pacific Coast; and Portland also fought vigorously against consolidation, with the result that Seattle was compelled to acquiesce in things as they were and to agree as best it might to the demands of the other cities. Pending formal reorganization of the Seattle body, the three conferences agreed to work together on transcontinental business and to advise one another of changes in local rates.

Several factors contributed to the first separation, but only one really was of compelling force. This was, to speak bluntly, the domination of the Canadian Pacific and Blue Funnel, which was manifested, according to the views of Portland and San Francisco, in several ways. For example, Portland operators asserted that the preponderating strength of Seattle lines in the old Pacific Westbound had resulted in the making of unfavorable rates on Portland's principal commodities, such as lumber, wheat and phosphate.

$5000 Forfeit Plan

With three separate conferences in existence and each going its own way, Seattle decided to apply to itself a proposal it had urged on San Francisco, which was that each member company post a bond of $5000 to guarantee compliance with tariffs and rules of the organization. All members agreed to do this except for Mitsui and the Blue Funnel, which agreed to abide by rates but stated that they would be compelled to refer the posting of a forfeit to their home offices. Weeks passed and nothing was done by either concern, and, of course, the others did not wish to post their own forfeits in the meantime. As a result, the conference became more disorganized, and finally broke to pieces.

New York the Danger

In some quarters the belief was expressed that there would be no rate-cutting until October, at least, inasmuch as most of the goods moving to the Orient had been contracted for up to that month. After that, however, something might occur. But New York is the real danger. During the many troubles of the Pacific Westbound Conference, the North Atlantic-Far East organization has become more restive and recently said baldly to the Pacific Coast that any more trouble would be the signal for independent action; in other words, that the Pacific need expect no working arrangement. In the old days of the Pacific Coast Oriental Tariff Bureau and the Pacific Westbound Conference the two coasts had kept in touch with each other through a New York committee of the Pacific, which had had practical control over all trans-Pacific rates on freight originating in the East, these tariffs being based on the ruling North Atlantic rates and those of transcontinental railroads, so that one coast would not be cutting under the other. But with the Northern lines out of all conferences there exists little prospect of the Atlantic being willing to work with San Francisco and Portland alone. Unrestricted competition for freight originating in Atlantic territory, therefore, is impending.

In addition to this situation, there are other disquieting aspects. One is the subject of rumors to the effect that the Shipping Board is tiring of the maneuvers of foreign lines and that it is preparing to fight, with rates as low as $2 a ton in prospect. At the present time, that is no more than a rumor.

Australasian Conference Formed

Formal organization of the Pacific Coast-Australasian Freight Tariff Bureau was completed at a meeting of companies in the San Francisco offices of the Shipping Board July 26. That such an organization was being made had been stated previously in these pages. The member companies and their representatives were: Union Steamship Company of New Zealand, Messrs. Back and King; Oceanic Steamship Company, Graham; General Steamship Corporation, Chidester and Wintermute; Yamashita Kisen Kaisha, Hitching; Canadian Government Merchant Marine and Canadian-Australasian Royal Mail Line (Union), J. C. Irons of the latter. This conference will exercise control over all rates from the Pacific Coast of the United States and Canada to New Zealand and Australia, which heretofore have been governed only by informal understandings between the lines concerned.

Headquarters of the Pacific Coast-Australasian Freight Tariff Bureau will be maintained in San Francisco, with J. H. Todd, Shipping Board conference secretary, as secretary. No offices will be maintained elsewhere on the Pacific Coast, the plan of the conference being that all Northern votes shall be transmitted by telegraph.

Several rate changes were made at the organization meeting. In these times of declining rates it is rather unusual to hear of an increase being made, but the new conference stepped out boldly and raised lumber from a flat rate of $20 to $21 to Melbourne and $22 to Adelaide. New Zealand ports and Sydney remain unchanged at $20. Indirectly dullness of business, however, made the increase possible, because the inability of sailing vessels to obtain return cargoes of coal at Newcastle makes the downward voyage in lumber unprofitable and consequently leaves the field to steamships. The latter had regarded the $20 flat rate as too low.

Among the other new rates announced were: sulphate of ammonia, $10; beans, $15 instead of $20; canned salmon, $16 instead of $18; doors, $15 instead of $17.50; inside finishing, $15 instead of $17.50; piano lumber, $15 instead of $20, weight or measurement; quicksilver, $1.50 a flask of 80 pounds; rice in parcels, $15; in lots of 100 tons or more, $12; strawboard, $10 instead of $15; wallboard, $12 instead of $15; machinery, overland, not more than 5000 pounds to the piece, $15, weight or measurement; more than 5000 pounds, $5 a ton less than the rate for pieces of corresponding weight as shown in the local tariff. These rates constitute a reduction of $5 on pieces exceeding 5000 pounds, which formerly took the local rate.

Steel Rate Broken

Under pressure of the North Atlantic-Far East steel rate of $13 a long ton, equivalent to $11.61 a short ton, the trans-Pacific tariff has broken from $5.88 to $5, the reduction being made effective by the California Pacific Westbound Conference

July 20. This new rate comes dangerously close to the actual cost of transportation.

Steel was not the only rate to break. Several changes were made, the most important of which were: copper from $10 to $8 weight; condensed milk from $12 weight or measurement to $10 weight; paper NOS from $14 weight or measurement to $12.50 weight; and rates were set on lead and lead spelter, $8 weight; plaster board, $8 weight or measurement; wallboard $10 weight or measurement. Cotton moved contrary to the downward tendency, being advanced from $8, standard or high density, to $10 weight.

Oriental Experience

Lindgren & Marr, commission merchants and importers and exporters, who organized their firm the first of the year, and who have established their quarters in the new Balfour building, San Francisco, have had much personal experience in the Orient, which should be valuable to American companies seeking to do business with the Far East.

J. L. Marr has had a wide experience in foreign trade, having been actively engaged in it for eight years. During three years of that time he was manager of the Kobe office of Hind, Rolph & Company, and later was manager of the Hind-Rolph foreign department in San Francisco, which position he left to organize the new company.

Charles J. Lindgren, the senior member, also has had experience in the Orient, where he was a member of the staff of the United States Shipping Board under J. A. McGregor. Campbell McGregor, the third member of the firm, also was in the Orient and was for six years with the Union Iron Works, San Francisco, of which his father, J. A. McGregor, was president.

Page Freight Report

San Francisco, August 24, 1921.

Since July 13, when our last circular was issued, business in chartering has continued very active, especially in barley charters on account of the drought in the United Kingdom. Steamers Keats and Shelly were chartered at 65/- for wheat from Portland and the steamer Woron at the same rate by the Northern Grain Warehouse Company. The steamer Vancouver by the Portland Flouring Mills at 63/9; the Cape Ortogal from Portland, also at 65/-, chartered by Balfour, Guthrie & Company, and the steamer Montrose by M. H. Houser at 65/-. The American steamer Nashaba chartered at 65/- for one port, 67/6 two ports from Portland, though the charterers' names are not yet given. The steamer Rubens from Columbia River to United Kingdom, etc., at 65/- for wheat by the Northern Grain Warehouse Company and the steamer Benrinnes chartered some time previously to United Kingdom at 60/-.

From San Francisco, Strauss & Company chartered steamer Grelisle for barley to the United Kingdom at 65/- for one port, 67/6 two ports; steamer Janelew at the same rate; also steamer Tancred at 65/- for one port and steamer Jose de Laringagua at 65/-; steamer Anglesea at 65/- for one port, 66/3 for two ports. U. S. S. B. steamer Narbo 65/- one port, 67/6 two ports. John Westrope & Company chartered the U. S. S. B. steamer Narcissus for barley to the United Kingdom at 65/- one port, 67/6 two ports; also Japanese steamer Koki Maru, same destination, same freight. Balfour, Guthrie & Company chartered U. S. S. B. steamer West Cusseta at 65/- and 67/6, and George Wills & Sons another U. S. S. B. steamer, as yet unnamed, at the same rate of freight, and all the different shippers took everything in sight on the regular liners for different United Kingdom or Continental ports at 65/-. In one case as high as 67/6 was paid for a thousand to two thousand tons to Avonmouth.

Chartering for lumber has not been as active as grain. A. F. Thane & Company chartered schooner W. A. West from the North to Callao at $18 a thousand and yesterday the Port Blakely Mill Company chartered the schooner William Nottingham from Puget Sound to Callao at $17.50. J. J. Moore & Company apparently have been the only charterers of lumber vessels to Australia, they having chartered the motorboat Malahat and the schooners Annie M. Campbell and the North Bend to Sydney, Melbourne and Adelaide on private terms. They also chartered the steamer Iquitos to three ports of discharge in Australia at a reported value of $17.50 and schooner Retreat to Adelaide at $16. In miscellaneous charters we have that of the steamer Romulus from Peru to Vancouver with a cargo of sugar at $9 and the American steamer Delco from the North Pacific to New York with a capacity of about two and a half million feet chartered by the Willapa Lumber Company at $18 a thousand.

As we close, the grain market seems to be inactive in England, with a result that steamers are now willing to accept 60/- to the United Kingdom and Continent.

PAGE BROTHERS, Brokers.

Beyfuss Freight Report

San Francisco, August 25, 1921.

During the past six weeks the freight market in general has shown no more activity than it has for a while past, although the inquiries are more numerous, where there was a dearth of inquiries before. Little actual business in a large way has been done except in grain exporting.

Rates in this trade have been ruling on a basis of 65 shillings for wheat from North Pacific to one port U. K., usual continent range, and quite a number of steamers have been taken for prompt and forward loading. These reported fixtures have been practically all British steamers, although two Norwegian and two Japanese have also been closed and half a dozen Shipping Board carriers.

The Shipping Board rate has been 65 shillings wheat and/or flour and/or barley and its vessels were fixed for prompt loading.

During the past week there has been a softening in grain freights and several foreign steamers are now reported fixed for wheat at 60 shillings, September/October loading from North Pacific to U. K. or Continent.

Lumber freights are still quite unremunerative from owners' standpoint, but three or four full sailing cargoes are reported to W. C. S. A. and Australia, $18 being nominally the rate for the first named ports; and $17 has been about the prevailing rate to Australia.

As we remarked above the general tendency shows more activity, but the importation of coals, copra and nitrate has been practically at a standstill.

C. BEYFUSS CO., Brokers.

Loss Record

According to the Liverpool Underwriters' Association, the number and total gross tonnage of vessels lost during June, 1919, 1920 and 1921, are as follows:

	No. Vessels	Gross Tonnage
June, 1921	18	35,925
June, 1920	14	29,666
June, 1919	12	17,494

Comparative figures of total losses for May are:

	No. Vessels	Gross Tonnage
May, 1921	13	27,659
May, 1920	26	51,632
May, 1919	15	23,178

About People

Joseph W. Powell, former president of the Fore River Shipbuilding Corporation and former vice-president of the Bethlehem Shipbuilding Corporation, will undertake the reorganization of certain departments of the Emergency Fleet Corporation, according to announcement made in Washington by Chairman Lasker of the Shipping Board. In commenting upon this announcement, Mr. Powell said that, contrary to impressions gained in many quarters, he had not been appointed a member of the Shipping Board. In fact, he had declined an invitation to become vice-president and general manager. What Mr. Powell has specifically consented to do is to give his services to the Shipping Board for a period of three months, without salary, on the distinct understanding that he is to have absolute authority to handle certain matters placed in his charge. These matters are the reorganization of the financial, auditing and sales departments, the last including sales of ships and shipyards. At the end of the three months' period he will be occupied with personal business matters that he had undertaken some months ago. Mr. Powell said that he accepted the responsibility only out of a sense of duty and to place what ability and experience he had at the service of the American merchant marine.

G. C. Williams, Sacramento steamer agent for the Southern Pacific Company's steamer division since August, 1912, has been appointed assistant superintendent of steamers for the Southern Pacific Company, succeeding F. A. Fish, who retired on July 30 after forty-five years' service.

Captain John Park has been appointed a pilot of Vancouver, B. C.

George B. Dunlap, for ten years contracting freight agent of the Great Northern Railroad in Seattle, has joined the Puget Sound office of the Atlantic-Gulf & Pacific.

D. Earle Brundage of Chicago has been appointed advertising director for the Shipping Board to succeed Herman Laue. Mr. Brundage will make a survey of the advertising situation before the adoption of a new policy by the board.

E. F. Townsend, agent of the Pacific Steamship Company at Singapore, has been transferred to Kobe, succeeding Ernest E. Johnson, resigned. H. M. Cavender, formerly chief clerk of the Kobe office, has been appointed assistant to J. B. Armstrong, agent at Manila.

George H. Kocherspeger has been elected chairman of the Delaware River Section of the Atlantic Coast Shipbuilders' Association for the coming year. J. K. Graham is vice-chairman and Clarence Samuel King secretary.

Admiral Benson has been delegated to represent the Shipping Board in conferences with private operators on labor relations. Other pending questions will be handled by commissioners as follows: Benson, sale of ships to foreigners; Plummer, advances of funds to operators; O'Connor, labor problems; Benson, allocation of ships; Plummer, value of wooden vessels; Benson, co-operation between the Shipping Board and the State Department; Plummer, relations with Interstate Commerce Commission; Lissner, insurance matters; Thompson, all claims other than those for construction; Chamberlain, relations with War Department.

William H. Collins, former assistant of hull construction, Harlan plant, Bethlehem Shipbuilding Corporation, has been appointed superintendent of hull construction. William A. Quade, former general foreman of the machine shop, has been made superintendent of machinery.

Captain Randall Rogers has been appointed master of the Los Angeles Steamship Company's Harvard, recently placed in the Los Angeles-San Francisco service. F. C. Dellegar is chief officer; Walter Madler, second officer; F. W. Muller, third officer, and L. J. Weld, fourth officer. Herman Broghman is chief engineer and Walter Nagel assistant engineer.

Captain Frank Mills, former master of the steamship Editor, has taken command of the West Canon, operated by Struthers & Dixon in the Puget Sound-Oriental service.

Commander H. C. Dinger, U. S. N., has been detached from his duties as inspector of machinery at the Fore River plant, Bethlehem Shipbuilding Corporation. He went to Fore River in 1918 as assistant to Rear Admiral McElroy and in 1919, when the admiral was detached for other service, he assumed the duties of inspector of machinery. He has been succeeded by Commander Carlos Bean, formerly at Cramp's.

Lieutenant C. D. Bishop, U. S. N., who has been assistant to Commander Jordan, U. S. N., supervising cost inspector at the Fore River plant since December, 1920, assumed duties on July 1 as cost inspector, while Commander Jordan has sailed on the Utah for a foreign station.

George E. Chapin, formerly of the claims department, Toyo Kisen Kaisha, San Francisco, has been made general freight agent.

Captain John Moreno, port captain of the Pacific Mail, San Francisco, has relieved Captain R. R. Drummond as master of the steamer Venezuela.

Edmund L. Woods, secretary of the Board of Marine Underwriters, San Francisco, sailed on the Royal Mail Steam Packet motorship Somersetshire for England August 19.

E. C. Rogers, guarantee engineer of the Newport News Shipbuilding & Drydock Company, who made a voyage from Baltimore to San Francisco on the 535 Golden State, fell while leaving the Hawkeye State a few days after his arrival and fractured his leg.

H. B. Taylor, vice-president of William Cramp & Sons Ship & Engine Building Company, Philadelphia, visited the Pacific Coast in August.

Kent Clark, manager of the Toyo Kisen Kaisha's Oriental Hotel, Kobe, arrived in San Francisco on the steamship Shinyo Maru in August. Mr. Clark formerly was purser of the Pacific Mail Manchuria and the China Mail China.

George A. Armes, president of the Moore Shipbuilding Company, Oakland, returned home in August from a trip to Washington, on which he wound up unsettled business between his company and the Shipping Board.

Prince Axel of Denmark, cousin of King Christian and of King George of Great Britain, had command of the East Asiatic motorship Asia when she arrived at Pacific ports in August. The prince is an officer of the Danish navy.

Captain Isaac Turppa, master of the tug Portland of the Port of Portland, has been appointed a Columbia River pilot. The number of pilots has thus been increased to twelve.

Henry C. Wiltbank has been appointed secretary of the National Merchant Marine Association, effective September 1. Mr. Wiltbank is well known to the marine world through his connection with the Philadelphia Press, New York Sun and New York Journal of Commerce, and more recently as shipping editor of the New York Tribune and editor of the Marine Journal. He also has been associated with the Atlantic Coast Shipbuilders' Association and the Committee of American Shipbuilders.

Morris Malkin of New York has been appointed manager of the chartering department of the Shipping Board.

John K. Caldwell, United States consul at Kobe, has been made Japanese secretary of the embassy to Tokyo, succeeding J. W. Ballantine, who becomes consul at Dairen. M. D. Kirjassoff, Dairen consul, goes to Kobe temporarily.

H. S. McKee, Jr., has been elected secretary of an organization to be known as the Los Angeles Steamship Agents' Association, recently formed at a meeting called by W. S. McPherson. Uniformity of practice will be one of the ends sought.

J. Harry Mull, president and general manager of the William Cramp & Sons Ship & Engine Building Company, Philadelphia, was elected treasurer of the Atlantic Coast Shipbuilders' Association to succeed Sidney Henry, resigned, at the monthly meeting of the administrative council of the association in Philadelphia August 8.

R. J. Ringwood of San Francisco has been appointed manager of the operating department of the Shipping Board, succeeding L. R. Rutter. Mr. Ringwood entered the employ of the Pacific Coast Steamship Company in 1899; went from that line to the Alaska Pacific Steamship Company as freight and passenger agent at Seattle; was traffic manager at Seattle and San Francisco from 1910 to 1916; became vice-president in the latter year and resigned the next. He was with Pacific Motorship and Pacific Freighters recently.

William J. Rogers, chief engineer of the U. S. S. B. Hawkeye State, operated by the Matson Line, was found guilty of incompetence and negligence in connection with that vessel's recent boiler trouble and was suspended after a trial before Inspectors Dolan and Turner, San Francisco. Other engineers were punished as follows: W. F. C. Davis, first assistant, suspension of license for three months; Berry Sturgeon, second assistant, one year; and Carl Hummel, third assistant, three months.

William O. Dunlevy, second assistant engineer of the U. S. S. B. Creole State, disabled on her latest trans-Pacific voyage, was accused on the liner's return to San Francisco of having instigated George Wing, an oiler, to place emery dust in the oil pumps. These men and one other were returned from Manila under arrest.

John T. Bloomer, formerly traffic manager of the Rolph Mail Steamship Company, has been appointed traffic manager of R. S. Silva & Company, general Pacific Coast agents of the Lindvig interests, which recently announced their reentry into the Pacific West Coast trade.

A. F. Mack has been appointed district manager, Shipping Board, New York, succeeding George W. Sterling. His jurisdiction will include New York, Philadelphia and Boston, although later he will have the entire Atlantic Coast, it is stated in Washington.

M. F. Cropley, assistant manager of the Pacific Steamship Company, in charge of San Francisco business, has been appointed manager of the Oregon district. This position is new. The late Frank J. O'Connor was agent at Portland.

In Eastern Insurance Circles

Hendon Chubb and Percy Chubb, of Chubb & Son, are making an extended business trip in Europe.

Ery Kehaya, president of the Washington Marine Insurance Company, is in Europe looking after the reinsurance accounts of his company.

Walter Wood Parsons, vice-president of the Atlantic Mutual Insurance Company, is another European sojourner.

Cecil B. Stewart is once more in active control of the brokerage firm of Frank B. Hall & Company.

H. C. Landwehr, treasurer and director of Frank B. Hall & Company, resigned August 1.

Frank H. Gasson has resigned as manager of the claims department of the United States marine branch of the Second Russian.

Eugene J. Coleman and Robert B. Jennings, underwriter and loss manager respectively in the firm of William H. McGee & Company, have resigned to open a marine office on their own account. The McGee office, which is one of New York's leaders, will continue the business as William H. McGee & Company. This was one of the most startling changes that Beaver Street has had in some while, both retiring gentlemen being members of the firm.

Deaths

Captain Thomas H. Peterson, retired mariner, in Seattle July 28.

Captain Ole Nielsen, in Coos Bay, Oregon, July 27.

Captain Harry H. Marden, the Puget Sound pilot who had charge of the steamship Governor when she was rammed and sunk by the West Hartland April 1, in Seattle July 20. The Governor disaster had much to do with his breakdown and death.

Captain J. S. Hellingsen, port captain of Hind, Rolph & Company, San Francisco, in San Francisco July 19.

Captain Harry Theilsen, who commanded the first Yukon River steamer to reach Alaska in 1898, was found dead at the bottom of the shaft of his coal mine in the Kobuk district, Alaska, July 24.

Captain Troels Smith, a well-known Pacific Coast mariner, in Mare Island Naval Hospital July 26.

Rear Admiral George Fink Katz, U. S. N., retired, in San Francisco August 9, at the age of 86.

Captain John L. Carlson, formerly a navigator in the coastwise trade, president of John L. Carlson & Company, salmon packers of Alaska, in Juneau, August 9.

Riga Reorganization

Trade Commissioner H. Lawrence Groves of Riga reports as follows to the Department of Commerce:

Through a complete reorganization effected on May 20, 1921, the former Second Riga Mutual Fire Insurance Company, originally organized in 1804, has now become the Riga Insurance Company, with a reported share capital of 5,000,000 German marks and a reserve fund of approximately 500,000 German marks, the latter represented partly by the company's home office building, Grosser Sandstrasse, 20, Riga.

The new company will underwrite all common forms of risk except life insurance, its undertakings being in charge of the three Riga firms, R. John Hafferberg, Wittrock & Schleicher, and the shipping firm of Helmsing & Grimm, which will handle its transport insurance. The reinsurance business of the company will be in the hands of the Munich Reinsurance Company (German), which has participated in the reorganization.

Bids Asked for Insurance

The Japan Advertiser publishes the following:

In tiding over the present shipping depression, it is important for shipowners to reduce their working expenses. They have already lowered wages as much as possible, and some of them are now trying to cut down insurance premiums. A certain shipowner in Nishinomiya invited tenders for the insurance of a ship of 8462 tons deadweight, built in 1916. The lowest rate was quoted by a certain marine insurance company in Osaka, with which the contract has been signed. It is said that the new rate is appreciably lower than that hitherto charged. This is the first time in the annals of marine business in Japan that a marine insurance contract for a ship has been made by public tender.

PACIFIC MACHINERY

LARGE OXYACETYLENE GAS PLANT

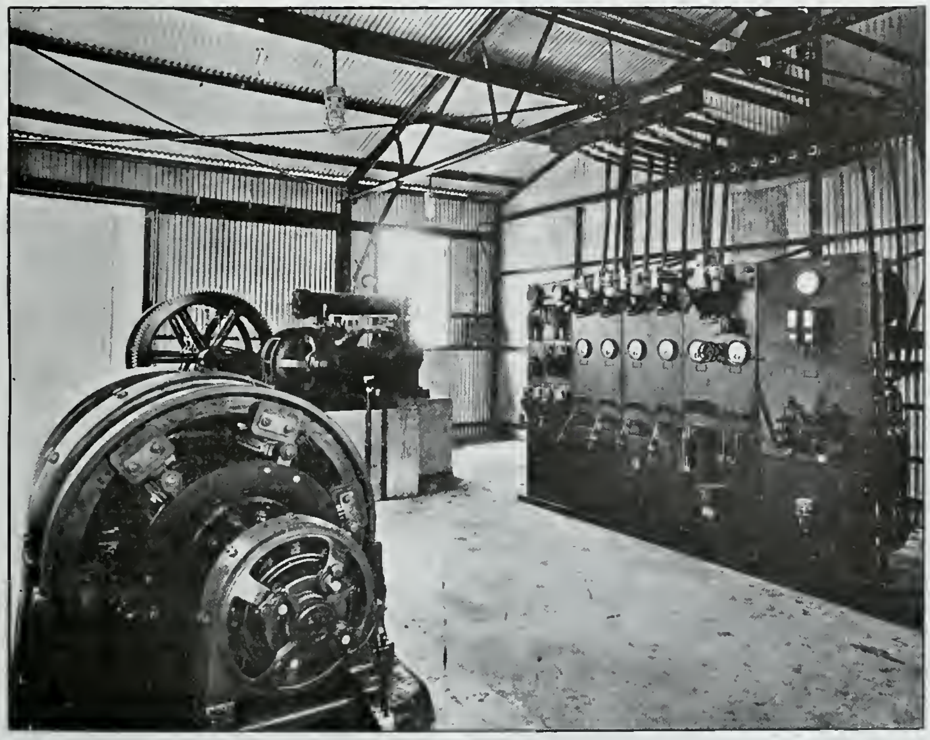
Exterior view of the oxyacetylene generating plant at the Los Angeles Shipbuilding & Dry Dock Company

EARLY in 1919 the Los Angeles Shipbuilding and Dry Dock Company installed in its shipyard on Los Angeles harbor the largest complete plant for generating oxygen and acetylene in Southern California. This plant consists of a cell house containing 200 Levin electrolytic cells supplied by the Electrolabs Company of Pittsburgh, having an hourly capacity of 1000 cubic feet of oxygen, and an acetylene generating plant with an hourly capacity of 2000 cubic feet of acetylene gas, together with suitable gasometers and oxygen high pressure tanks.

The acetylene plant was put into commission in March, 1919, but the oxygen plant on account of delay due to causes beyond the control of the shipbuilding company, was not ready for operation until late in July, 1920. The whole yard and shops were piped with mains so as to bring the gases under suitable pressure to all points where they might be needed for cutting and welding operations.

At the time that these plants were decided upon, Mr. H. Haas, a research engineer, was brought to the yard to carry on a campaign of education and training among the welders and cutters and to have complete charge of the erection and operation of the generating plants. Due to a careful supervision and training of the workmen and the weeding out of inefficients, the acetylene consumption at the yard dropped in 1919 from 6,023,900 cubic feet to 1,911,291 cubic feet, while oxygen consumption dropped from 10,192,000 cubic feet to 3,778,060. In 1920, due probably to the installation of the drydock and the taking on of a large amount of repair work, the consumption of oxygen rose again to 6,194,756 cubic feet, of which 2,787,616 cubic feet was of the firm's own manufacture, the oxygen plant having begun operation late in July, 1920.

The company and their research engineer, while of the opinion that great economies have been effected in the yard through the manufacture of gas in their own plants and distribution through pipes to the various yard stations, still figure that the leakage space in the high pressure oxygen can be further reduced. It is always noteworthy in surveys of plants such as these that the acetylene leakage is very small.



Interior view showing the control switchboard and the motor-driven compressor and part of one generating set

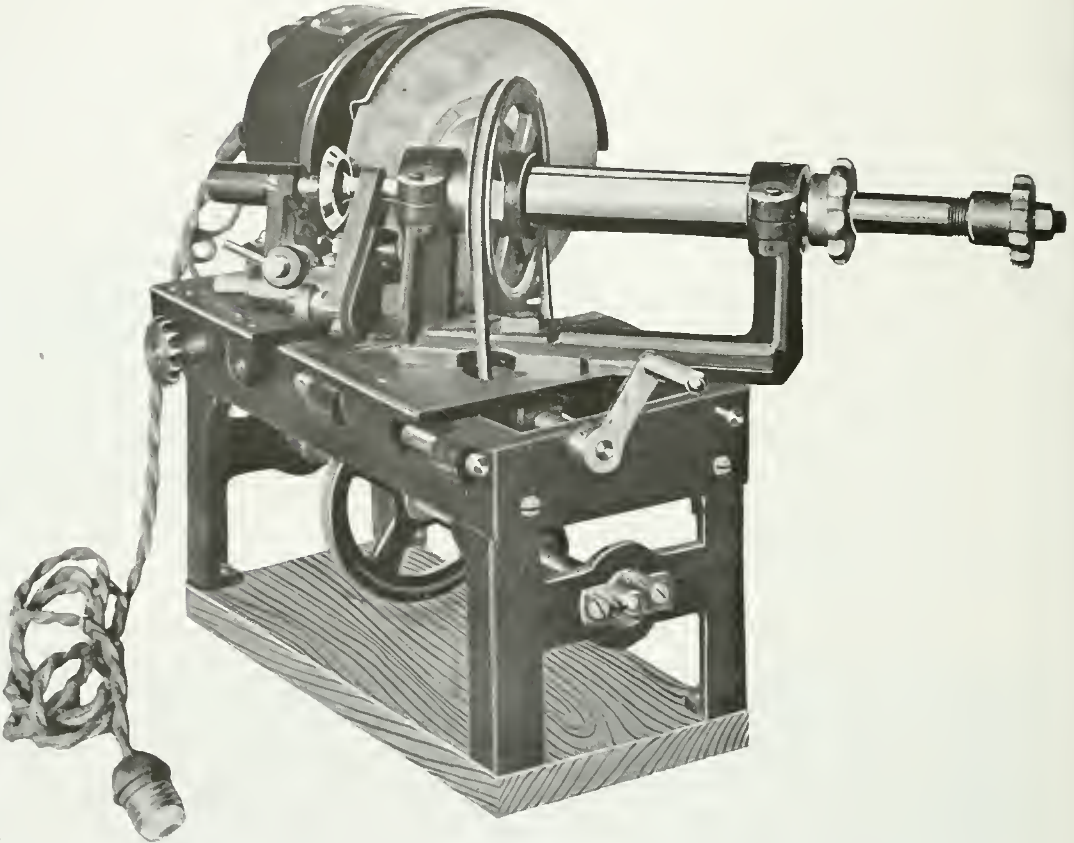
In this plant it does not exceed one per cent. This is due to two facts: first, the low pressure at which acetylene is carried; second, the fact that the unpleasant odor of acetylene makes detection of leaks an easy matter. Oxygen, on the other hand, being an odorless gas and carried at much higher pressure, has a much larger proportion of leakage.

Detection of Leaks

The Los Angeles Shipbuilding and Dry Dock Company has now under consideration the idea of imparting a stench to oxygen gas which, while in itself harmless, will give a very decided warning of any leak in the pipe lines. This is not a new idea, some European cities having carried out the practice in installations of poisonous gases, like water gas or natural gas, with considerable success.

The cost of handling the heavy cylinders in which acetylene and oxygen gas are supplied was no small factor in determining the installation of this gas generating plant and of the piping throughout the yards. In 1918 the Los Angeles Shipbuilding and Dry Dock Company had used 50,960 oxygen cylinders and 20,772 acetylene cylinders. It will be readily seen that the handling of this number of cylinders inside the yard itself would be no small problem and would constitute a very considerable item of expense.

UNIVERSAL VALVE FACING MACHINE



Universal valve facing machine

THERE has been a great demand in machine shops and garages for a portable machine tool for dressing the face of poppet valves such as are used in many types of pumps, in internal combustion engines, and in some forms of steam engines. We believe that this demand has been met by the Universal valve facing machine now being introduced to Pacific Coast markets by Harron, Rickard & McCone, San Francisco.

This machine consists of a grinding wheel and a spindle with a special Universal self-centering chuck which holds the valve stem at the correct angle for grinding the face of the valve.

The machine is portable and can be placed on the repair bench.

It is driven by a 110-volt induction motor using alternating current and having a rated speed of 3400 r. p. m.

The machine is furnished complete with 6 feet of lamp cord and plugs ready to attach to a lamp socket.

The abrasive wheel is mounted on the motor shaft, and the valve to be ground is held in a spindle which is driven from the motor through a reduction gearing and belt. This spindle is adjustable to any angle desired for the valve face.

One of the special features which makes the Universal valve facing machine desirable is the self-centering chuck. This chuck grips the end of the valve stem by the twist of a knurled knob. It is adjustable for any length of stem up to 7½ inches. The head of the valve is run on a center point or in an adjustable double-V steady rest. If the center mark on the head of the valve is true, the center point is used. If the stem near the head is true, the rest is used.

The capacity of the machine includes all valves up to 3 inches in diameter with stems from 5/16 to 7/16 inch diameter and up to 7½ inches long. A valve may be faced absolutely true with this machine in less than one minute.

Centrifugal Castings

A NEW development in foundry practice is the centrifugal method of casting which has been applied successfully in recent months to the production of iron, steel and nonferrous drums and cylinders.

The method consists of pouring the molten metal directly into a revolving die or form, and has resulted in producing castings with physical properties very much superior to those obtained with similar mixtures of metal by casting in the ordinary sand mold.

At Stokes Castings, Ltd., of Mansfield, England, they have now an average output of 2000 castings per week, largely piston ring drums and cylinder liners for internal combustion engines. This company has carried on a long series of experiments on mixtures, pouring temperatures, die temperatures, revolving speeds, etc., and they have been able to systematize their work with this method of casting so that in their latest machines, which are driven direct by a variable speed motor through a flexible coupling and friction clutch.

RECLAIMING WASTE

STRICTEST economy is necessary at the present time in all machine shops, and it will therefore be of interest to American shop operators to read the following description of the waste reclaiming plant of the Canadian National Railways at the Leaside shops, Toronto, taken from the Canadian Railway and Marine World. The waste here referred to is that used in the journals of railway cars, but the method of reclaiming is applicable to waste used for almost any purpose in our machine shops.

When the old waste is brought into the reclaiming plant, it is placed on grating, picked over, and separated into two portions, according to quality, the better grade being used subsequently for passenger car journal lubrication and the other for freight cars. The short ends, waste filled with babbitt, etc., go through the grating into a receptacle provided to receive them. The old waste is then placed in a tank. This is so constructed that the interior tank is surrounded by a jacket on the bottom and sides. The tank is of wood, the lining and jacket material being sheet iron.

Two pipes open into this jacket, or outer tank, one of which conveys cold water, forced in by a pump, and the other conveys live steam. The water level is shown by a water glass. A pipe conveying compressed air opens into the interior tank, connecting to a series of pipes at the bottom of the tank, each of which has openings along its upper surface. On top of this layer of pipes is a $\frac{1}{4}$-inch mesh screen, to keep the waste from coming into direct contact with the air pipes.

The interior tank contains oil, to which a certain amount must be added every time the reclaiming operation is performed. When the picked over old waste is put in, the cover is put down and secured and the air pressure applied. This agitates the mass of oil and waste, while the live steam entering the water in the outer jacket keeps it hot. This agitation goes on for from two to five hours when the air and steam are shut off, the waste taken from the tank and placed in the cylindrical compressor above the tank, where it is subjected to a pressure of 80 pounds a square inch, the oil draining back into the tank.

Following this operation the waste is again put on a grating and picked over to loosen it; it is then soaked in oil for five hour, after which it goes to the next tank and drains for six hours; then it is stored in tanks, all ready for use in the journal boxes. The drainage tanks for this last operation are so arranged that the oil can be easily drawn off and any sediment removed, and the oil can be used over and over again with a very small addition each time.

In connection with the oil used in the first operation, where the waste was subjected to the agitating action of the air jets, there are tanks, divided into three compartments, in which the oil is afterwards placed. Oil from the first compartment overflows into the second, and from the second into the third. Practically all of the sediment is drawn out of the first compartment, a little out of the second, and oil in condition to be used for a repetition of the operation is drawn from the third.

Waste which is not fit for further use in journal boxes is burned in an incinerator and the babbitt reclaimed. At the C. N. R. Leaside shops, the reclaiming plant handles the packing from approximately 4000 journal boxes a month.

OXYACETYLENE VERSUS DYNAMITE

SIX twelve-inch mortar carriages, part of the fortifications protecting Long Island Sound, are being removed from their positions of dignity at Fort Wright, Fishers Island, to the less glorious confines of a scrap yard at New London, Connecticut.

"Finis" was written officially to their service last spring when the carriages were sold by the government as scrap. The guns originally mounted on the carriages were remodeled for use with mobile artillery during the war.

The task of removing the scrap material is no easy one. Many of the sections are heavy and cumbersome. The purchaser has attempted to reduce the castings to portable size by blasting with dynamite. Blasting, however, has not proved satisfactory owing to the labor and time involved in moving the unwieldly metal from the concrete battery positions to open fields nearby, the danger of flying fragments hitting passing soldiers, and the inability of the charge to fracture the steel sections easily.

The difficulties experienced with dynamite led the purchaser to investigate the possibilities of the oxyacetylene flame in cutting metals, especially cast iron.

Demonstrations were made by an expert cutter of the Airco Engineering Service Department. These were so successful that it is expected the use of dynamite will be discontinued, and the oxyacetylene torch utilized to cut up the balance of the metal.

Airco oxyacetylene operator cutting 12-inch mortar carriage at Fort Wright, Fishers Island

PORTLAND'S TRAFFIC DEPARTMENT

H. L. Hudson, general traffic manager for the Port of Portland

WITHIN the past ten years the Port of Portland Commission and the Commission of Public Docks of Portland have expended upon the municipal terminals, harbor and channel improvements, and cargo handling facilities of that port, over $14,000,000. These bodies at the time of the beginning of the present depression in shipping realized that it was necessary to sell to the marine shipping world the advantages of Portland as a seaport in order that they might justify to the people of Portland this heavy investment in port improvements.

With this thought in mind in April, 1920, the commissioners secured the services of Harry L. Hudson as general traffic manager, and the results obtained to date indicate that the commissioners picked the right man to sell the facilities of the port. The whole of Mr. Hudson's experience has been closely related to traffic, either by railroad or steamship. He began as a messenger boy with the M. K. & T. Railway at Parsons, Kansas, and worked up through the various departments of the Union Pacific system until he was in active charge during 1917 of the operating and traffic department of that system in the Puget Sound territory, at the same time acting as dock agent of the Union Pacific dock at Seattle.

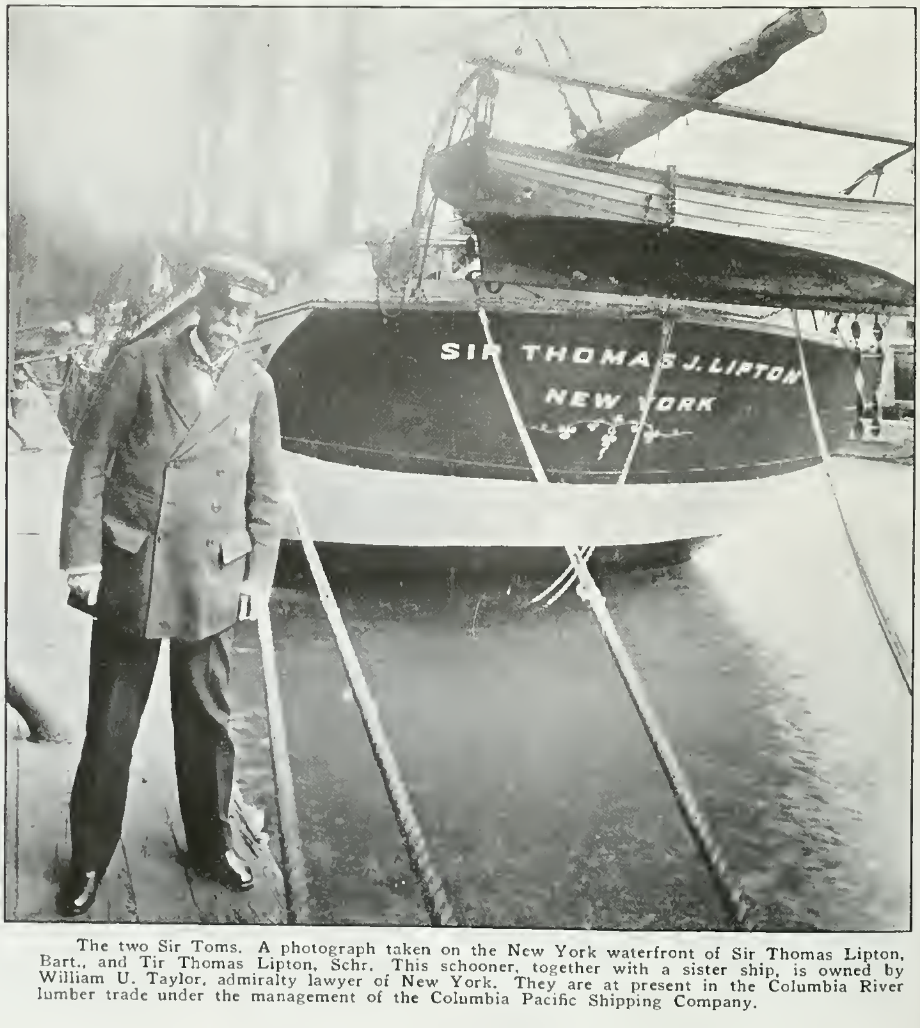
In all matters pertaining to marine traffic, rates, regulations, customs duties, negotiable documents, and trade exchanges, Mr. Hudson is recognized as an expert. This wide expert experience, taken together with a winning personality and an enormous capacity for work, has enabled Mr. Hudson to achieve great results already in his work for Portland. He has established an efficient organization in his department, has opened branches in Japan and on the Atlantic seaboard, and is at the present time in negotiation with representatives for Portland in South America, Australia, and New Zealand.

The foreign traffic agent under Mr. Hudson is Mr. W. G. Tait, who has headquarters at Kobe, Japan. Mr. Tait has had a very considerable experience in railway traffic and during the war in traffic management for the United States Shipping Board at Seattle. After the armistice he was placed at Shanghai as manager for the Shippers' Commercial Corporation.

The New York office of the traffic department is in charge of C. A. Lockhart, who has had a large experience in the employ of the Canadian Pacific Steamship Company, both in Canadian and Oriental ports.

R. M. Standish, manager publicity bureau of the traffic department of the Port of Portland

The traffic department has recently established a publicity bureau, whose activities will cover the publication of booklets, maps and other illustrated literature concerning the navigation of the Columbia River and the facilities of the Port of Portland. This bureau has been placed in charge of Robert Miles Standish, an experienced publicity expert. Mr. Standish has large plans under way for obtaining moving picture publicity for the Port of Portland.



The two Sir Toms. A photograph taken on the New York waterfront of Sir Thomas Lipton, Bart., and Tir Thomas Lipton, Schr. This schooner, together with a sister ship, is owned by William U. Taylor, admiralty lawyer of New York. They are at present in the Columbia River lumber trade under the management of the Columbia Pacific Shipping Company.

You're looking through Oxygen to read this!

BUT the gas your eye pierces—the gas you inhale at every breath—is but the *raw material* for Linde Oxygen.

Every trace of physical contamination must be eliminated, every chemical impurity removed before atmospheric oxygen is pure enough to meet Linde requirements.

To that end a great army of Linde scientists are constantly at work rigidly maintaining the high standard of Linde purity. To their efforts is due the absolute uniformity for which Linde Oxygen is famous.

A chain of seventy-five plants and warehouses insures prompt deliveries of any volume, anywhere.

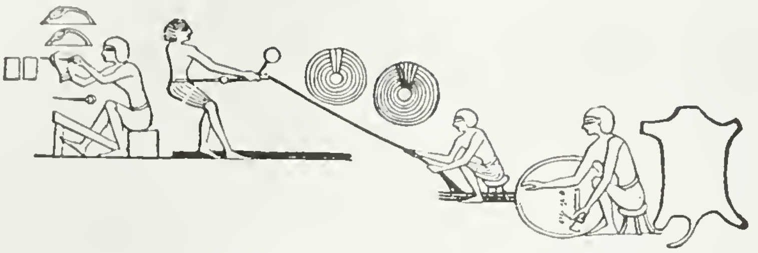
THE LINDE AIR PRODUCTS COMPANY
Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco

THE LARGEST PRODUCER OF OXYGEN IN THE WORLD

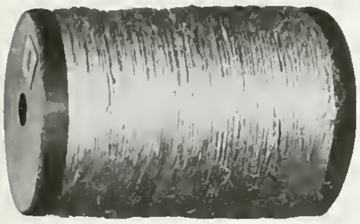
L-503-21

HOW MANILA ROPE IS MADE AND USED

On a recent trip to Portland a representative of Pacific Marine Review had the privilege of inspecting the rope works of the Portland Cordage Company, a modern factory splendidly equipped for the manufacture of manila ropes and hawsers. Through observation and questions he there gleaned the following interesting rope facts, which are here passed on for the benefit of our readers.



Rope making in the time of the Pharaohs



Rope is one of the oldest implements used by man. It was probably first made of skins of animals, later from vines and finally from different varieties of fiber. The process of manufacture has been practically unchanged for centuries, although there has been great improvement in late years in the machines used for carrying out the process.

Though many countries have produced fiber suitable for rope making, the Abaca fiber, commonly known as manila hemp, produced in the Philippine Islands, gives the most serviceable rope for present-day uses.

This fiber comes into our ports in bales weighing about 270 pounds. These bales are opened at the factory and the fiber is combed out, cleaned and fed by hand into a machine called a breaker, where it is oiled, re-combed, the hanks broken up, and emerges as a continuous ribbon or sliver of fiber. This process is repeated until the sliver emerges from the finishers drawn to about the size of a man's finger.

It is now ready for spinning, generally with a right-hand twist, in yarns of various sizes. These yarns are the basis for all ropes. They must be true to size and free from dirt, tow and fiber bark. The yarn is wound on bobbins holding about ten pounds.

The next step is the formation of rope strands. The strand is made from a number of yarns, the number depending upon the size of rope desired. These yarns are formed into the strand with a left-hand twist and the strands are then laid together into a rope, three or more being used, with a right-hand twist, this reversal of twist preventing the untwisting of the rope. If the proper care has been used in the process and the fiber has been well cleaned, we will now have a first-class manila rope or hawser.

Considerable care must be taken of this rope both in its storage and its use, or it will quickly be ruined. The storeroom should be dry and well ventilated. A damp room will cause dry rot, a hot dry room will make the rope brittle, in which case it will wear quickly on the pulleys. Care should be taken that no acid of any kind comes in contact with any rope. A very slight amount of acid on the boards of the floor will be absorbed by a coil of rope and several courses of the coil will be damaged. In using rope be sure to have blocks of ample size to allow for the swelling of the rope when wet.

Dirt in a working rope will very quickly ruin the rope. For this reason, and to prevent rotting, ropes should never be put away wet and dirty, nor should they be left on the floor to dry, but should be cleaned and put on a rack or grating to allow free circulation of air. Use the largest sheaves possible with a running rope so as to minimize internal friction.

In using the rope on a capstan or dolly, see to it that the rope is thrown on at different times in alternate directions. If thrown on in the same direction continuously the rope will gradually lose its twist. Always allow an ample factor o safety, avoid sharp bend while under strain and i general use common-sense i rope treatment.

The Portland Cordage Company, Portland, Oregon, ha achieved a splendid reputation for the dependability o their manila ropes and hawsers. This is evident fro the following table showing the results of tests carried out by the Federal government on ropes supplied t the Panama Canal Commission during 1920. It will b noted that in every instance the strength of the manila ropes was well ahead of the specifications, the percentage of excess strength varying from 9½ to almost 30 per cent. In a series of tests covering such a large quantity of rope and such a wide range of sizes, this is quit remarkable.

Tests of rope sold to the Panama Canal Commission in 1920 by the Portland Cordage Company:

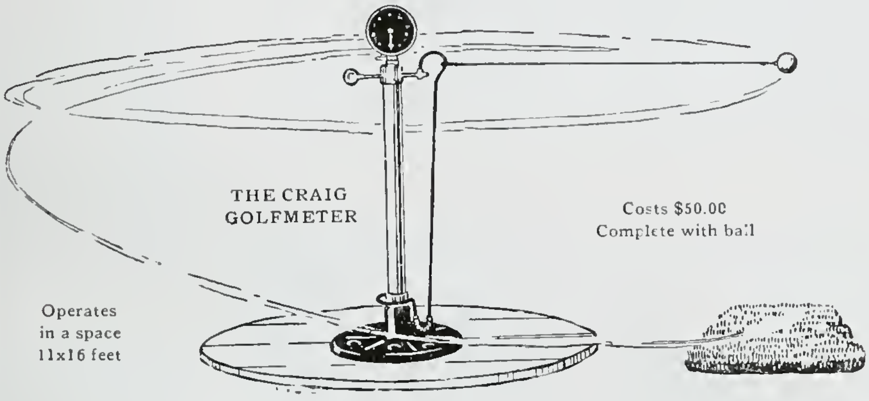
1200 foot Coils	Size ins.	Wgt. lbs.	Average wgt. per coil lbs.	Est. govt. wgt. lbs.	Our break lbs.	Required break lbs.	Over per cent
257	¼	6,129	23 8	24	843	700	20.4
485	⅜	22,780	47.4	50	1,656	1,450	14.2
330	½	28,407	86.1	90	2,857	2,450	16.6
280	⅝	42,335	151.2	160	4,833	4,000	20.8
400	¾	78,246	195.6	198	5,843	4,900	19.3
246	⅞	66,406	270	270	8,478	7,000	21.0
505	1	159,734	316.3	324	10,603	8,200	29.3
330	1¼	164,042	494.0	504	15,770	12,500	25.6
161	1½	113,705	706.0	720	20,807	17,500	18.2
37	1¾	38,148	1031.0	1080	30,080	25,500	18.0
190	2	239,627	1261.2	1296	34,932	30,000	16.4
75	2½	148,227	1976.4	2016	50,880	43,500	16.9
5	3	13,871	2774	2916	66,800	61,000	9.5
3	3½	11,525	3841.7		101,900	82,000	24.2
3304		1,133,182					

The above deliveries were on Panama Canal Commissions's contracts as follows:

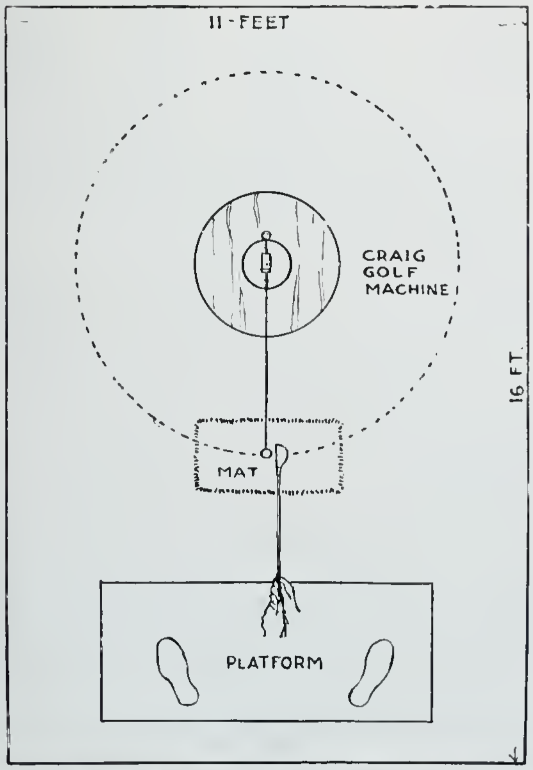
Circular 1261	Washington order No. 89451
Circular 1275	Washington order No. 90818
Circular 1285	Washington order No. 91953
Circular 1312	Washington order No. 94774
Circular 1359	Washington order No. 98856
Circular 1365	Washington order No. 99080
Circular 1396	Washington order No. 101461
Circular 1408	Washington order No. 102712

When golfers travel they miss their golf—Unless the ship carries a Craig *Golfmeter*

You can make your ship a golfers' paradise at little cost with this wonderful machine—takes up little space. Everybody enjoys it.


THE CRAIG GOLFMETER
Costs $50.00 Complete with ball
Operates in a space 11x16 feet

Golf nowadays is so tremendously popular that a large and important percentage of every passenger list practically demands some form of deck golf on ocean going voyages.



The Pacific Mail Steamship Line after a twenty-day voyage of the S. S. Empire State with a Golfmeter on board are now equipping all of their larger boats with Golfmeters. The Taiyo Maru of the Toyo Kisen Kaisha Line is en route to the Orient at present writing with a Golfmeter on board. The Matson Line is equipping the S. S. Hawkeye and the Buckeye State with Golfmeters.

The Pacific Steamship Company is equipping its three big boats with Golfmeters as fast as they come into port and are putting one on the President to try out its feasibility on shorter trips.

These big steamship companies have found the machine to be of intense interest to their passengers, not only adding pleasure to the trip from a games and competitive standpoint, but almost an essential on shipboard for the opportunities it affords to golfers traveling, all of whom wish to keep their golf up to standard through daily practice.

If your local dealer cannot supply you, write us direct.

Craig Golfmeter Co.

590 Howard Street San Francisco

10,500-Ton Tank Steamers Refitted with De Laval Double-Reduction Gears and Turbines

An installation of propelling units of more than usual interest has been made recently by the Atlantic Refining Company in the first of five of their 10,500-ton tankers christened W. M. Burton, Herbert L. Pratt, J. E. O'-Neill, W. M. Irish and H. C. Folger. These tankers were built in 1917 and 1918 and the main dimensions are as follows: Length, 435 feet; beam, 56 feet; mean draft, 27 feet; depth of hold, 33.6 feet.

A change in propelling equipment was considered advisable, and an order was placed with the De Laval Steam Turbine Company to build five compound double-geared units for these vessels. The rating of the original geared turbine propelling units was 2600 horsepower, and in making the change the Atlantic Refining Company decided to increase the horsepower rating of the units somewhat in order to obtain higher speed from the tankers.

Turbines

The new propelling units rated at 3300 horsepower each, and designed to give the tankers a speed of 11 knots, consist of cross-compound turbines of the De Laval impulse type divided into high pressure and low pressure sections and connected to the single screw through a set of double reduction one plane speed reduction gears. Each turbine delivers its full power at a speed of 3200 r. p. m. The reduction of speed from that of the turbine to that of 90 r. p. m. on the propeller is accomplished in two steps, making a total reduction ratio of 35.5 to 1.

These turbine elements are so arranged that they can be operated independently of each other in case of emergency by means of a very flexible throttle control. The high pressure turbine element for ahead operation is equipped with one velocity stage and seven pressure stages. The low pressure element for ahead operation consists of six pressure stages. A reversing element located in the high pressure turbine operates in series with a reversing element located in the low pressure turbine.

Full power is developed at a steam pressure of 200 pounds, with 50 degrees F. superheat and a vacuum of 28 inches. Each turbine section develops one-half of the full rated power for running ahead. The astern elements develop two-thirds of the full ahead torque.

Governor

Steam is admitted through a strainer to a valve under control of speed governors located on the forward end of both high and low pressure turbines. These governors are set to bring the governor valve into operation when the speed reaches 10 per cent above normal. When brought into operation this governor does not entirely cut off steam as an emergency trip would do, but holds the speed below a safe limit without shutting down the unit.

From the governor valve steam passes into the ahead or astern nozzle of the high pressure section, thence through the stages of that section, thence to either the ahead or astern nozzle chambers of the low pressure section, and through that section into the condenser.

The maneuvering valves are of the balanced vertical spindle type, and control the steam to the ahead and astern elements of the turbine. These valves are operated by hand wheels and are interlocked so that only one can be operated at a time. Hand valves are installed for further controlling the steam supply to the first stage nozzle of the high pressure section.

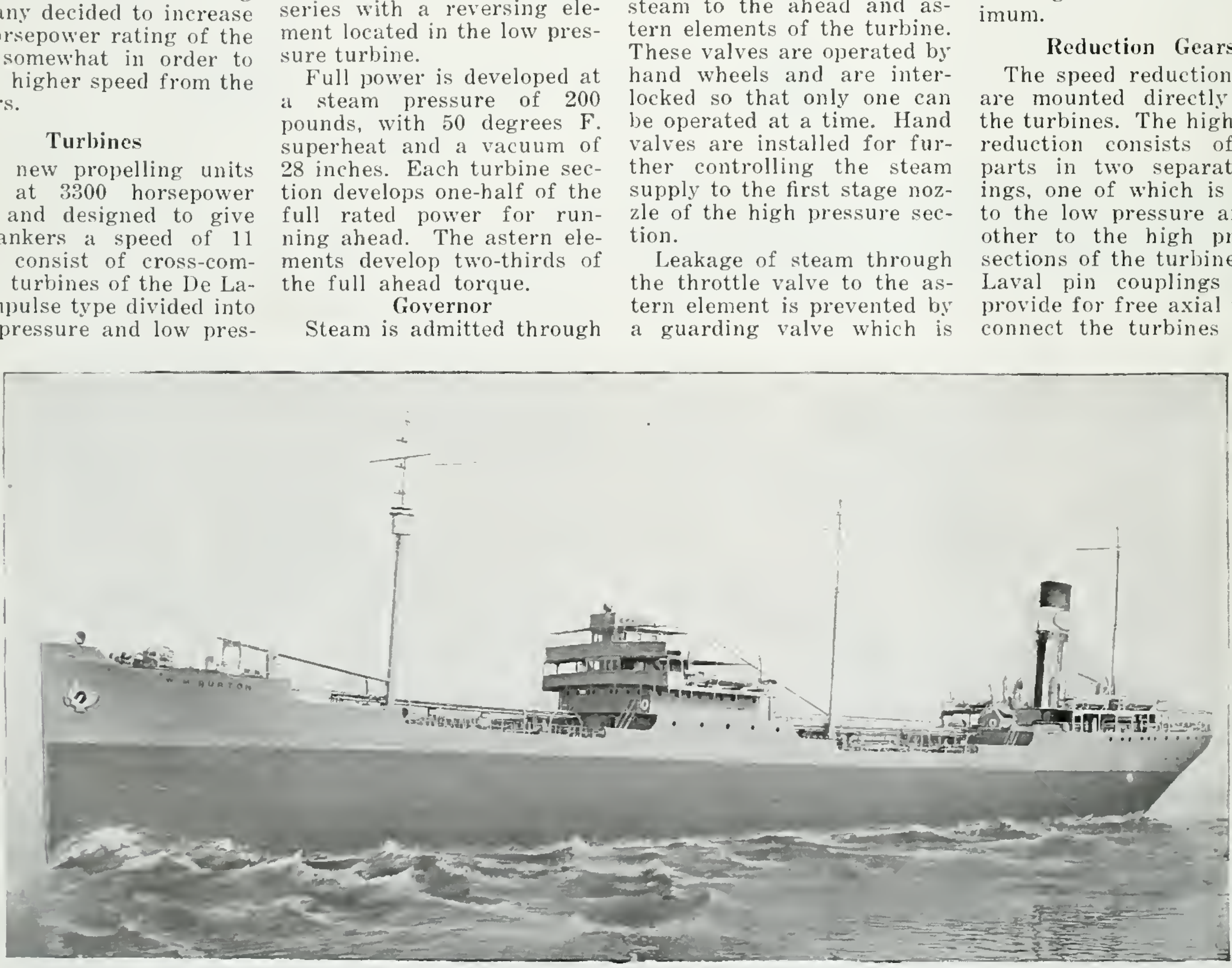
Leakage of steam through the throttle valve to the astern element is prevented by a guarding valve which is controlled from the main operating platform.

The piping between the two turbine sections is so constructed that the operating engineers can easily make steam supply connections to operate either section separately in case of emergency.

The turbine case is supported in such manner that it is free to expand in all directions without changing the position of the axis, so that the center line of the wheel case and the center line of the shaft coincide under all conditions. It is, therefore, possible to start the turbine quickly and safely, without danger of rubbings, vibration or other troubles due to distortion by heat. Ample bucket clearances both axially and radially are provided so that the danger from internal rubbing is reduced to a minimum.

Reduction Gears

The speed reduction gears are mounted directly abaft the turbines. The high speed reduction consists of two parts in two separate casings, one of which is bolted to the low pressure and the other to the high pressure sections of the turbines. De Laval pin couplings which provide for free axial motion connect the turbines to the

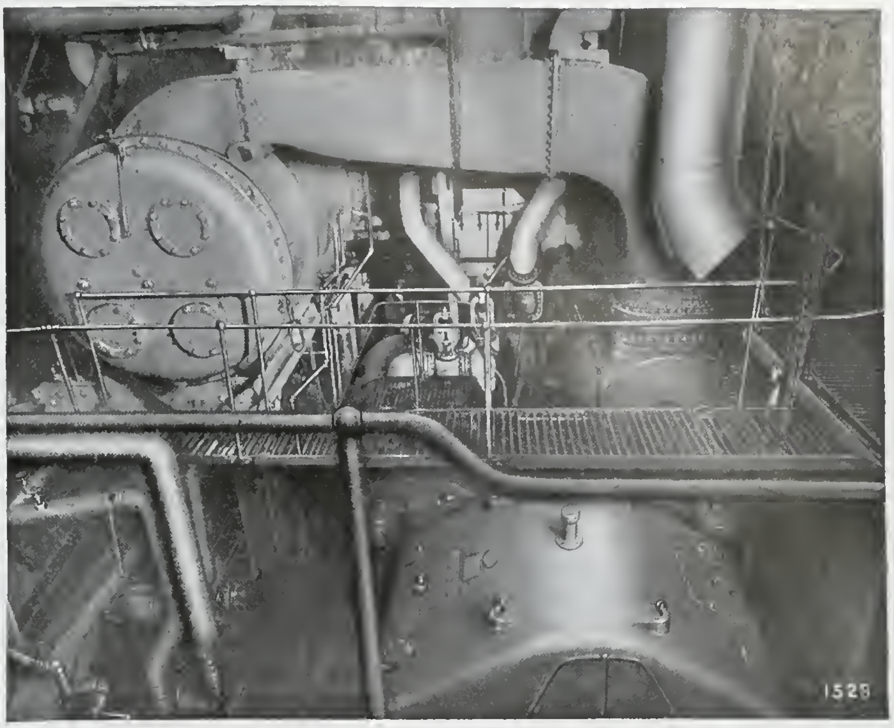


10,500 ton tanker W. M. Burton, length 735 feet, beam 56 feet, mean draft 27 feet, depth of hold 33.6 feet high speed pinions. The low speed gear with pinions is contained in one casing. The high speed and low speed gear cases are entirely independent of each other, the high speed gears being connected to the low speed pinions by means of a De Laval rubber bushed flexible coupling which gives proper compensation for any slight inequalities of alignment.

Both high speed and low speed gears are of the standard rigid De Laval type designed for low tooth pressure and ample factors of safety. The pinions are made from nickel steel forgings and the gears consist of cast iron centers upon which are shrunk seamless rolled steel bands in which the gear teeth are cut.

The general details of gear construction are in accordance with standard De Laval practice and similar to the general details of the 2,000,000 horsepower of marine gears that have been produced by the De Laval Steam Turbine Company and which without exception have been highly successful in operation.

In order to obtain quiet operation, De Laval gears are carefully cut on gear-cutting machines specially designed by the De Laval company. The involute shape of tooth is used which gives a true line contact of each tooth so long as the tooth is in mesh. After cutting, the teeth are carefully polished by a special process to remove scratches and inequalities left by the cutting tool. This polishing must be done by mechanical means and not by hand scraping or filing. All parts entering into the construction of the propelling units are manufactured to limit gages and are interchangeable. This feature will appeal particularly to marine engineers.



Condenser, Gear Case and Turbine from upper grating engine room S. S. W. M. Burton

Successful Operation

The operation of these propelling units was uniformly successful on the trial trip of the W. M. Burton and a speed of 11.77 knots was obtained.

Since the trial trip the W. M. Burton has been in continuous service and the propelling equipment has operated to the entire satisfaction of the owners. The reduction gears are quiet in operation and all parts of the unit operate without heating or vibration.

The J. E. O'Neill has also been placed in service and the propelling units for the Herbert L. Pratt, W. M. Irish and H. C. Folger are now being installed and the vessels will be placed in service immediately.

On account of the anticipated low steam consumption the original condensing equipment which was installed in connection with the original 2600 horsepower propelling units was not changed as the total steam consumption of the new units rated at 3300 horsepower was not greatly in excess of the total steam consumption of the original 2600 horsepower units. On the trial trip the condenser was found amply large to take care of all the steam used by the new unit and very satisfactory vacuum was obtained.

TRADE LITERATURE

Seven Centuries of Brass Making. Bridgeport Brass Company, Bridgeport, Connecticut, 1920.

This handsomely bound book of 75 pages gives a brief history of the ancient art of brass making and its early method of production as contrasted with the present electric furnace process. Some very interesting old prints are reproduced, running back to the beginning of the fifteenth century, while the text carries the reader back to the ancient Egyptian copper and brass workers of 4700 B. C.

After this historical introduction the booklet goes on to an analysis of the problems of brass making and to the history of the efforts made by the Bridgeport Brass Company in the solution of these problems, leading up to their present electric furnace equipment and machinery for drawing brass in all kinds of special shapes and sections.

The Signode System of Nail-less Box Strapping. Signode System, Inc., manufacturers, 564 West Adams street, Chicago.

A 12-page pamphlet describing the method of fastening box straps with a sealed joint and without the use of nails. The system includes a patented process, patented joints, and patented tools for the application of the joint. The tools include a stretcher and a sealer. The steel strap is stretched onto the box under high tension and sealed under tension so that all strains or blows upon the box are transferred to and absorbed by the steel joint and do not cause loosening of the box nails. This system is also adaptable for the binding of all sorts of bales, fibre containers and loose articles, such as automobile tires, stove parts, bundles of catalogs, etc. It is claimed that this system has acted as a deterrent of pilferage.

Small Tool Catalog No. 46. The GTD Corporation, Greenfield, Massachusetts.

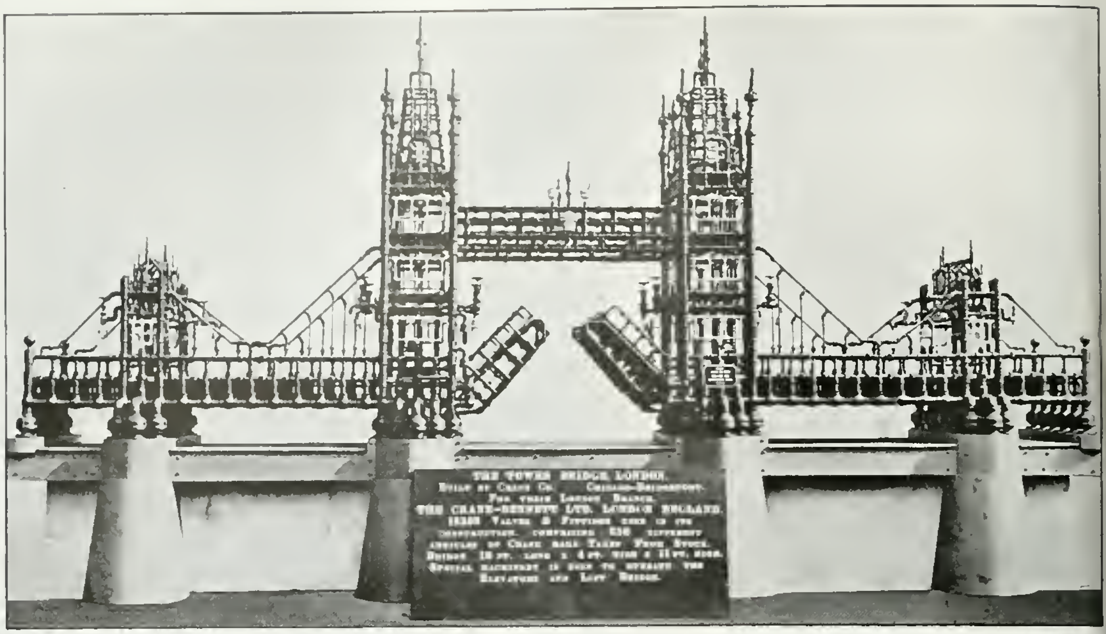
From the frontispiece depicting the plants of this largest manufacturer of small tools in the world, to the seventy or more pages of tables and useful information at the back of the book, this catalog contains a great deal that is of interest to the user and designer of tools and machinery. Some of the tables are new and especially instructive.

The tools described include screw plates, taps, dies, drills, reamers, milling cutters, bits, arbors, countersinks, hobs, tap and drill kits, mandrels, sleeves, sockets, stocks, tap wrenches, pipe vises and pipe wrenches.

A copy of this book will be sent to any address provided the name of this publication is mentioned.

A UNIQUE BRIDGE MODEL

THE small photograph attached shows a picture of the Tower Bridge in London, England. The large photograph shows the same bridge made of Crane valves and fittings.



This novelty was built at the Bridgeport, Connecticut, works of Crane Company and the only guide used throughout the entire work was the postal card view of the original bridge. This bridge is now on display at the Crane exhibit rooms, 23 West Forty-fourth Street, New York, and later will be shipped to Crane-Bennett, Ltd., London, England.

Fifteen thousand three hundred and fifty-eight pieces taken from regular stock, comprising 230 different kinds of elbows, tees, crosses, nipples, valves, etc., were used in building the bridge. Sixteen thousand two hundred and fifty-one joints were required to make up the fittings, and it is worthy of note that not one left-hand thread was used in the entire structure.

The bridge is approximately 19 feet long by 11 feet high by 4 feet wide. The spans are 57 inches wide. It is of the roller lift type, having four towers, each tower being provided with one elevator. The lifts are 22 inches long by 30 inches wide.

The elevators are 6 inches square by 8 inches high; the upper part of the elevator cage being made by using a brass floor flange with a plug screwed in, into which the cable used for raising and lowering the elevator is fastened. The men operating the elevator are represented by reducers, nipples and caps.

The towers are neat in construction and well proportioned, having four spires—one on each corner. These spires are neatly constructed by the use of malleable iron reducers, caps and cast iron flange unions.

The cables connecting the towers to the approaches are made up of nipples, tees and 45-degree elbows.

Each approach is provided with two clocks bearing the name of Crane-Bennett, Ltd.

The lifts and elevators are raised and lowered by specially devised machinery. The reversing is done by an unusual mechanical movement and no clutches are used in its construction.

The bridge is illuminated by thirty-six lights, eight being red and green for controlling traffic, four of which are used for navigation and four for traffic on bridge. When the bridge is closed the red light flashes and the green light extinguishes to show that the bridge is closed to navigation. At the same time, the green lights open traffic on the bridge. When the bridge is open the green light flashes to navigation and the red light to traffic on the bridge. Eight hundred feet of wire was used to carry out the electrical effect.

In the sidewalks there are 1600 right-hand close nipples together with numerous galvanized tees, crosses and elbows. This has offered a great amount of speculation as to how the elbows, tees and crosses were made up with standard right-hand close nipples, each fitting being not more than 1/16 inch apart, and is worthy of consideration.

The curb separating the sidewalk from the roadbed is represented by galvanized nipples slotted and slipped over a tongue which holds an amber glass roadbed.

The bridge is mounted on skids covered with granite packing, painted a wavy green. When looking through the amber glass roadbed onto the green granite packing it gives a very good effect of the witching waves.

The shades on the arc lamps are made of galvanized malleable iron reducing nipples.

Those who have had an opportunity to inspect the bridge speak highly of it, and it is indeed an accomplishment of which Crane Company may well be proud.

Oil Bunkering Facilities

THE Union Oil Company of California has been largely extending the facilities it offers to shipowners for the bunkering of vessels with either fuel oil or diesol at both domestic and foreign ports of call. Through the courtesy of the company we are enabled to present to our readers the following list of ports at which Union Oil Company's products are available for marine bunkering. These facilities are being constantly extended to other ports:

Union Oil Company Bunkering Ports for Fuel Oil—Vancouver, B. C.; Seattle, Wash.; Portland, Ore.; Astoria, Ore.; Oleum, Calif.; San Francisco, Calif.; Port San Luis, Calif.; San Pedro, Calif.; Wilmington, Calif.; San Diego, Calif.; Honolulu, T. H.; Balboa, C. Z.; Iquigue, Chile, S. A.; Antofagasta, Chile, S. A.; Taltal, Chile, S. A.; Mejillones, S. A.; Tocopilla, Chile, S. A.; and Valparaiso, Chile, S. A.

Union Oil Company Bunkering Ports for Diesol—Vancouver, B. C.; Seattle, Wash.; Portland, Ore.; Oleum, Cal.; San Francisco, Calif.; San Pedro, Calif.; Wilmington, Calif.; Honolulu, T. H.; Balboa, C. Z.; Antofagasta, Chile, S. A.; Valparaiso, Chile, S. A.

Pamphlet TX, Pawling & Harnischfeger Company, Milwaukee, Wisconsin.

This pamphlet describes and illustrates a new attachment known as the skimmer boom, which is designed as an additional boom for the standard P. & H. 205 or 206 excavator cranes. By replacing the standard boom with this new attachment the crane becomes an efficient road-grading machine. The pamphlet includes data and operating cost figures on a road grading job done by a contractor with this apparatus. These figures show a remarkable saving over ordinary scoops and plows.

The boom can be installed readily in a few hours on the field and is interchangeable with the shovel attachment brought out earlier this year, or with the standard boom on either style of crane, making this crane almost instantly available for road grading, tearing up of old roadbed, shovel excavating, back filling, pile driving, or all-around material handling with grab bucket, drag line bucket, scraper, electro-magnet, sling chains, or grapples.

THE N M Co

"Straightening out like a Fiddle String"—Naco Chain HELD

THE experience of Captain Jamison as told in his letter of April 11th has been the common finding whenever Naco Chain has been put to an emergency test.

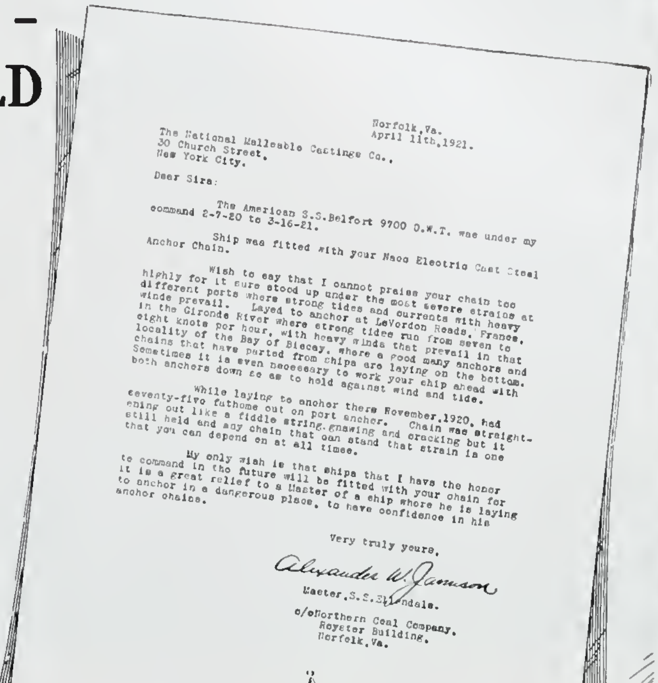
It has always been found dependable.

And to use Captain Jamison's own words—"it is a great relief to a Master of a ship to have a dependable chain—one that he can place his confidence in." To know that when the crisis comes, and life depends upon the tenacity of a single link, stud, or shackle, that his anchor chain will hold.

Naco chain is built to inspire that confidence—it is built to meet the emergency. Its tested strength, 40% greater than that of any other type of stud link cable, gives assurance of a reserve strength adequate to resist the excessive strains imposed in times of peril.

You can rely on

"NACO" Electric CAST STEEL ANCHOR CHAIN CABLE



Norfolk, Va.
April 11th, 1921.

The National Malleable Castings Co.,
30 Church Street.
New York City.

Dear Sirs:

The American S.S. Belfort 9700 D.W.T. was under my command 2-7-20 to 3-16-21.

Ship was fitted with your Naco Electric Cast Steel Anchor Chain.

Wish to say that I cannot praise your chain too highly for it sure stood up under the most severe strains at different ports where strong tides and currents with heavy winds prevail. Layed to anchor at LeVordon Roads, France, in the Gironde River where strong tides run from seven to eight knots per hour, with heavy winds that prevail in that locality of the Bay of Biscay, where a good many anchors and chains that have parted from ships are laying on the bottom. Sometimes it is even necessary to work your ship ahead with both anchors down so as to hold against wind and tide.

While laying to anchor there November, 1920, had seventy-five fathoms out on port anchor. Chain was straightening out like a fiddle string, gnawing and cracking but it still held and any chain that can stand that strain is one that you can depend on at all times.

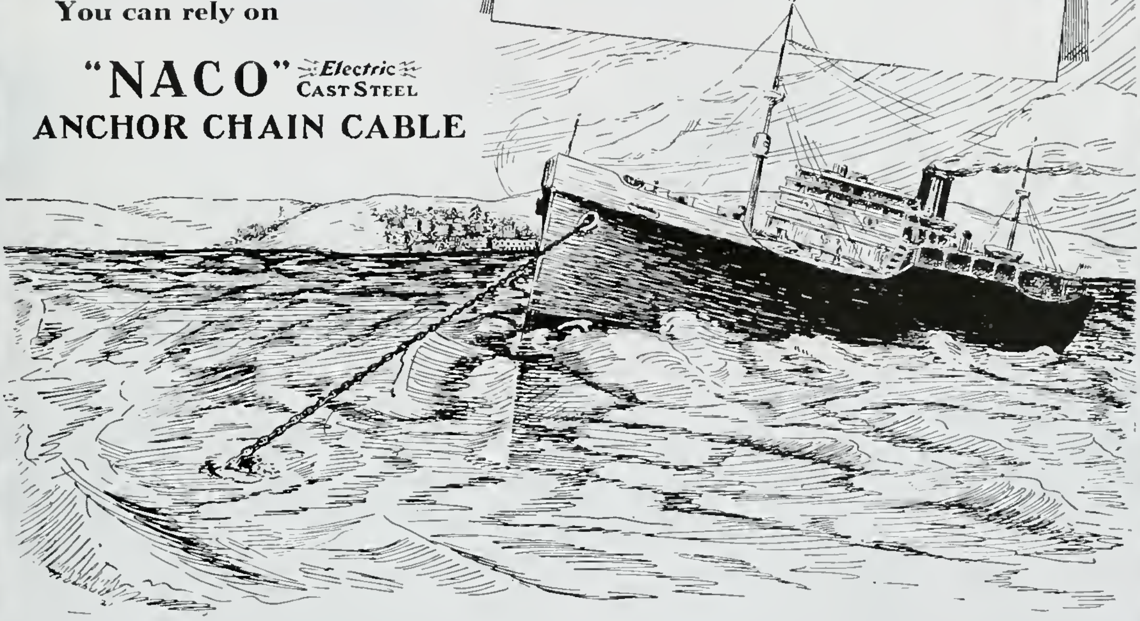
My only wish is that ships that I have the honor to command in the future will be fitted with your chain for it is a great relief to a Master of a ship where he is laying to anchor in a dangerous place, to have confidence in his anchor chains.

Very truly yours,

Alexander W. Jamison

Master, S.S. Ellendale.

c/o Northern Coal Company,
Royster Building,
Norfolk, Va.



THE NATIONAL MALLEABLE CASTINGS CO.

CLEVELAND, OHIO

NEW IDEAL PUMP GOVERNOR

THE Ideal Pump Governor, well known in marine circles, has been redesigned. It is now manufactured solely by the Atlas Valve Company, Newark, New Jersey, whose designing engineers are reponsible for the improvements made.

Figures 1 and 2 show the two principal designs, called Style "A" and Style"B" respectively. Both of these are made for turbine or reciprocating steam driven pumps. Both styles, also are approved by the National Board of Supervising Inspectors of Steam Vessels and by the Bureau of Engineers, United States Navy Department. Style "A" Figure 1, is designed for constant or fixed pressures whereas Style "B" is made for pressures that may be varied from time to time.

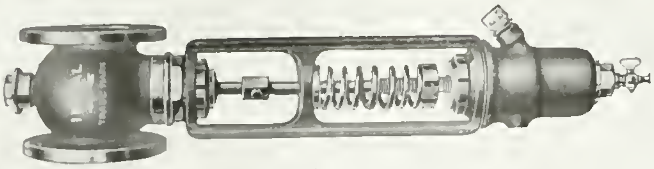


Fig. I

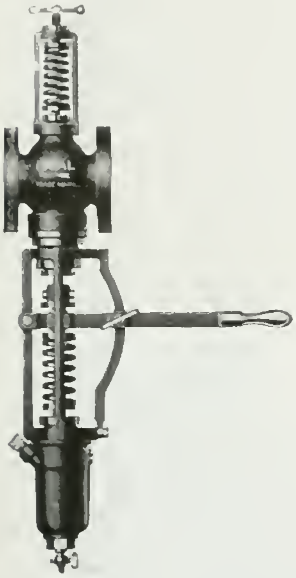


Fig. II

Style "B", Figure 2, is equipped with an emergency control lever which provides means for manually operating the governor so that it can be held wide open or be shut off tight regardless of the pump pressure. Where the pump must deliver an exceptionally high pressure during an emergency, or where pumps must be shut down quickly in case of fire or rupture of the pipe lines it is evident that this lever adjusting feature is important. It is ready at all times to throw the pump in or out of service as the emergency may require.

This pump governor is of the variable pressure type which can be adjusted to maintain any predetermined pump dicharge pressure. At the same time by manipulating the lever an almost instantaneously increased discharge pressure is effected.

The Ideal Governor is piston actuated. It is extremely sensitive, with a patented exclusive feature of an actuating piston operating in a bath of oil. This body of oil not only lubricates the operating piston but also prevents the liquid being pumped from eutering the control cylinder, thus eliminating any possibility of the sticking of the piston due to corrosion sediment.

The Ideal Governor is very simple in construction and consists of only two moving parts—the steam valve which moves backward and forward within the valve body (which is of the double seated balanced valve type), and the control piston which moves backward and forward in a bath of oil within the control cylinder. There are no diaphragm, cup leather packings or small delicate parts to get out of order.

These governors are installed in the feed line to the pump in a manner as indicated in Figure 3. Figure 3 shows Style "A" in place, hence the pump is a constant pressure pump. The governor is connected through valve "A" and pipe line to the pump discharge as plainly shown in Figure 3.

For general use, from ⅜ inch to 2 inch sizes, these governors are made of bronze throughout and for larger sizes up to 6 inch they are given iron bodies, trimmed with bronze. For superheated steam they are furnished with steel bodies and monel metal seats and stems.

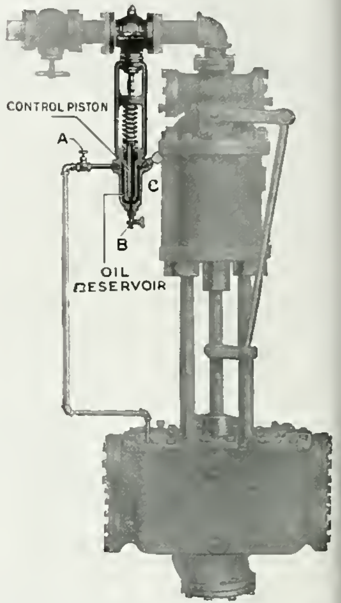
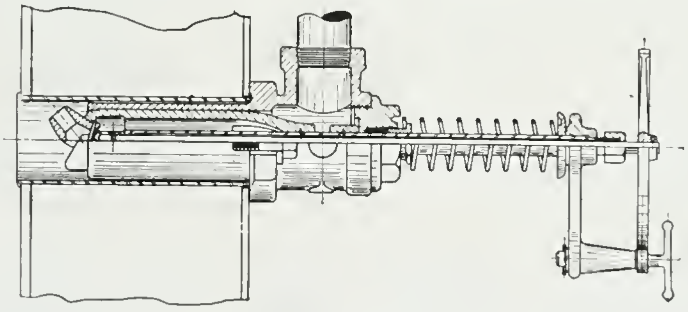


Fig. III

AN EFFICIENT BOILER FITTING

IN the recent reconditioning of the Harvard and Yale to fit them for express service between San Francisco and Los Angeles, their twelve Scotch marine boilers were each fitted with three Diamond Power Specialty Company's model B rear end Diamond soot blowers, making a total installation on the two boats of seventy-two of these blowers. This installation on the Harvard and Yale has been found to effect a decided saving in fuel, and with the cleaner tube surfaces and more efficient transmission of heat made possible by the use of this apparatus, the boats have been able to maintain a remarkably low stack temperature around 400 degrees.



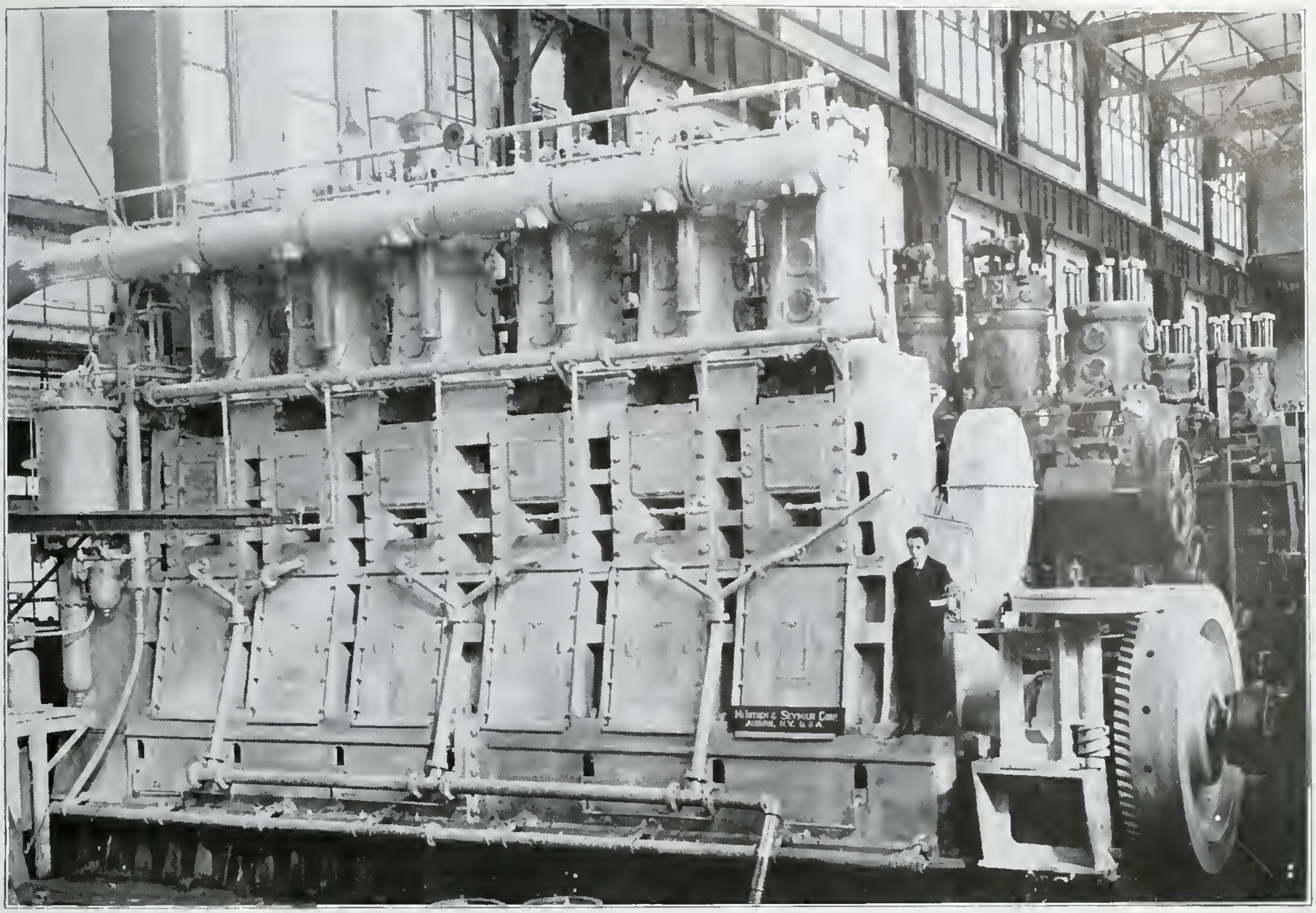
Model B Diamond Soot Blower as fitted to rear end of Scotch Marine Boilers

The Diamond soot blowers on Scotch marine boilers are installed at the rear end of the boiler and automatically clean the soot and scale from the upper tubes and superheating baffles by blowing a fine jet of steam through the tubes.

One unique feature of these blowers is the treating of all of their metal parts by a peculiar process with aluminum as a protection against oxidizing at the very high temperatures which they have to withstand in oil-fired boilers.

Other recent installations of this apparatus on the Pacific Coast may be mentioned, including four of the Robin Line ships for Skinner & Eddy, the seven Swiftsure Oil tankers building at the Northwest Bridge and Iron Company, Portland, and the Edward Luckenbach.

The Diamond soot blowers are manufactured by the Diamond Power Specialty Company, Detroit, and distributed on the Pacific Coast by the Jenkins-Miller Company of San Francisco and Seattle.



The above picture shows one of our 1200 I. H. P. Directly Reversible Marine Engines on the test floor. A pair of these engines have been installed on the M/S "KENNECOTT."

Other sizes available for Marine work, 390, 640, 1550, 2000 and 3000 I. H. P. all four cycle and directly reversible.

DIESEL TYPE MARINE ENGINES

HEAVY DUTY

McINTOSH & SEYMOUR CORPORATION

AUBURN, NEW YORK

149 BROADWAY
NEW YORK

412 BISBEE BLDG.
JACKSONVILLE, FLA.

815 SHELDON BLDG.
SAN FRANCISCO, CAL.

S. S. America Reconditioned

THE sailing of the S. S. America of the United States Mail Steamship Company from New York on June 26 marked the beginning of a new era in American shipping. Not only was she the largest and most luxurious liner yet to sail under the American flag, but she inaugurated a new service on the North Atlantic route, stopping at Plymouth, Cherbourg, Bremen, and on her return at Cherbourg, Southampton, and Queenstown.

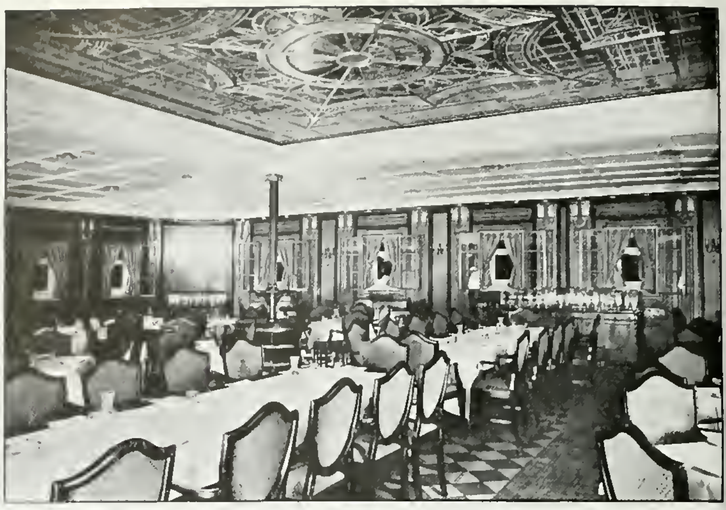
The America had just been completely reconditioned from a troop transport by the Morse Dry Dock & Repair Company, Brooklyn, the work being carried through in the remarkably short space of little over two months in order that the ship might take part in the rush of summer travel. She is the first of a fleet of these big liners (including the George Washington, President Wilson's peace ship) being made ready to sail under the American flag for the United States Mail Company.

Fitting the America for service was one of the largest repair, alteration and reconditioning jobs ever undertaken by a ship repair company. Originally going to the Morse yard to be made into an immigrant carrier in fifty-three days, the passing of the Immigration Restriction Bill caused a sharp change in the specifications so that she was made into a luxurious passenger liner. The quickness with which the work was done is declared by shipping men to be a record in ship repairs, an undertaking usually requiring eight or nine months being completed in little over two months and meeting with the highest praise from the officials of the United States Mail Company for the excellence of the work.

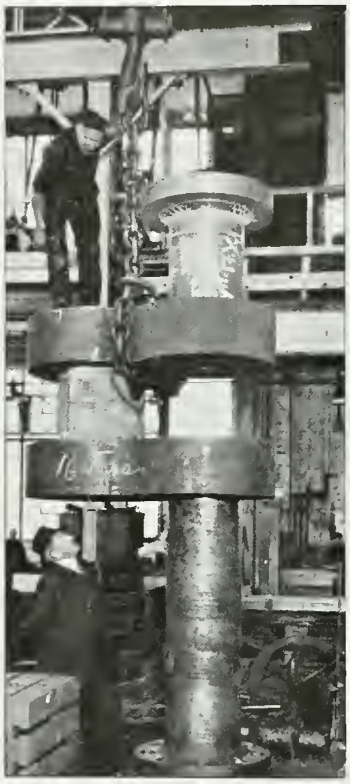
Formerly the Hamburg-American liner Amerika, built in 1905 by Harlan & Wolff, Belfast, she was fitted up in the luxurious style characteristic of the Germans and was chosen by the kaiser for making one of his visits to England, the "kaiser suite" being made one of the finest on board.

Taken over by the United States during the war, she was fitted as a troop transport for carrying 8000 soldiers. In this service she made twenty-two trips and transported upwards of 132,000 troops.

Last year she was used in repatriating the Czecho-Slovaks, leaving New York, going through the Panama Canal, up to San Francisco, across to the Hawaiian Islands, then to Vladivostok. There she took on 7100 Czechs, those sturdy people who had fought their way clear across a continent amid terrible losses and hardships. The America with Captain Rind in command carried those of the survivors back to their homeland disembarking at Trieste, and then completed her trip clear around the world, only to go back with another load from Norfolk, Virginia, when the Mount Vernon was disabled en route.



The Ritz-Carlton dining saloon finished in maroon and gold, United States steamship America



One section of huge crankshaft United States steamship America.

United States steamship America ready for her maiden voyage after being reconditioned at the plant of the Morse Dry Dock and Repair Company

Towed to the Morse yard about the first of May after eight months of idleness, the fitting of the America for productive service in the American merchant marine presented a mighty task. More than 900 men were put on the job and the entire resources of the plant put at the disposal of the men in charge.

Old and useless fittings were torn out over the whole length and breadth of this massive floating structure 668 feet long and 76 feet beam, with seven decks besides holds, compartments, and all equipment and accessories of a great ocean liner.

Hundreds of new staterooms, piping and plumbing work, safety, sanitary and electrical installations and the thosuands of details connected with so vast a task were going on at the same time.

One of the features of the work was installing in five holds removable staterooms, the walls of which can be quickly taken down and stored away, leaving the space for cargo when occasion demands.

Other features were electric baths, a ladies' hairdressing parlor, an electrically equipped gymnasium with facilities for running, swimming and horseback riding. Hospitals and the latest sanitary facilities assure the best of health protection to the passengers, and the up-to-the-minute safety equipment looks out for the possibility of any unforeseen happening.

The life-boats were equipped with new modern davits and the latest appliances throughout. A fire-detecting and extinguishing apparatus is connected with every room warning instantly of any danger in this direction. Sprinkler systems were installed in all the third-class quarters.

All staterooms, social halls, dining rooms, smoking rooms, promenade decks, in fact the entire ship both inside and out was renovated, repainted, and redecorated, making her again as fresh and beautiful as when she first sailed the seas.

Outside her hull was painted a jet black set off with the white of her entire superstructure and lifeboats. Buff colored masts and the red, white and blue funnels of the United States Mail Steamship Company made her indeed a striking ship.

Inside the hallways were decorated in a cream color with light blue trimmings, the Winter Garden in green lattice work, the Ritz-Carlton dining room in maroon and gold. Many of the staterooms have still the rare inlaid work in the walls and furniture as in the original ship, while others are entirely redecorated.

The galleys and pantries were overhauled and remodeled, making them the last word in up-to-date equipment for preparing the food for the small army of inhabitants who will live in this floating city. Electrically equipped instead of coal burning ranges will make for greater efficiency and cleanliness in this department.

The old heating system was entirely removed and a new model equipment installed, and the ventilating system was also changed. In fact, nothing was spared to make the America a delightfully fine and comfortable passenger liner, in every way a credit to the United States Mail Steamship Company and the American merchant marine.

She is fitted to carry approximately 550 first class passengers, 3000 third class and 700 crew. Commander William F. Rind, who was formerly captain of the Matsonia on the Pacific Coast and of the President Grant during the war and who has had wide and varied experience in shipping circles, asserts that every effort will be expended to make the America the most popular liner on the Atlantic.

"This may well be so," he declared, "for the sumptuousness of her interior decorations is unsurpassed by any ship afloat. Her luxurious accommodations, Ritz-Carlton dining room, beautiful Winter Garden and social halls will make for the utmost comfort and delight of her passengers."

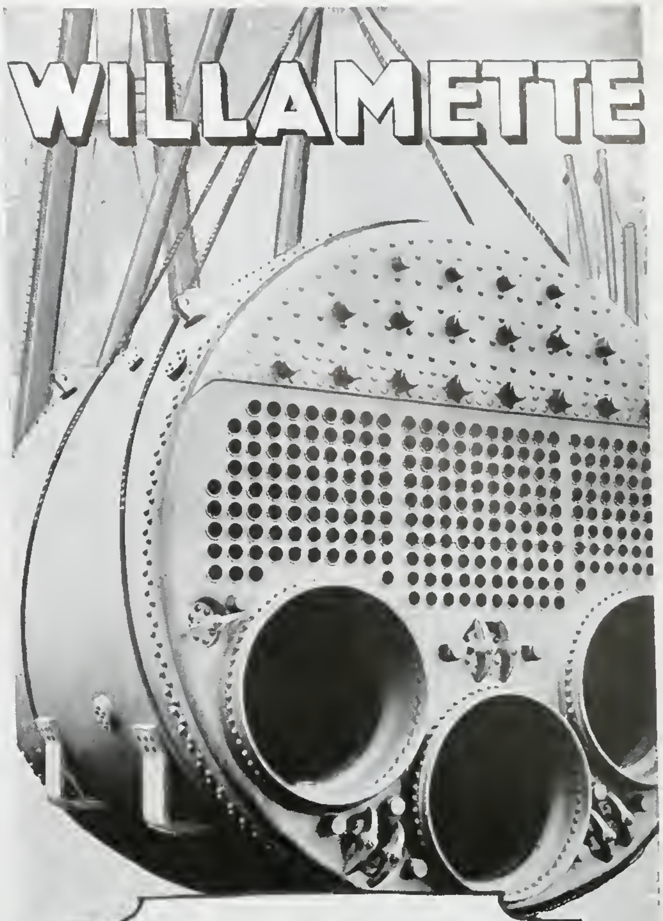
All the machinery in the America had to be entirely overhauled and put in first class working order, a task requiring the highest skill and care. When the crankshafts were lifted, it was found that they would have to be remetaled, as well as the bottom end connecting rods and eccentric straps. This necessitated setting all the main engine valves.

The main condensers had to be partly retubed and thousands of ferrules made to put the condensers in first class condition. The entire system of watertight doors of Stave & Lloyds design, which had not been working, were thoroughly overhauled and made to operate perfectly from the captain's bridge.

Many parts for the Aspinal governor gear, which had not been used for some time, had to be newly designed and constructed in the Morse yard. One new crank journal was fitted, the ship's pumps overhauled, the water tanks cleaned, coal bunkers enlarged, in fact, every part of the machinery put in A-1 condition.

One of the features of the work was drydocking the America on the 30,000-ton floating dry dock of the Morse Company, the only commercial dock in New York harbor capable of lifting so large a ship. This feat was successfully accomplished, raising her in 28 minutes and 7 seconds, claimed as a world's record for a ship of this size.

Another feature, showing the complete facilities for ship repairs in the Morse yard was the building in the company's own machine shop of two big capstans, said to be the largest ever constructed in the port of New York, the America's original ones having been removed for gun placements.



REINFORCED by wide experience covering many important marine operations, the Willamette plant is well prepared to undertake and complete your work with satisfaction, economy and dispatch.

MARINE MACHINERY

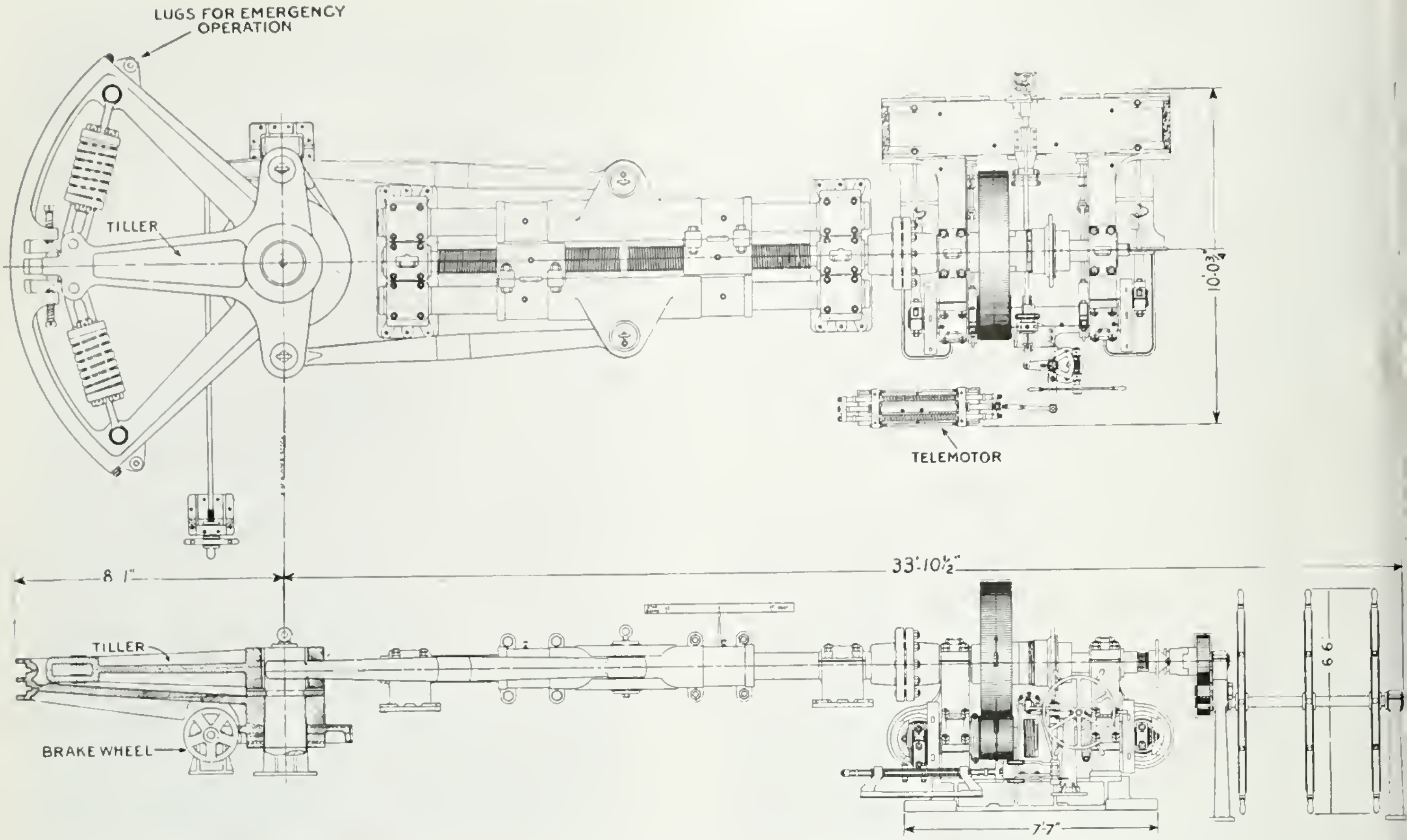
MARINE AND
STATIONARY BOILERS

DECK MACHINERY
AND AUXILIARIES

MARINE REPAIRS
OF ANY CHARACTER

Willamette
IRON & STEEL WORKS
Portland, Oregon, U. S. A.

1043 Monadnock Bldg.,
San Francisco, Cal.
1920 L. C. Smith Bldg.,
Seattle, Wash.
Canadian Office
916 Rogers Bldg.,
Vancouver, B. C.



Combined Screw and Spring Quadrant Steam Steering Gear as designed by the Bethlehem Shipbuilding Corporation for the 20,000 ton combination ore and oil carriers

BETHLEHEM COMBINATION STEERING GEAR

THE steering gears for use in the 20,000-ton ore-and-oil and ore-and-coal vessels under construction by the Bethlehem Shipbuilding Corporation, Ltd., are being built at the Moore Plant of the corporation at Elizabeth, N. J. Four of the vessels, the ore-and-oil carriers, one of which is for the International Petroleum Company, Ltd., and three for the Ore Steamship Corporation, are being constructed at the Sparrow's Point, Maryland, Plant; the other two, designed for carrying ore and coal for the Ore Steamship Corporation, are building at the Union Plant, San Francisco, California.

The steering gear, which is the same design for all six vessels, consists of a Bethlehem standard 16-inch by 12-inch screw steering gear direct-connected to the rudder-stock through a spring-quadrant and tiller, as shown in the accompanying illustration. The tiller docking purposes, the valves is free to turn on the rudder-stock, and is operated by the connecting links of the screw gear. The quadrant, keyed to the rudder-stock and connected to the tiller by two heavy springs, transmits the power to the rudder. All shocks between the rudder and engines are taken by the quadrant springs, which are so arranged that they are both in compression at the midship position, and therefore, instantly transmit any movement of the quadrant and screw gear to the rudder stock. This combination provides an extremely powerful gear with the added advantage of transmission through the shock-absorbing springs.

For ordinary operation the steering engines are controlled by hydraulic telemotor. A trick-wheel, on the same deck as the engine, provides means for control when adjustment of the telemotor is required. For of the engines can also be controlled from a steering column located on the engine and boiler room casing and connected up through shafting and bevel gearing. For hand-steering, the engines can be disconnected and the screw operated by three 78-inch hand wheels located at the forward end of the gear.

Arrangements are also made for relief steering from a steam winch located on the poop deck. The quadrant is grooved to take chains which are operated from two winch heads by means of relieving tackle carried through deck leaders to the steering gear room. The quadrant keyed to the rudder-stock, operates the rudder direct.

Lugs for emergency steering are fitted to each side of the quadrant and the rudder-stock can be operated by hand through cables attached to the lugs.

S. L. KREIDER

SHIPPING

Gen'l Agent
TOYO KISEN KAISHA
WILLIAMS S. S. CO., INC.

At Los Angeles
375 Pacific Electric Building
At San Diego
239 Spreckels Building

Mineral Oils

MARINE lubricants may be classified as follows:

Oils — mineral or ompounded.

Greases.

Mineral Oils

Mineral oils are petroleum products, possessing characteristics usually expressed n terms of gravity, cold est, flash point, fire point, nd viscosity; sometimes The color is mentioned. These specifications indicate the oil properties, in terms f laboratory measurements. The service condiions and the method of application of the oil, however, re two most important points upon which the selecion of a lubricant must be ased.

Mineral oils may be classiied, as follows:

Cylinder Oils; Bearing Oils; Special Oils.

Cylinder oils are residual roducts in the distillation f crude petroleum. These ils are used for the lubricaion of steam valves and ylinders.

Bearing oils are distilled products, consequently more highly refined and someimes specially treated. Circulation systems of turbines and Diesel engines nd splash systems of special types of reciprocating engines, demand the highest quality of pure mineral oils.

Special oils are other manfactured petroleum products, usually made for particular purposes, such as the cylinder lubrication of air compressors, refrigerating machines, Diesel and oil engines.

Animal and Vegetable oils —It is possible to manufacture mineral lubricating oils that will lubricate, after a fashion, under practically any conditions. However, to meet certain operating conditions, a mineral oil, compounded with the proper vegetable or animal oil, is necessary.

The animal oils used for lubrication are tallow, lard, neat's foot, and some fish oils. Vegetable oils used are cotton-seed, rape and castor oils. These oils, formerly used as lubricants, are noe superseded by mineral or compound oils.

While there are great variations in the quality or serviceability of mineral oils, there are greater variations in fixed oils. Here also careful laboratory analysis is necessary to ensure the production of the proper lubricants.

Compounded Oils — Compounded oils are mineral oils mixed with animal oils, such as sperm, whale, fish, lard or with vegetable oils, such as castor, rape, cottonseed, etc.

Animal or vegetable oil is added to mineral oil for the purpose of giving, to the finished product, special emulsifying properties. These properties are necessary in correctly lubricating certain types of marine engines. Compounded oils have laboratory specifications similar to those of medical oils, but, in addition, the following properties are insisted upon:

1. Freedom from gumming tendency;
2. Freedom from acidity;
3. Stability under temperature changes;
4. Emulsifying properties.

Greases

Greases are semi-solid lubricants which do not flow at ordinary room temperatures. They are generally made up of a combination of saponified fats and mineral oils. In the manufacturing process saponified fats take up and absorb a large proportion of mineral oil.

Greases are used for bearing lubrication, usually in places where lubricating oils cannot be satisfactorily applied. The manufacturer's specifications of greases are of little value in selecting grease as a lubricant and except for a variation in consistency, usually expressed in terms of No. 1—very soft, No. 3—medium, No. 5 —very hard, etc., the name of the grease conveys the purpose for which it is best fitted, and for which it is usually recommended, such as Tunnel Bearing Grease or Pinion Grease.

The lubricating requirements for various types of marine prime movers vary greatly. The correct lubricant for any specific purpose can only be determined by careful analysis of the operating conditions. These have been studied by the Vacuum Oil Company for more than fifty years and every lubricant that is recommended is the result of thorough mechanical and engineering tests.

This experience and knowledge of the correct lubricants are available to users and prospective users of Gargoyle Marine Oils for any purpose.

The use of Gargoyle Marine Oils assures:

1. Reliability of operation;
2. Minimum repairs and renewals;
3. Long life of the machinery;
4. Economy in fuel;
5. Economy in lubricants.

DOES YOUR BOAT LEAK?

Send for Booklets—"HOW TO MAKE YOUR BOAT LEAKPROOF," and "MARINE GLUE — WHAT TO USE AND HOW TO USE IT."—Each grade is for a different purpose. IT IS IMPORTANT THAT YOU USE THE GRADE WE RECOMMEND. Any old boat, so long as the frames are in fair condition, can be made water-tight by following the instructions in the above booklets. This applies to anything that floats, from a canoe to a yacht, wood or steel. Put your leak troubles up to us, we will help you to stop them.

JEFFERY'S MARINE GLUE IN ALL THE VARIOUS GRADES

For sale by all Yacht, Boat and Canoe Supply Houses Hardware, Paint and Oil, and Sporting Goods Dealers.

L. W. FERDINAND & CO. - - - - - - 152 Kneeland St., Boston, Mass., U. S. A.

CAM, CRANK
STEAMSHIP
SHAFTING, SHOES
AND DIES, PUL-
VERIZING BALLS

Forrest FORGINGS

OIL AND WATER
WELL MACHINERY
TOOLS AND
SUPPLIES

OAKLAND EDWIN FORREST FORGE COMPANY SAN FRANCISCO

COMMERCIAL IRON WORKS
Portland, Oregon
ENGINEERS, FOUNDERS, MACHINISTS
GENERAL MARINE REPAIRS

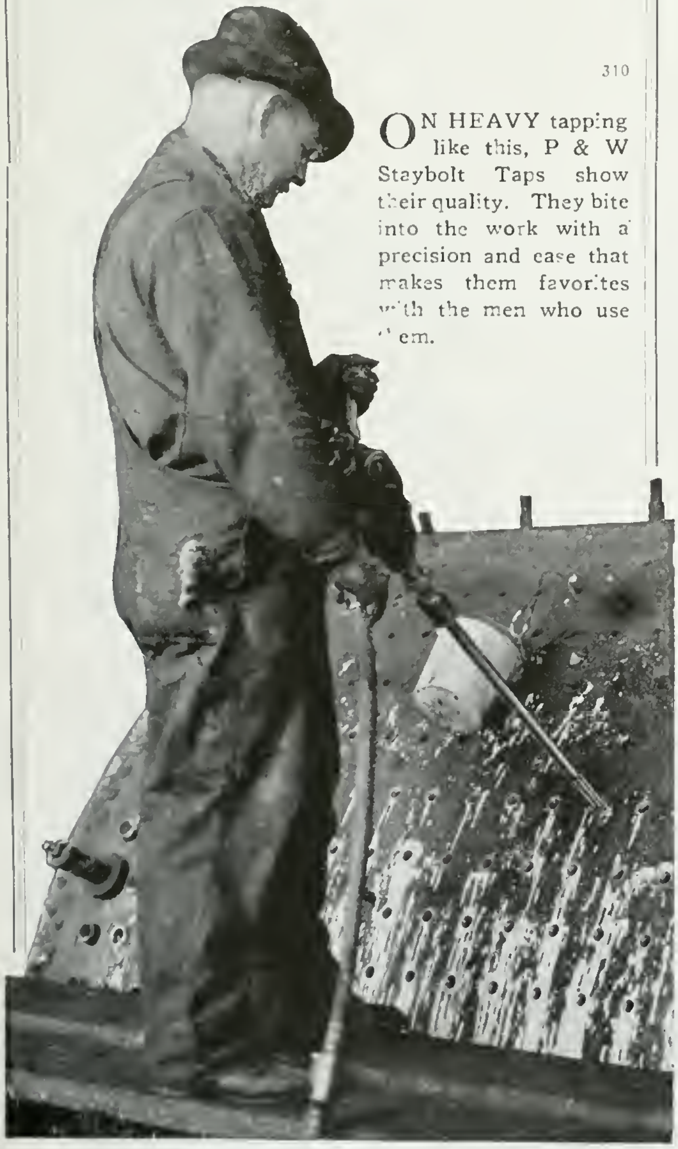
PRATT & WHITNEY
STAYBOLT TAPS

TO MEET all your boiler requirements, we build P & W Staybolt Taps in five standard styles, as well as Spindle Staybolt Taps with and without threaded end and also Combined Reamer and Tap to tap continuous hole in the reamer hole of the far boiler plate.

Our reputation for precision and high quality stands behind these tools. Buy them in any of the styles and sizes listed in our Small Tool catalogue which is yours for the asking.

These taps and our complete line of Small Tools are on sale at our offices in Boston, Philadelphia, Birmingham, Rochester, Cleveland, Detroit, St. Louis, Cincinnati, Seattle, St. Paul, New Orleans, San Francisco.

PRATT & WHITNEY CO.
111 BROADWAY NEW YORK
Works Hartford, Conn.



310

ON HEAVY tapping like this, P & W Staybolt Taps show their quality. They bite into the work with a precision and ease that makes them favorites with the men who use them.

Trade Literature

Stellite Welded-tip Tools and Stellite Bar Stock — Volumes 9 and 10, Stellite Reference Library. Published by the Haynes Stellite Company.

These two new books just issued contain valuable information never before published. They tell all about Stellite and its power to increase cutting speed in modern machine tool practice. Heat charts, tables, complete data and exceptionally fine illustrations aid in presenting graphically this information.

There has been a rather remarkable recent development in the extension and improvements in the use of Stellite in speeding up peace time production in the manufacturing centers, and these two books explaining the newer applications of this material should be of unusual interest and value to all machine tool operators.

Copies of these handbooks may be obtained without charge by writing to the Haynes Stellite Company, 30 East Forty-second street, New York City.

Bulletin No. 12—Pacific Diesel Engine Company.

A handsome 16-page magazine size booklet describing the Werkspoor Diesel engine as manufactured by the Pacific Diesel Engine Company of Oakland, California, and giving some of the results obtained by these engines in marine installations. Specifications are given for marine engines ranging in size from 100 to 3000 B.H.P. and for stationary engines ranging in size from 65 to 4000 B.H.P.

C-H Magnetic Clutches. The Cutler-Hammer Manufacturing Company, Milwaukee and New York.

The Cutler-Hammer magnetic clutches have been on the market for the past twenty years and are used in many different industries and for many different purposes. The principle upon which the clutch acts is the direct pull of an electromagnet holding together friction surfaces. It has been built in sizes from 7 inches to 78 inches in diameter and for the transmission of power from 1 to 2000 H. P. The principal features of C-H magnetic clutches are:

1.—Direct magnetic action, giving a compact structure with no joints of any kind to wear or get out of order.

2. Ease of operation, it being necessary only to close or open switch to engage or disengage the clutch. The disengaged clutch members have a positive running clearance. The switch may be located at any convenient point and may be operated either manually or automatically.

3.—Smooth acceleration. A short interval of time is necessary to bring up the magnetic pull so that the friction surfaces engage gradually, insuring a smooth starting.

4.—There is no end or side thrust, the magnetic pull balancing pressures between the friction surfaces.

5.—The clutch has a fixed capacity depending upon the known pull of the magnet. The clutch cannot be adjusted so that it will lock, and the capacity is not affected by centrifugal forces so that variation of speed does not affect the clutch.

There are many marine uses to which this type of magnetic clutch could be adapted with advantage, especially as the marine fraternity is now coming to acknowledge the advantage of electric drive for much of the auxiliary machinery on board ship.

"Little David" Pneumatic Tool Accessories. Form No. 8017. Ingersoll- Rand Company, 11 Broadway, New York.

A 24-page booklet of the loose leaf binder type issued as a supplement to Ingersoll-Rand catalog No. 8000 and describing the accessories incident to the use of the various pneumatic tools described in that catalog. It includes air hose, hose couplings, hose clamps, drill chucks, chisels and chisel blanks, rivet sets and blanks, wire brushes, oils and greases, rail bonding drills, rail drills, railroad kit boxes, and describes the uses and methods through which these fittings may be utilized to advantage by the users of pneumatic tools.

Trade Literature

Wood and Steel Tackle Blocks—Marine Decking & Supply Company of Philadelphia. A handsome new 60-page catalog recently issued by this firm which will be found very valuable as a ready reference book for all who are interested in the use of blocks.

The Marine Decking & Supply Company of Philadelphia have devoted considerable experimental and research work to the standardization of blocks for marine tackle, and in this book will be found a complete line of blocks standardized for all marine purposes. The catalog gives complete data of every block, its size, finish, and a full description of its details.

The Madesco block was designed primarily for use on shipboard. The company has built up a plant equipped with every modern facility for the turning out of good blocks at a reasonable cost. Their sales organization, distributors and jobbers have been carefully chosen with a view to good service for their customers, and they are in a peculiarly favorable position to give prompt and courteous attention to all the needs of the merchant marine in the block line.

Catalog M — Thacher Propeller and Foundry Corporation, Albany, N. Y. A 60-page handsome booklet bound in press board of a henna shade with dark blue stampings.

This book contains complete lists and illustrations of all of the marine equipment manufactured by the Thacher Propeller & Foundry Corporation. Anchors of all types and sizes, cleats, chocks, mooring posts, bitts, dock warping and towing, snubbing posts, mooring rings, capstans, manholes, ventilators, fairleaders, hawse reels, hawse pipes, deck irons, spud points, propeller wheels, and grates are described in a considerable variety of forms and sizes. The Thacher Propeller & Foundry Corporation is prepared to submit estimates on castings of any form or size in iron or semi-steel.

Bulletin No. 99 of the Hauck Manufacturing Company, Brooklyn, New York, describing the Hauck line of oil burners for shipyards—a 16-page booklet showing the various uses of the Hauck burner in repair work and in the various heating operations in the different departments of a shipyard.

One of the most extensive uses of this outfit is in preheating for welding operations. The Hauck torch burns oil, and in its various forms has been very successfully applied to the melting of babbitt, the annealing of copper pipe, the brazing of copper, the heating of rivets and bolts, the melting of tin, and various repair operations too numerous to enumerate.

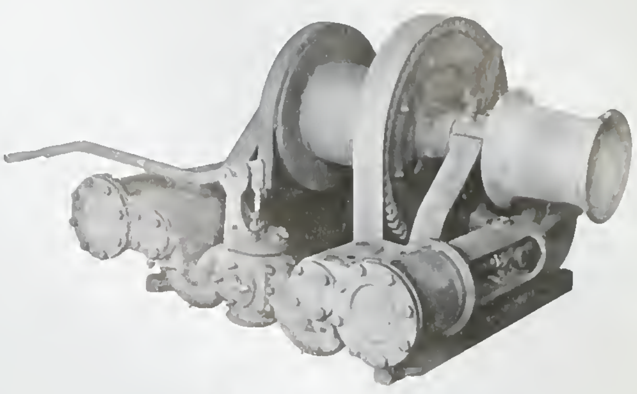
The Hauck Manufacturing Company also manufacture a line of kerosene furnaces for contractors, plumbers, roofers, and electricians.

Pipe Stills for Oil Refineries—Bulletin No. 202 of the Power Specialty Company. A 40-page booklet bound in buff press board with brown stampings and largely devoted to a discussion of the main difference between the conventional tank still and the pipe still for refinery work.

Reference is made to the superior fuel economy, distribution of heat, greater uniformity of heating by the use of the pipe still, and to the many advantages obtained by superheating the steam used in refinery work and in pipe line pumping stations. There are included also notes and much data of interest to refiners and pipe line engineers on the flow of fluids in pipes.

Steam Tables for Condenser Work. Wheeler Condenser and Engineering Company, Carteret, New Jersey. 6th edition. 31 pages, blue press board cover with gold stampings.

A very convenient handbook of steam tables with pressures below atmospheric expressed in terms of inches of mercury referred to a 30-inch barometer. The book also includes a thorough description of the use of the mercury column, the errors incident to measurements by its use, and the constants for their correction. Marine engineers will find this little booklet a very handy reference work in connection with their handling of condenser problems.



FOR SALE
Specially Priced
HELSER MARINE WINCHES
Three 8¼ x 8
One 9 x 9 Standard
Two 9 x 9 Heavy Duty
1—9x9 Compound Geared Throttle Reverse Warping Winch with extended shafts
1—7x9 Enclosed Type Hesse-Martin Steam Capstan

Lifting capacity on single line, 8¼x8, 10,000 pounds; on straight line, 9x9, 12,500 pounds, on straight line. All throttle reverse. Piston valves. Gear ratio 5 to 1.

Wire or Write

Helser Machine Works, Inc.
PORTLAND :: :: OREGON

Ship Repairs by Experts

Builders of Seventeen steel vessels, including their engines, windlasses and condensers.

GENERAL MARINE REPAIR WORK
HULL AND ENGINE

Contractors for some of the largest Repair Jobs Ever Done at the Port of Portland.

Drydock Facilities Ample for Vessels up to 15,000 Tons.

Albina Engine and Machine Works
PORTLAND OREGON

A NEW STEAM GENERATOR

THE Leister Steam Power Corporation of San Francisco, California, has very recently developed an interesting, highly efficient heavy duty boiler of the flash type. The experimental unit built and tested in the shops of the corporation was rated at 50 h. p. and was found to be very successful.

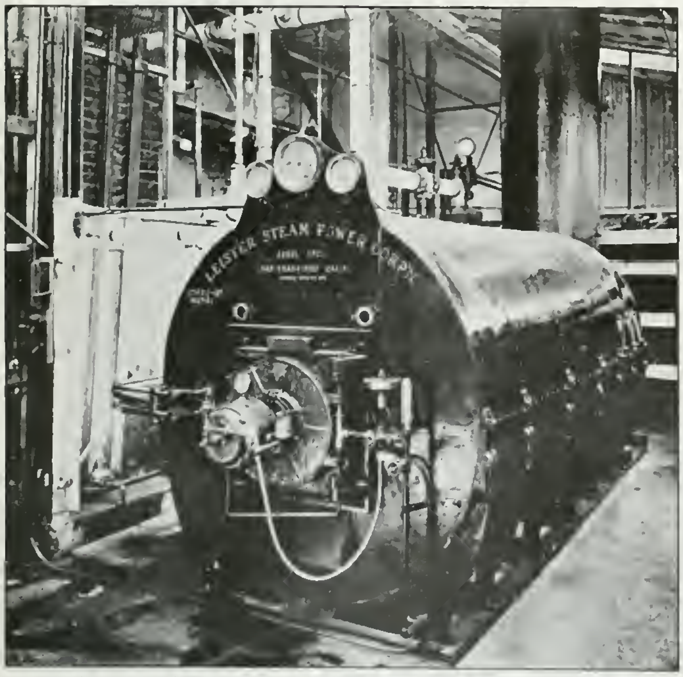
The boiler is a series of coils, the water entering first into concentric coils of flat section arranged in pairs so that the water flows from the exterior periphery of one coil in the pair to the center of that coil across to the center of its pairing coil and out to the exterior, repeating the process in the other sets of coils. The boilers are made with four of these sets of coils at the feed water end. After the water has passed through these four sets it is usually at the boiling temperature and then passes into cylindrically arranged coils of round section and gradually increasing interior diameter, the steam passing from the forward end back to a convenient point on the side of the boiler, where it is taken off. The oil burner is in the front of the boiler and is arranged to throw the flame along the inside of the cylindrical coils back to the flattened sets of concentric coils. On one side of the boiler is arranged a double thermostatic control, operating on steam supply to the feed water pump. This control holds the steam pressure automatically at any predetermined point within the range of the boiler under very varying conditions of load.

In working out the tube sections for the Leister boiler special attention has been given to the idea that these tubes should give a practically unlimited service. Extra heavy steel hydraulic tubing is used for the cylindrical coils in the steam section of the boiler, and for the concentric coils at the back a special grade of steel hydraulic tubing is used. All of the joints in these tubes are acetylene welded. and the factor of safety is far beyond that used on any other boiler with which the writer is familiar. The tubes are self-scaling, due both to the expansion and contraction of the metal and to the velocity of passage of water and superheated steam through the tubes. In the experimental boiler, after six months' intermittent use, the inside of the tubes was as bright and clean as when they were first installed; in fact, showed a slight wear from friction.

The experiments carried out on the 50 h. p. unit and the experience gained in its working have been utilized to good advantage in the design, construction and installation of a 200 h. p. unit at the Excelsior Laundry in Oakland. A recent inspection of this installation by a representative of Pacific Marine Review developed the fact that the chief engineer of this plant is very enthusiastic in his endorsement of the way in which this type of boiler delivers hot dry superheated steam to his mangle rolls and other ironing machinery in the laundry. Under very extreme variations of demand for steam both from the engine driving the laundry machinery and from the various heat appliers in the laundry, the boiler displayed almost instantaneous regulation and showed a very decided fuel economy in comparison with the older type of return tube boiler which had been employed in this plant previously.

The stack temperature on the boiler at the Excelsior laundry varied from 280 degrees to 300 degrees Fahrenheit with full demand on the boiler and the burner wide open. This plant is run at 200 pounds boiler pressure, and shows boiler steam temperatures of from 525 to 575 degrees Fahrenheit. Comparative tests showed the old return tubular boilers in this plant using 70 to 75 gallons fuel oil per hour to pull the same load for which 45 gallons per hour were used on the Leister boiler; in other words, a fuel saving of well over 35 per cent.

There will be undoubtedly a large field for the application of this type of boiler in marine service, particularly in steam turbine work where high superheats have so many desirable features for economical and dependable operation.



Exterior view of the Leister steam boiler 200 H. P. unit installed at the Excelsior Laundry, Oakland, California

Trade Literature

Tested High-Speed Brass Rod. Bridgeport Brass Company, Bridgeport, Connecticut.

A very nicely gotten up brochure from a typographical standpoint, containing 16 pages of well written text describing the manufacture of brass rod for use on screw machines and having particular reference to the improved product in this line originated by the Bridgeport Brass Company, known as Bridgeport tested high-speed brass rod.

Bridgeport brass rod is made by what is known as the extrusion process. This process consists of introducing a red hot cylindrical brass billet into a hydraulic cylinder, one end of which is fitted with a die. The red hot brass is then forced through the die by means of a plunger.

Prass for free cutting consists of copper, zinc, lead and scrap, scrap in a brass mill meaning brass cuttings. These materials are melted in crucibles holding about 300 pounds each, and the mixture is cast into iron molds, producing cylindrical billets about 7 inches in diameter.

The Bridgeport Company brass is all melted on electrical furnaces, which gives complete and accurate control of the mixture used and eliminates the human element in the melting process. The billets after casting are delivered to a powerful saw where the tops or gates are cut off, and the billet is then ready for the extrusion operation.

In the extrusion process, if the reduction in size is great, the usual practice is to extrude more than one rod from the same billet by having a die with the number of holes required. It is obvious that in this process any shaped section desired can be obtained by making the die of suitable contour. After extrusion the rod is delivered to the draw bench where it is drawn to finished size. It is then passed through a straightening machine, cut to the required length, inspected, and passed out to the shipping warehouse.

Many facts are given in this booklet as to the machining of brass rods, permissible limits of speed in cutting, and other data useful to the brass manufacturer.

L. J. Ziesel Company, 216 Market Street, are distributors in the San Francisco Bay district for the Bridgeport Brass Company.

Pacific Marine Review

The National Magazine of Shipping

S.S. "CALIFORNIA".
TER'S POINT DRY-DOCK.
PTEMBER 1921.

OCTOBER
1921

Pacific Marine Review, Vol. 18, No. 10 Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.

Behind the locomotive—*Linde*

FEW people realize the enormous work done by Linde in keeping the wheels turning on our railroads.

The recent National transportation tangle would have been a thousand times worse but for the quick and permanent repairs on rolling stock and rails made possible by the oxy-acetylene process.

Linde Oxygen, because of constantly uniform purity and unfailing deliveries, is used for this highly important work by almost all railroads of standing.

Whenever time is a weighty factor in repair work Linde Oxygen and Linde Service are indispensable.

Seventy-five plants and warehouses centrally situated, place Linde quality and Linde Service at the disposal of every oxygen user.

THE LINDE AIR PRODUCTS COMPANY
Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco

THE LARGEST PRODUCER OF OXYGEN IN THE WORLD

L-505-21

Pacific Marine Review

CONTENTS

OCTOBER, 1921

Pacific Coast Fisheries, California II 573

An Electric Fish Barrage 575

The Last of a Great Program 576

All Hands 579

The Clipper Ship Three Brothers 581

Editorial 584

Safety at Sea 588

Oil Engines and Motorships 589
Progress in Motorship Building; Motor Shipbuilding in Germany, by R. Z. Dickie; From Steam Turbine to Diesel Electric, by John L. Bogert; An Interesting Motorship.

European Marine Notes 595

The Blow-off Cock: The Cost of Ocean Freight from a Marine Engineer's Standpoint, by Sea Flame 598

A Crankless Reciprocating Engine 599

New Coast Guard Cutters 600

Uncle Sam's Latest Dreadnought 601

Nippon Yusen Kaisha 603

International Conclave of Port Authorities 604

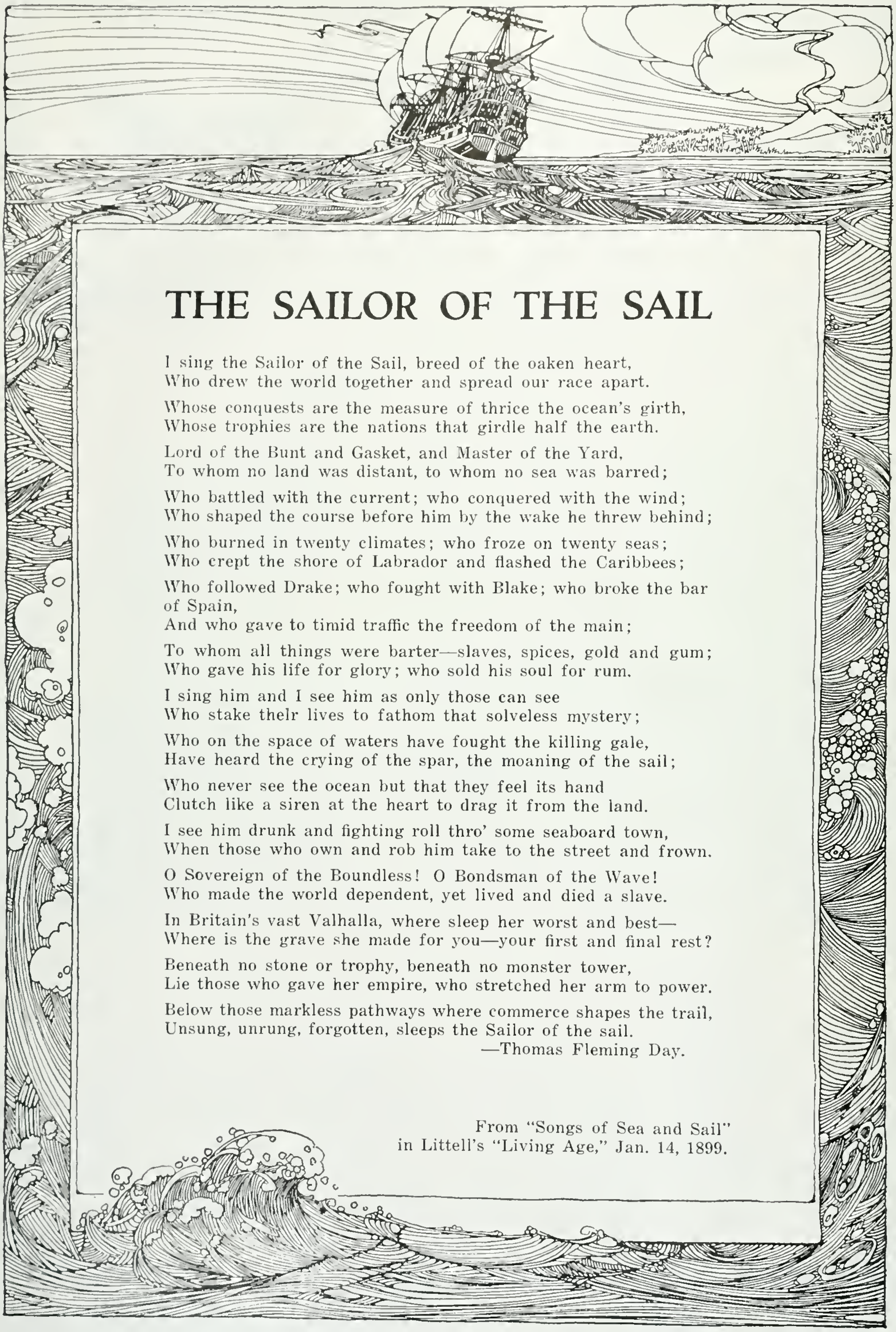
Full Speed Ahead 605
Deep-sea Shipping; Marine Insurance; In the Shipyards; With the Exporters and Importers; Personals.

Saving the Canadian Importer, by G. W. Gore, Master of Tug Sea Lion 631

Book Reviews 632

Machinery and Equipment 633
The Most Modern Steamer; A Blowpipe Test; A Shipbuilding Plant's Accident Record.

Industrial Section 44



THE SAILOR OF THE SAIL

I sing the Sailor of the Sail, breed of the oaken heart,
Who drew the world together and spread our race apart.

Whose conquests are the measure of thrice the ocean's girth,
Whose trophies are the nations that girdle half the earth.

Lord of the Bunt and Gasket, and Master of the Yard,
To whom no land was distant, to whom no sea was barred;

Who battled with the current; who conquered with the wind;
Who shaped the course before him by the wake he threw behind;

Who burned in twenty climates; who froze on twenty seas;
Who crept the shore of Labrador and flashed the Caribbees;

Who followed Drake; who fought with Blake; who broke the bar of Spain,
And who gave to timid traffic the freedom of the main;

To whom all things were barter—slaves, spices, gold and gum;
Who gave his life for glory; who sold his soul for rum.

I sing him and I see him as only those can see
Who stake their lives to fathom that solveless mystery;

Who on the space of waters have fought the killing gale,
Have heard the crying of the spar, the moaning of the sail;

Who never see the ocean but that they feel its hand
Clutch like a siren at the heart to drag it from the land.

I see him drunk and fighting roll thro' some seaboard town,
When those who own and rob him take to the street and frown.

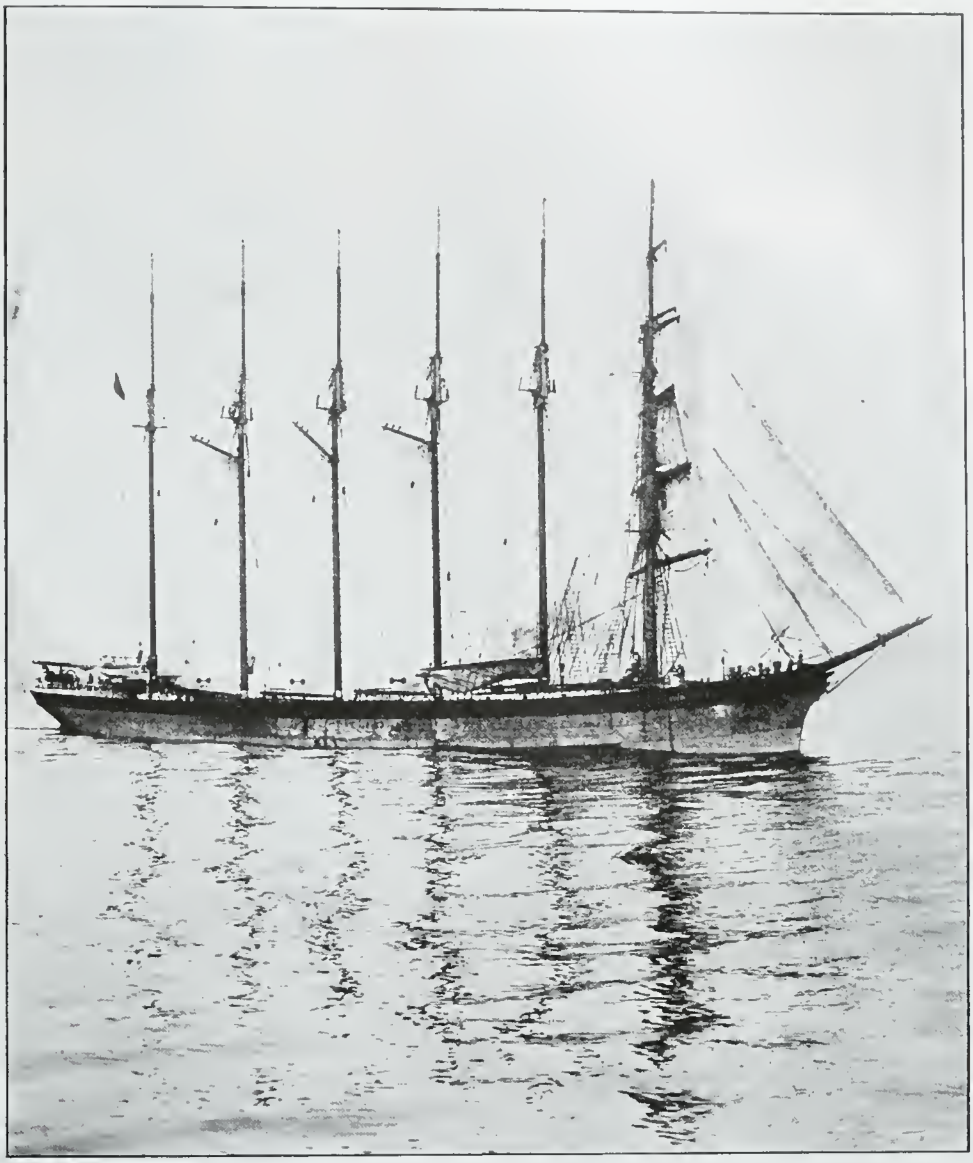
O Sovereign of the Boundless! O Bondsman of the Wave!
Who made the world dependent, yet lived and died a slave.

In Britain's vast Valhalla, where sleep her worst and best—
Where is the grave she made for you—your first and final rest?

Beneath no stone or trophy, beneath no monster tower,
Lie those who gave her empire, who stretched her arm to power.

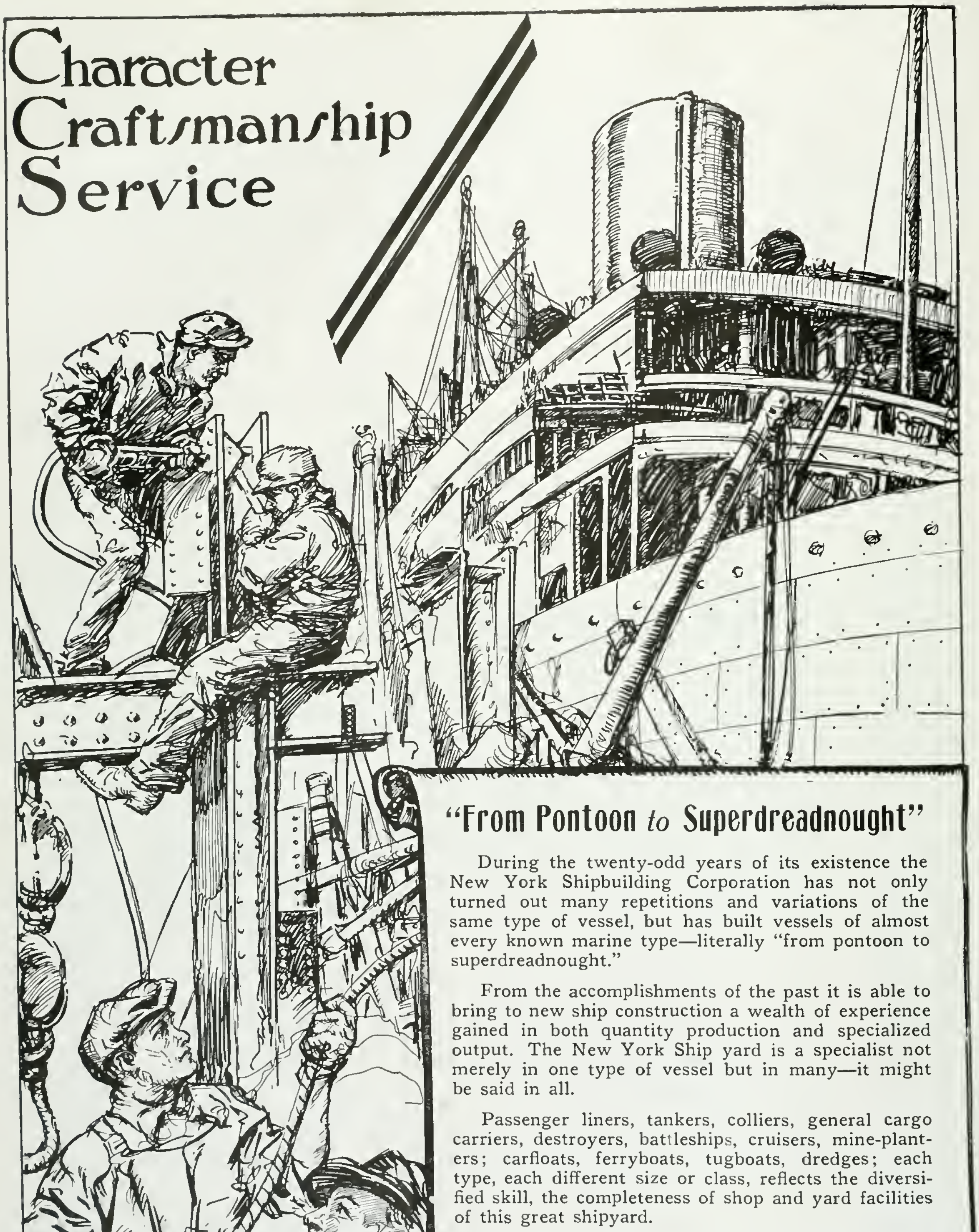
Below those markless pathways where commerce shapes the trail,
Unsung, unrung, forgotten, sleeps the Sailor of the sail.
—Thomas Fleming Day.

From "Songs of Sea and Sail"
in Littell's "Living Age," Jan. 14, 1899.



A STAUNCH OLD WINDJAMMER

THE six-masted barkentine E. R. Sterling, photographed just after a tug had cast off at the San Francisco lightship. She is a vessel of 2404 tons gross, 308 feet in length and 42-9 beam. She was built by Harland & Wolff, Belfast, in 1883, and is, as the date of her build would indicate, of iron. She was formerly the Lord Wolseley; then the German ship Columbia; then the Lord Wolseley again, after she had been wrecked and repaired; under the latter name she was towed into Victoria disabled and was repaired on the American side, thus gaining American registry. Her name was again changed, this time to Everett G. Griggs, and finally to E. R. Sterling. She is one of the few sailing vessels of the world equipped with wireless.



"From Pontoon *to* Superdreadnought"

During the twenty-odd years of its existence the New York Shipbuilding Corporation has not only turned out many repetitions and variations of the same type of vessel, but has built vessels of almost every known marine type—literally "from pontoon to superdreadnought."

From the accomplishments of the past it is able to bring to new ship construction a wealth of experience gained in both quantity production and specialized output. The New York Ship yard is a specialist not merely in one type of vessel but in many—it might be said in all.

Passenger liners, tankers, colliers, general cargo carriers, destroyers, battleships, cruisers, mine-planters; carfloats, ferryboats, tugboats, dredges; each type, each different size or class, reflects the diversified skill, the completeness of shop and yard facilities of this great shipyard.

NEW YORK SHIPBVILDING Corporation

Pacific Marine Review
The National Magazine of Shipping
October, 1921

Copyright, 1921, by J. S. Hines

PACIFIC COAST FISHERIES

California, the Premier Fishing State—II.

California sardines in the cockpit of a California fishing boat taken from the wharf of a cannery at Monterey Bay Scott, Photographer

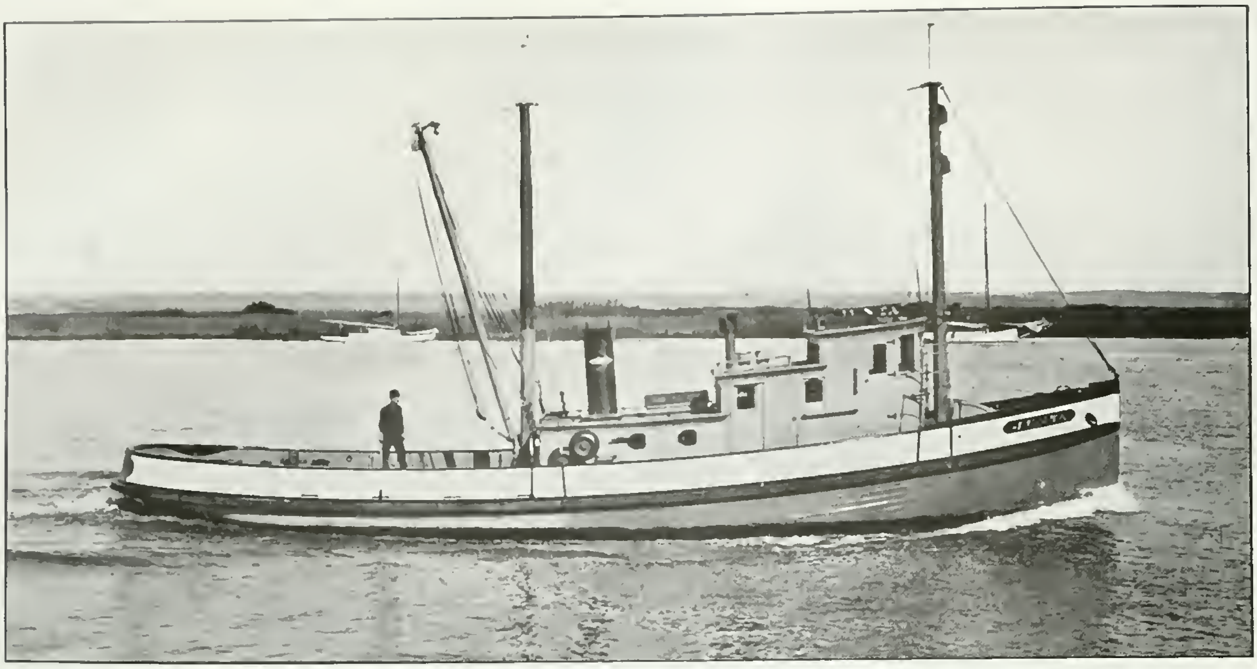
THE first installment of this article covered the story of California's fisheries in a general historical way and gave considerable data on the boats, apparatus and personnel, particularly of the fisheries from San Pedro north.

At San Diego there has grown up a fishing business with some phases peculiar to that port. The statistics of San Diego fisheries include 28 boats manned by whites and 30 boats manned by Japanese, which fish exclusively for tuna and albacore during the canning season, and at the end of that period the boats are tied up. In addition to these, there are 48 boats which fish for albacore and tuna for the canneries and during the rest of the season fish for the fresh fish markets. That phase of the fishing industry peculiar to San Diego employs 29 gill net boats owned and manned principally by Italian fishermen and fishing exclusively for fresh fish markets. These boats are very successful. The Italian fishermen not only are very industrious, but prosperity is seldom allowed to interfere with their industry. The majority of their boats are equipped with two complete sets of halibut, sea bass and barracuda gear. While fishing with one set of nets the other is left ashore and is being mended and tanned so that when a good run of fish is on no time is wasted for lack of condition in the equipment.

The financial agreements under which these Italian fishermen operate are quite interesting. The great majority of their catches are in Mexican waters. The markets guarantee to take all of the fish that may be brought in on each trip, at a stipulated price. The markets also agree to pay the Mexican government one cent per pound on all fish brought in from Mexican waters.

Another interesting feature of the situation in San Diego is the importation of lobsters from Mexico.

Part of the fishing fleet at anchor in Monterey Bay. Note the various types Scott, Photographer



The Junta, a typical California fish cannery tender

There are about 50 lobster camps established along the coast of Lower California and Mexico with a total of about 150 men divided as to nationality about as follows: 30 per cent Mexican, 40 per cent Japanese, and about 30 per cent American. The equipment used in these camps is extremely varied, comprising everything from simple skiffs through Evinrude outboard motors to small power boats of from 5 to 10 H. P. Several gasoline engine and Diesel engine carriers are used to pick up the lobsters from the camps. One new boat recently brought out from the Atlantic Coast is a converted "subchaser" with two 125 H. P. Diesel engines. The duty on lobsters at present is about 2⅛ cents per pound.

Summarizing, we find that California leads all the states of the Union in the volume and value of fishery products; that in 1920, a rather low year, 213,800,000 pounds of fish were caught in California waters, 118,500,000 pounds being sardines, 11,134,000 pounds being salmon, balance tuna, albacore, barracuda and miscellaneous fish; that the total value on conservative estimates of the boats used is over $5,000,000 and the value of the nets and gear almost $2,000,000; that the industry has grown so rapidly during the last ten years that the great majority of the boats in use are conversion jobs, making the best out of the material at hand to meet existing conditions, and that therefore in the next four or five years there should be a very considerable demand for new boats designed to meet the requirements which experience has dictated must be met in order to make good under modern competitive fishing conditions.

IMMIGRATION

THE appended table shows the division of admissible aliens as fixed by the act "to limit the immigration into the United States" passed by Congress May 19, 1921. There seems to be quite a difference of opinion among experts as to the propriety of this sort of division, and from figures at hand the rate of net immigration just prior to the passage of this act was scarcely larger than, if equal to, the rate which would be permitted by the act. One peculiar feature which seems to stand out prominently is that this act allows a very much larger number of Germans to enter than were entering at the time the act was passed.

Anticipation of the passage of this bill created quite a flurry in immigration from southern Europe and resulted in a congestion at Ellis Island which necessitated emergency action on the part of Congress slightly changing the application of the act so as to allow entrance to all aliens who had taken passage for America and were actually en route before the date set for application.

The table will be of interest to operators of passenger steamship lines and others who are figuring on immigration business.

NUMBER OF ALIENS ADMISSIBLE UNDER THE ACT OF MAY 19, 1921, ENTITLED "AN ACT TO LIMIT THE IMMIGRATION INTO THE UNITED STATES."

Country or place of birth.	Quota June 3-30, 1921	Quota Fiscal year 1921-22	Limit per month Fiscal year 1921-22
Albania	22	287	57
Austria	571	7,444	1,489
Belgium	119	1,557	311
Bulgaria	23	301	60
Czechoslovakia	1,095	14,269	2,854
Danzig	22	285	57
Denmark	433	5,644	1,129
Finland	296	3,890	778
Fiume (1)	5	71	14
France	437	5,692	1,138
Germany	5,219	68,039	13,608
Greece	252	3,286	657
Hungary	432	5,635	1,127
Italy	3,224	42,021	8,404
Jugoslavia	491	6,405	1,281
Luxemburg	7	92	18
Netherlands	276	3,602	720
Norway	930	12,116	2,423
Poland (2)	1,528	20,019	4,004
Eastern Galicia	451	5,781	1,156
Portugal (including Azores and Madeira Islands)	177	2,269	454
Roumania	569	7,414	1,483
Russia (including Siberia)	2,627	34,247	6,849
Spain	51	663	133
Sweden	1,531	19,956	3,991
Switzerland	287	3,745	749
United Kingdom	5,923	77,206	15,441
Other Europe (including Andorra, Gibraltar, Lichtenstein, Malta, Monaco, San Marino, and Iceland)	6	86	17
Armenia	122	1,588	318
Palestine	4	56	11
Smyrna District (3)	34	438	88
Syria	69	905	181
Other Turkey (Europe and Asia)	16	215	43
Other Asia (including Persia and territory other Than Siberia which is not included in the Asiatic Barred Zone. Persons born in Siberia and included in the Russia quota.)	6	78	16
Africa	9	120	24
Australia	21	271	54
New Zealand	4	50	10
Atlantic Islands (other than Azores, Madeira, and islands adjacent to the American continents)	5	60	12
Pacific Islands (other than New Zealand and islands adjacent to the American continents)	2	22	4
TOTAL	27,298	355,825	71,163"

- - - - oOo - - - -

AN ELECTRIC FISH BARRAGE

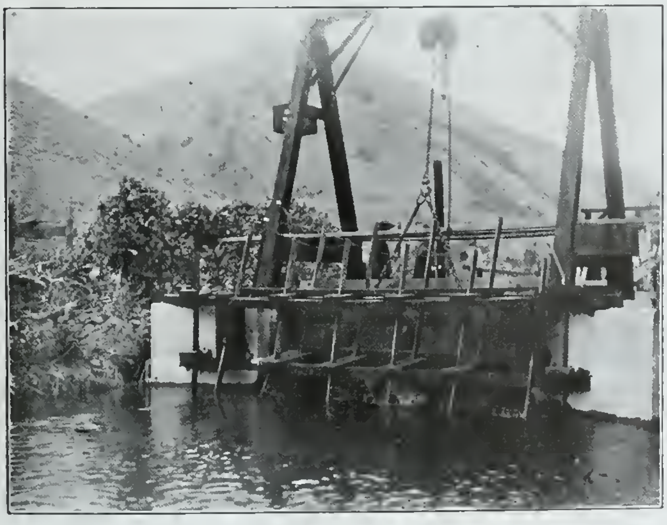
THE irrigation ditch, a comparatively new product on the Pacific Coast, while of great benefit in developing the arid lands in certain sections, as at present operated is a considerable menace to the salmon fisheries. It is estimated that each year between 3,000,000 and 4,000,000 young salmon, slowly making their way down stream to the ocean home, pass into these ditches and are left to die when the water is drawn off.

To cope with this situation numerous devices have been tried. Placing at the head of the ditch a screen with a mesh fine enough to prevent the small fish from passing through proved ineffectual. The drift and waste carried down by the current would clog the mesh, and the waters carrying the young fish would flow over the top of the screen and out onto the adjacent ground. Several other means of remedy were attempted, but only with partial success.

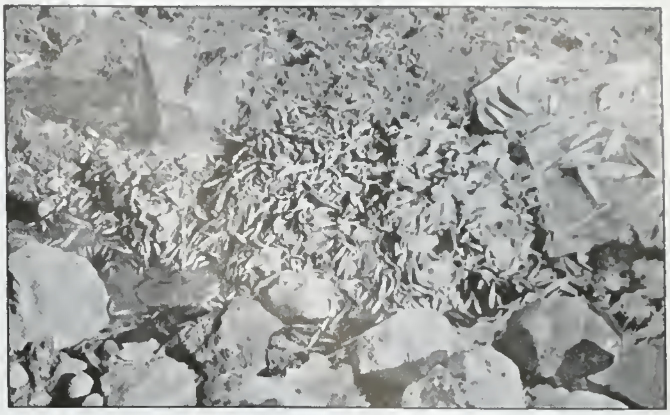
Even were the screen to remain clear, the mode of progress of the salmon fry down stream would make impracticable the use of a screen. Salmon almost universally swim head on to the current, and their progress down stream is very slow in comparison with the current. The tail fins of the young fish are very soft and flexible, and it has been found that they become entangled in any screen set across the current and large numbers of the fish die right in the screen. The impracticability of screens for stopping young fish has been demonstrated in the intakes of many power canals in hydro-electric developments along the Pacific Coast.

Finally after giving the problem much serious study and making numerous experiments, C. D. Hessey, game commissioner of Yakima county in Eastern Washington, worked out an electrical barrier. This new invention is the electric fish stop, and the photograph accompanying this article makes its method of operation plain.

The electric fish stop is placed across the head of the irrigation ditch. A small water wheel and a magneto furnish the power. Small iron bars are set four feet apart on the front of the device extending down into the water. By a system of wiring and a vibrator to regulate the current the water is charged with electricity for a distance of about four feet from the bars. Fish coming down stream with the current strike this charged water and immediately whirl around and continue on their way instead of going on into the irrigation ditch.

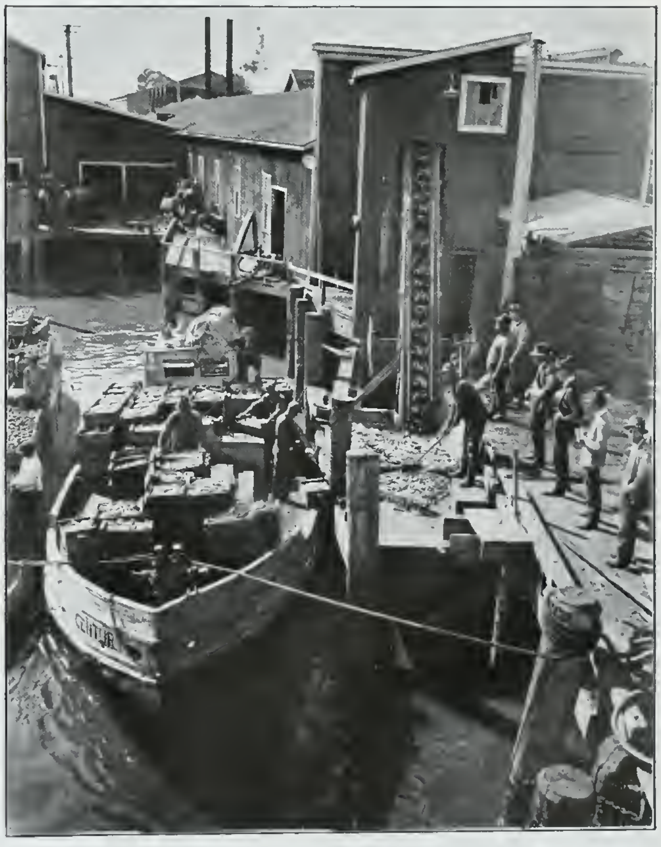


The head of an irrigation ditch near Yakima, Washington, with electric fish stop installed
Photo J. N. Cobb, College of Fisheries, University of Washington



View in a dry irrigating ditch showing young salmon left to die by receding waters
Photo J. N. Cobb, College of Fisheries, University of Washington

The electric fish stop shown herewith is one of two already in use in the Yakima, Washington, district, and construction of a large one is now under way for the Sunnyside Canal. Men familiar with the irrigation ditch problem are confident a successful solution has been found. Also, it is stated, the same device could be used to establish rearing ponds in any stream. It could be so placed as to make any size pond desired and the fish would be kept within the charged area. The invention is new. This is the first season it has been tried out, but there is every indication that it is a success.



California Sardines and California tomatoes being delivered at the wharf of a river cannery. Both go into the same can

NOTABLE GROUP AT A NOTABLE LAUNCHING

Group at the launching of the West Chopaka, September 19, 1921, Los Angeles Shipbuilding and Drydock Company, Los Angeles. Right to left: Meyer Lissner, United States Shipping Board commissioner representing the Pacific Coast; George E. Cryer, mayor of Los Angeles; Erle M. Leaf, vice-president Los Angeles Shipbuilding and Drydock Company; Mrs. Fred L. Baker, sponsor West Chopaka; Fred L. Baker, president Los Angeles Shipbuilding and Drydock Company; Joseph J. Tynan, general manager Union Plant of the Bethlehem Shipbuilding Corporation, Ltd., San Francisco.

WITH the launching at the plant of the Los Angeles Shipbuilding and Drydock Company on September 19, 1921, of the 12,000-ton freighter West Chopaka, there was consigned to the waters of Los Angeles Harbor the last of the ocean carriers of the war emergency program of the United States Shipping Board.

The launching of a ship has always been an occasion for moralizing, and undoubtedly many American citizens will be looking back over the war accomplishments of the United States Shipping Board with feelings of mingled pride and humility.

We are all proud that it was given to us as Americans through our Shipping Board to make such a splendid contribution toward the winning of the great war as is represented in the great merchant marine fleet now owned by us and operated under the guidance of the Emergency Fleet Corporation. On the other hand, we are forced to be humble as we realize that through circumstances entirely beyond our control this fleet, which we had hoped would become a commercial asset, must now very largely be looked upon solely as a war contribution which has no inherent ability for self-support under present conditions.

The West Chopaka completes a total of 2312 ships aggregating 13,636,711 tons. All these ships built in less than five years, an average per year of more than five times the normal output of the United States in the ten years preceding the war.

The first launching of this program occurred at the Staten Island Shipbuilding Company, Port Richmond, New York, May 29, 1917, the second launching at the Moore Shipbuilding Company, Oakland, California, August 25, 1917, and the third at the Fore River plant of the Bethlehem Shipbuilding Corporation, October 27, 1917. Deducting these three from the 2312 above we see that 2309 vessels have been launched by the Shipping Board in less than four years, averaging approximately two vessels per working day during that time.

Much has been written and spread on the pages of our public prints concerning graft and inefficiency in this shipbuilding program. We take no stock in the bulk of such material, knowing very well that had the high prices for shipping tonnage been sustained at the levels of 1918 and 1919 there would have been no talk of shipbuilding graft.

It is only when compared with the present low levels of prices procurable for steam tonnage that Shipping Board costs, taking into consideration war conditions, seem at all excessive.

We can say proudly that the cost of the shipbuilding program, considering the results of that program, would compare very favorably with the costs of any war activity either of our own government or of any government of the Allies.

A. J. FREY

Vice-President U. S. Emergency Fleet Corporation in charge of physical operations

Once more the Shipping Board chairman has come to the Pacific Coast for a practical steamship operator. While born in Heidelberg, Germany, June 6, 1875, A. J. Frey very early in life evidenced that practical common-sense which has marked his career as an organizer, by bringing his family to California in 1883. Graduating from the California public school system, he entered journalism in the newspaper field, remaining in the mechanical and news departments of a San Francisco daily from 1892 to 1899. In the latter year he secured a position as secretary to R. P. Schwerin, vice-president and general manager of the Pacific Mail Steamship Company, and was rapidly promoted to the position of assistant general manager, occupying later in succession the active managership of the Portland and Asiatic, Occidental and Oriental, and San Francisco and Portland Steamship companies, then affiliated with the Pacific Mail. In 1915 Mr. Frey organized the China Mail Steamship Company. Later he reorganized the purchasing and supply departments of the Associated Oil Company and affiliated companies. In 1918 he became assistant district manager of ship construction for California under the Emergency Fleet Corporation, and in 1919 was appointed district manager. In 1920 he became vice-president and general manager of the Los Angeles Steamship Company and established the present express passenger service between Los Angeles and San Francisco. Mr. Frey now faces the gigantic task of keeping in operation 13,000,000 tons of ocean shipping, and in this task he should have the patient co-operation and loyal backing of every American citizen. He is a practical man and knows his business well.

W. J. LOVE

Vice-President Emergency Fleet Corporation in charge of traffic department

Mr. Love is considered one of the foremost experts on traffic management among the younger executives of the ship operating companies, with headquarters at New York. For a considerable period prior to the acceptance of his present position he had been traffic manager in New York for the great British steamship firm, Furness, Withy and Company. In that connection he has become intimately acquainted with traffic problems in all the seven seas. There is hardly a trade carried on by sea water anywhere on the globe in which Furness-Withy have not at some time or other been operating steamers. Mr. Love will, therefore, bring to the soution of the problems connected with his office a ripe understanding and a thorough, practical working knowledge which should speedily bring order out of what has been largely chaos.

ALL HANDS

IN the early days of the sea when occasion arose to communicate anything in which all hands were interested, it was the custom to muster the crew aft and there tell it to them face to face. Conditions are different today, but the occasion arises at times when there's a message to be put over in which all hands are interested. Such an occasion is here now and all hands on every American ship are interested in what we have to say.

There is no quarter deck on which such a crew could be mustered, so we're sending the message in the form of a pamphlet, which you can read and think over on your watch below.

The United States government—the only union to which every American citizen owes first allegiance—is pledged to the task of building up and maintaining a great merchant marine. This can be carried out only with the help of all hands.

Best Work Conditions in World

The shipping laws of this country guarantee the American sailor safety, comfort and financial protection, such as no other country could afford to offer. These laws, while making seafaring a more inviting career, have added tremendously to the expense of operating ships. In fact, it will be impossible to operate them in competition with the world unless the personal service thus protected is of such a surpassing efficiency that it overcomes the great cost.

Our coastwise shipping exists almost entirely because through the coastwise shipping laws foreign competition has been shut out. In this way part of the burden of the high cost of operating American ships has been shifted indirectly to the shoulders of the general public. This high operating cost in the past automatically shut us out of trade open to foreign competition. The same thing can happen again and unless by greater efficiency we are able in the coastwise trade to offset this higher cost there will come a day when the country will weary of furnishing a protection which adds only to its own cost of living and will let the foreign ships compete for our coastwise traffic.

In a large measure this is up to you.

We can't have efficiency in the personnel of the American merchant marine as long as there is division of allegiance.

"No Man Can Serve Two Masters"

Here is a typical admonition from the "regulations" of the Masters, Mates and Pilots of the Pacific:

"Before shipping see that all of the mates are members of the association; if they are not—think twice. At all times before shipping or when leaving a ship, consult the secretary, agent or business manager, by calling at the association rooms or by telephone. It will be to your interest to follow instructions."

Here is another:

"Let the password be, 'Do your duty to the association, hammers over the side, let all hands be more than brothers of the sea, do not be divided, stand as one man,' then you will reap the benefit by better conditions, and not otherwise."

If in the latter quotation the Masters and Mates would substitute "American merchant marine" for "association," their password would point the way to a course of action worth any man's while.

In the constitution and by-laws of the Sailors' Union of the Pacific, which may be taken as typical of the "supreme law" to which marine workers other than licensed officers have bowed, it is frankly admitted that the union is based on the principle of its members getting all they can from the employer and giving as little as possible, and that only incidentally. Although the seafarer is dependent for his very life on the protection afforded him by the laws of the United States government, the oath or obligation that he assumes on joining the Sailors' Union is not of allegiance to the flag that protects him. Here's the oath:

"I pledge my honor as a man, that I will be faithful to this union until death; that I will work for its interest and will look upon every member as my brother; that I will not work for less than union wages and that I will obey all orders of the union. I promise that I will never reveal the proceedings of the union to its injury or to persons not entitled to know the same. And if I break this promise, I ask every member to treat me as unworthy of friendship and acquaintance. So help me God!"

Lives Depend on Discipline

A sailorman shouldn't have to be told that the safety of life at sea depends on the maintenance of a proper discipline. Anybody knows that nothing will ruin discipline as quickly or as completely as having too many bosses. Your very life then depends on this discipline which is made impossible by the divided allegiance demanded by maritime unions and so-called beneficial associations.

Without discipline your lives are imperiled and the efficient operation of shipping is impossible.

Whenever a law has been passed adding to the expense of operating American ships, the champions of the law have protested that the superior efficiency of the American crew would offset this additional expense and that it wouldn't, consequently, count against the American ship in the fight for business against foreign competition. To put this theory into practice would require the absolute and whole-souled allegiance of every worker, from master to galley boy, to the task of making the American merchant marine the most effective working organization in the world.

In the last analysis, the existence of the American merchant marine depends on the ability to perform certain services either better or for less money than anybody else. If we can do this we can build up the greatest merchant marine the world ever saw. If we can't do it, all the laws for bettering the conditions for seafarers, all the unions, all the associations, won't mean anything for the reason that there will be no American merchant marine.

Pacific American Steamship Association.
Shipowners' Association of the Pacific Coast.

OUR COVER

THIS issue of Pacific Marine Review has for its cover subject the reproduction of a photograph showing the new United States dreadnought California in the graving dock of the Union plant of the Bethlehem Shipbuilding Corporation at Hunters Point.

The California was built at Mare Island Navy Yard, San Francisco harbor, and is the largest vessel yet completed on the Pacific Coast. She has a full load displacement of 33,190 tons, a length over-all of 624 feet, and a beam of 97 feet 3½ inches.

Hunters Point dock is the largest commercial graving dock in the United States, having a length of 1000 feet, a width at sill of 110 feet, and a depth on sill at ordinary high water of 40 feet.

IN THE DAYS OF THE CLIPPERS

WITH the story of the clipper ship Three Brothers we are beginning a series of histories of famous sailing ships that will appear from time to time in forthcoming issues of Pacific Marine Review under the authorship of F. C. Matthews of San Francisco, who for nearly fifty years has made a hobby of keeping track of his old favorites

As we were considering this series, there appeared in two of our contemporaries the poems reproduced below, which form so beautiful an introduction that we are reprinting them here. Both poems relate to exactly the same phase of life in a sailing ship, yet in their treatment of this subject they could not well be more different. Both voice the real appeal of the sea to the heart and mind of all of those who have Viking blood in their veins, and apparently this appeal is just as potent to the real sailor, whether he be fighting the sea in the lee scuppers or navigating a ship from the quarterdeck. The real incentive seems to be the thrill which comes to every man when he is able by his own skill and will to overcome the elements bent on his destruction.

EASTING DOWN

JUST for a moment still the hissing steam,
And southward lift free Fancy on swift wing
To traverse once again the steep ravines
And mountain ranges of that regal sea
That rolls around the Cape and round the Horn.
No idle words, for like the land, the sea
Hath mountains and wide valleys and vast plains;
And I, on yardarm's giddy perch, have gazed
From foaming crest of billowy Snowdon
Into the yawning gulf below and thought
This surely is the Hollow of God's Hand.
Thence, swooped as on an avalanche, and felt
As if my body's lower half had gone
And left its blood to crowd the arteries
That lead through upper half to heart and brain.
My face would flush and o'er me there would come
A fierce desire to hollo with the gale.
So to the depths and then, without a pause,
Lift on the next great surging slope and mount
Skyward like thought inspired, till on my view
There burst a scene magnificent, sublime;
Foaming Sierra ranges, ridge on ridge,
With summit, cleft and valley, peak and spur.
And then to downward glance, and watch the ship,
One of the Clyde-built darlings slim of waist,
Run from the chasing waves like maid who runs
From over eager arms of lover fond;
The pride of clippers at her racing bows,
And in her wake the sea birds great and small;
The mottled pigeon and swart Cape hen,
The tiny Mother Carey and the dove,
The roving molynhawk and, lord of all,
The proud beaked albatross on soaring wing;
And singing through her cordage and her sails
The vigor of the voices of the wind.
Ah, dear, those days of easting down, those days;
When, to the merry southwest gales, we swung
The saucy royals, and veiled them only
When, like boisterous boys from school, the squalls
Would romp upon us in their haily glee,
And hustle us a moment from our course,
Raising the stand-by call along the deck;
So pass, and leave us to adjust ourselves,
As young boys leave their sisters, half in tears,
Half smiling, after the rude embracing
That disarranged the dressing of the hair.
We sighed to sight a steamer on such days
When, from the rattling reel, the line rushed out
And made the fourteen seconds seem an age.
I've seen the fifteenth knot outside the rail
Not once, but many times, down Forty-five.

JOHN ANDERSON, in The Nautical Magazine.

RUNNING THE EASTING DOWN

YOU can prate of yer ocean racing and swift Cunarders too,
That skip The Ditch by power of steam and the thrust of a mighty screw.
You may thrill in the Aquitania or ships of like renown,
But gimme a trip in a clipper ship when running her Easting down.

D'ye mind the day when we squared away and ran her East by South?
When she trampled down the big Horn seas with a roaring bone in her mouth,
When the best hands twirled her bucking wheel and dared not look behind
At the growling grey-back in her wake. . . D'ye mind, old pal, d'ye mind?

Them were the days with the life-lines strung from the poop to fo'c'sle head,
When the cook 'n stoo' had their work cut out to give us our daily bread,
When the dollops came thundering over the rails and flooded the decks in a broil,
And us poor devils were plunged to the necks as we hoisted and sheeted a royal.

D'ye mind the smile in the Skipper's eyes when he summed her daily run?
And the blighter would hang to his rags aloft 'til a gan's'l banged like a gun,
And the cloths of it flogged from the bolt-ropes and canvas-threads whitened the stay. . .
It was "Leggo that mizzen t'gallant, me sons; 'n aloft and cut it away!"

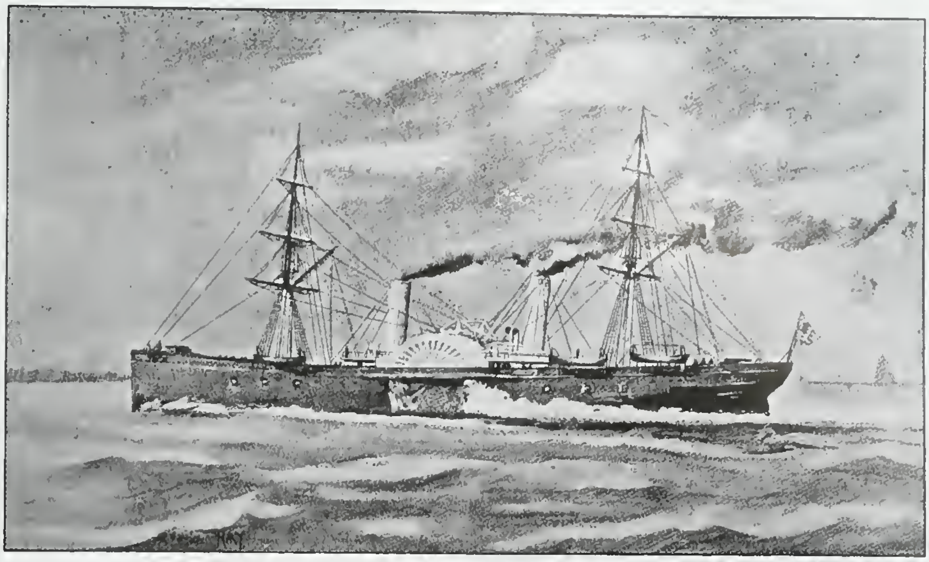
It was wonderful square-yard sailing, m'lad, and glorious storming through
The watery hills of fifty south with bar-taut brace and clew
And preventer-sheets on the tops'ls, and the fores'l arched like a bow,
As she ran like a hound to the East'ard,—'n, Lord, how the hooker did go!

Ye can have yer steam-boat racing, but gimme the run in a gale
Of a well-geared able clipper what is driven by snow-white sail.
For I've known the thrill of a piling sea and the sky in a cloud-flecked gown,
And fourteen knots in a wind-bag when she's running her Easting down!

FREDERIC W. WALLACE, in Canadian Fisherman.

THE CLIPPER SHIP THREE BROTHERS

By F. C. MATTHEWS



The U. S. steamer Vanderbilt presented by Commodore Vanderbilt to the United States government in 1861

IT has been considered appropriate to begin our series of clipper ship histories with an article on the world-famous Three Brothers, whose reconstruction, its financing, and its successful accomplishment were all San Franciscan, the ship itself being everywhere regarded as a San Francisco product.

As the merchant steamship Vanderbilt, she was built by Jeremiah Simonton at Greenpoint, Long Island, 1856-7, for Commodore Vanderbilt's North Atlantic Mail Steamship Line operating between New York and Havre. The other steamers of the line were the Adriatic, 4145 tons, and Illinois, 2124 tons, the Valderbilt's tonnage being 3361. All were wooden side-wheelers of clipper model. These were running in 1860, but shortly afterwards they were withdrawn, due to lack of governmental support, and the discontinuance of this line left no American steamers engaged in trans-Atlantic traffic.

The Vanderbilt was then considered the fastest steamship afloat. On her third voyage she arrived off The Needles in 9 days 8 hours from New York, the fastest time on record to that date; ran 350, 337 and 333 miles on successive days. In June, 1858, she reached dock at New York in 9 days 13 hours from Southampton, best on record, and the following year made the run from The Needles to New York in 9 days, 9 hours, 26 minutes. Captain Edward Higgins, who came to San Francisco in 1874 to take over the agency of the Pacific Mail Steamship Company, was commander of the Vanderbilt when she made the (then) record passage from New York to Southampton in 9 days, 5 hours, being one-half hour better than the time of the Persia, which had been represented as the fastest steamship afloat.

In 1861, as a United States war steamer, the Vanderbilt was presented by Commodore Vanderbilt to the government, fully outfitted as a vessel of war, and she was immediately sent to Hampton Roads to run down the Merrimac, should the latter attempt to get to sea. She was afterwards put on the trail of the Alabama, which, however, successfully evaded her.

American clipper ship Three Brothers. Length over-all 350 feet, breadth 48 feet, depth 31 feet, registered tonnage 3360

Her first appearance in the port of San Francisco was on June 22, 1866, when she arrived from Hampton Roads convoying the monitor Monadnock. She then bore the broad pennant of Commodore Rodgers, her commander being J. P. Sanford. She was described as of 3100 tons, 2800 indicated horsepower; crew of 386, officers and men; the swiftest and one of the largest wooden war steamers afloat, which had "borne our starry flag over half the globe," as the papers had it.

In 1866 Commodore Vanderbilt received the gold medal which the government had voted him for his princely gift. The ship when turned over by him had been furnished with a battery of fourteen heavy guns on the main deck and two long Parrott guns on the upper deck. She afterwards had her upper cabins cut away and her guards lowered.

In August, 1863, when in charge of Commander C. H. Baldwin and in chase of the Alabama, the Vanderbilt came across the dismasted and rudderless Dutch bark Johanna Elizabeth, from Batavia for Amsterdam with a valuable cargo and fifteen passengers, consisting of Dutch army officers on leave and their families. Commander Baldwin successfully towed the bark into Simons Bay, Cape of Good Hope, and as all claims for salvage were waived, the Dutch government and all interested were very profuse in their acknowledgments of appreciation for the service rendered. The disabled bark had been for over five weeks drifting back and forth over her own tracks and was in a very dangerous situation.

In 1866 the Vanderbilt made a trip to Honolulu, taking to the Islands Queen Emma and her suite, the party having been touring here. From this time until she was sold, the ship was kept at Mare Island.

From Steamship to Sailing Ship

The Vanderbilt was sold under the hammer at Mare Island March 27, 1873, to George Howes & Company for $42,000 currency. Official documents shed a very interesting light on this sale, especially when viewed in connection with the present efforts of the United States Shipping Board to sell our great merchant marine fleet. In February of 1873 the Vanderbilt was put up for bids. The largest bid was $56,000 gold. She had previously been appraised by the Naval Board at $80,000, and the bids were all rejected. Six weeks later came a peremptory order from Washington that she be sold at auction, with the result noted above. Her purchasers sold the engines for $20,000 gold and salvaged stores and materials to an additional $12,000 gold, so that the hull, ready to be reconditioned into a fine clipper ship, cost them $7000 gold, which even for those days was a great bargain.

Work on reconstruction was begun April 13 at Hunters Point, San Francisco, by Coombs & Taylor under the supervision of Captain Robert W. Waterman and continued until ship was loaded and ready for sea, October 23. Cost of rebuilding was $175,000 gold. Her length for tonnage purposes was given as 312 feet 6 inches, beam 48 feet 8 inches, and depth of hold 21 feet 6 inches. She had three full decks and beams for a fourth lower deck, and her total depth to spar deck was 32 feet. Her registered tonnage was: below deck 1922.91; between decks 967.47; above deck 81.79; total 2972.17 tons. Her upper works were raised 14 inches and a handsome shear given her. From plank shear to bends, she was 2½ feet thick, solid wood, and below that, 3 feet mainmast, 98½ feet long, 44 inches diameter at deck, without a single knot or flaw; main topmast, 56½ feet long, 20-inch diameter at cap; topgallant, royal and skysail mast, one piece, 70 feet long. Foremast itself was 3 feet shorter than the main; all other dimensions of other masts on the fore were the same as those of the main. Main yard, 100 feet long, 29 inches diameter in the slings; lower top sail yard, 87 feet 20 inches; upper, 78 feet by 18 inches; topgallant-yard, 55 feet by 13½ inches; royal, 41 by 11 inches; skysail-yard, 33 by 9 inches. Yards on forecast the same. Bowsprit 50 feet, 40-inch diameter at Knight Head; jibboom with flying-jibboom, 65 feet by 19 inches at cap. Under full sail spread 15,000 yards of canvas, the mainsail alone containing 1010 yards.

Reproduction of panel in the old San Francisco Merchants' Exchange showing the scene in San Francisco Bay as Three Brothers was towed out on her maiden voyage. Shown in the picture above are, inward bound, the barks Rival, Windward, and Powhatan, the schooners Caroline Mills and Margaret Crockard, and the German corbette Nymph. Outbound are shown the bark Clara Bell and the brigs Josephine and Crimea. The tugs Rescue and Neptune are towing the Three Brothers, and the steamer Princess is following with excursionists.

Panel painted by Coulter

She was renamed Three Brothers for the three Messrs. Howes, owners.

Her Career as an American Ship

Friday, October 24, 1873, was a momentous day in San Francisco shipping circles, for it was the commencement of the career of the world's largest merchant sailing vessel. Precisely at noon the tug Neptune left Pacific Mail Dock with a party comprising the master of the big ship, Captain George Cumming (formerly of the clipper Young America, same owners), and his wife; the Messrs. Howes, of whom Jabez went in the ship to Havre; the pilot commissioners; a number of leading merchants; Pilot Nathan; and last, but not least, a band of music. The tugs Neptune and Rescue began towing at 1:15 p .m. to the tune of "Good Bye, Eliza Jane" by the band. The wharves were crowded with cheering multitudes, while the noise from innumerable whistles was deafening. The clipper ship Herald of the Morning added her quota to the din by saluting with her two guns, shortly afterwards being followed by the guns from Fort Point and from an inward-bound revenue cutter. An excursion party on the steamer Princess followed the ship until past Fort Point, and amidst music and continued cheering, the tugs dropped their charge eight miles outside. When Pilot Nathan left the ship at 5 p. m. she was under full sail, courses to skysails, going off close hauled, in a fine westerly wind.

The voyage thus auspiciously commenced was brought to a successful termination off the port of Havre, at daylight, February 13, 1874; time of passage, 111 days 12 hours; took pilot off Falmouth 108 days 16 hours out. Captain Cumming had made the Horn in 54 days and was on the line the 86th day. Best day, February 5, 314 miles in strong northeast by north winds. Least day, 10 miles, though had several days under 20 each. Total distance sailed, 16,073 miles. Beat, by three days, the British iron clipper British King, whose San Francisco backers had considerable money up that she would outrun the "big brother," but as "Along the Wharves" in the "Alta" had it, "Kings weren't trumps this deal." Three Brothers by her passage also won for her backers their wagers that she would arrive at Havre not later than Young America (from New York, October 29) would reach this port; as it was both ships arrived at their respective destinations on the same day, but "big brother" was several hours ahead. Completing her first voyage, Three Brothers crossed from Havre to New York; loaded 4800 tons general cargo and reported herself at this port November 8, 1874, after a passage of 132 days. With much light and head winds and 13 days of calms in the North Atlantic, and then taking 9 days to make the run from 4 degrees south to 7 degrees south, she retrieved herself by making the fine time of 85 days from the latter point into port.

Second voyage: Sailed hence December 28, 1874. Took British pilot April 14, 1875, 107 days out and anchored at Liverpool three days later, 110 days. Reported light winds to the line, 23 days; passed Cape Horn in 50 days and was again on the line on 80th day out. Distances run weekly were: 520, 853, 1114, 1559, 1104 (one day 282), 1350, 1378, 1405 (one day 310, under all sail, running about seven points free and frequently logging 15 knots), 883, 839, 553, 1471, 1472, and for week ending April 12, 1092. Log showed that on March 4 in South Atlantic "spoke British ship Derbyshire (left San Francisco 26 days before us) and dropped her out of sight in a short time. Soon after came up with and passed the ship Oakland (left San Francisco 11 days before us)." The "big brother" also beat the crack Britishers, America, British King and British Peer, all sailing about the same time, the first by 19 days and the last named by 27.

Completing this voyage, Three Brothers arrived here October 24, 1875, after a tedious passage of 134 days from Liverpool. Had hard luck in the North Atlantic, 36 days to the line; no trades in South Atlantic and 19 days of strong gales off the Horn. However, she came up from 50 degrees south in the Pacific to within 600 miles of this port in the excellent time of 42 days. Thence, however, luck again deserted her and for 14 days she had light airs and calms and was inside the Farallones for three days in a dense fog.

Third voyage: Sailed hence December 23, 1875; arrived in the Channel 105 days out and anchored at Liverpool April 9, 1876, 108 days. Was 13 days 15 hours to the line, a very fine run; passed the Horn in 48 days and crossed the line 76 days out, good time thus far, but thence had adverse winds. During the seventh week out made 1457 miles; on January 31 logged 318.

Completing this voyage Captain Cumming brought his charge safely into this port, January 13, 1877, in 116 days from New York. Had a fine run of 52 days from the Horn to the Farallones, off which lost some sails in a heavy norther the day before arrival.

Fourth voyage: Left here March 17, 1877. Had 19 days to the line; 52 days to the Horn and was on the line in the Atlantic 77 days out. Made Fastnet light June 26, 101 days out; anchored in the Mersey 29, 104 days. During week ending June 9 made 1600 miles; and for the last eight weeks of the voyage ran 10,044 miles. Made the fastest passage of any vessel sailing about this time, beating Patterdale by 10 days, Langdale by 8 days, Benmore by 13 days, Charger by 16 days, all ships noted for speed.

Three Brothers rounded out this voyage by arriving here January 8, 1878, 112 days from Liverpool with 3473 tons of coal. Had uniformly fine weather; was but 11 days from 50 degrees south in Atlantic to 48 degrees south 86 degrees west in Pacific—was off this port and within 300 miles for 8 days. This voyage was her fastest, 216 sailing days on the round.

Fifth voyage: This was a round to New York between dates, October 11, 1878, and September 19, 1879; time outward, 111 days; return, 134 days. Took hence 3258 short tons barley. Have no memoranda of outward trip. On return had nothing but unfavorable weather and winds; 31 days to the line; thence 34 to the Horn; thence 31 to the Pacific Line with much heavy weather, gales and violent squalls in South Pacific; and as if to finish consistently, head winds kept her 38 days from the line to port, off which she was also detained two days in a dense fog.

Sixth voyage: Sailed hence November 24, 1879; arrived at Liverpool April 4, 1880, 132 days passage.

This was the last run of Three Brothers under the American flag, for following the suspension of her owners, she became the property of Mr. John Williams, a partner of James Baines of old Black Ball Australian clipper packet fame.

Three Brothers Under the British Flag

In recent correspondence to the Liverpool Weekly Post, Captain Mathias, who was in command of the ship during her career as a Britisher, states that he was persuaded, much against his inclination, to go out as master, but that the sequel proved that he was fortunate and made good passages. To quote from Captain Mathias further: "She was very fast and I do not think could be beaten. She was a favorite ship at Antwerp, where we loaded general cargo, principally glass, for 'Frisco.' Finally freights got so low for wheat that a great many ships were laid up, and it was difficult to get so large a cargo in one ship, so when I arrived at Liverpool in July, 1885, she was laid up and shortly afterward sold to the Anchor Line to go to Gibraltar as a coal hulk; being of great length, those round-mainsail fellows can lie alongside comfortably to coal. I have often wondered why the Germans did not destroy her during the war."

Her record as a British ship follows:

Arrived at Wilmington, California, August 3, 1881, 134 days from Liverpool; discharged 3000 tons coal; came to San Francisco; discharged 1000 tons; loaded 90,435 centals of wheat (the largest amount carried in her history), and arrived out at Antwerp January 28, 1882, 105 days passage. Cargo turned out in excellent order. Loaded general cargo and sailed from Antwerp May 2. Arrived here August 22, 1882, 117 days out; 112 days from dropping pilot off the Lizard. Was 62 days to the Horn and was on the Equator 90 days out. In the South Pacific Captain Mathias got caught in the bight of the spanker sheet and broke his leg. Log had the terse entry, "Set same with the assistance of the steward." The mate took charge and brought the ship safely into port.

Sailed hence October 28, 1882, for Antwerp. Had been ready several days previously, but the crew had refused duty, and finally Captain Mathias had to get a shore gang to heave up anchor. Put into Plymouth March 15, 1883, 138 days out, with mutiny aboard: there was trouble all the voyage out and six of the crew had refused all duty the whole passage.

Vessel proceeded to Antwerp; discharged; loaded and arrived here December 21, 1883. She lost her rudder and was some six weeks at Rio replacing it. Thence she had the very quick passage of 72 days to this port.

She bade a final farewell to her former home port on March 7, 1885, when she got away for Liverpool; arrived out July 8, in 123 days, and was sold as heretofore stated.

Authorities who have seen her within ten years or so past say that she was then in good condition, her sides being very smooth and seams about as narrow as those of a new ship. The Norwegian steamer Tricolor, a former well-known trader to this port, discharged a cargo of coal into her not many years since.

So here we will take leave of our old friend. Still serving a useful end, rounding out a strenuous career of nearly three quarters of a century, in which she always "made good," for her builders builded well. Little did the writer think over forty years ago, while sitting on the wharf stringer watching the husky stevedores in their back-breaking job, as, steadily and regularly as machinery, they lifted the bags of grain by stages over the ship's bulwarks, sliding them down into the huge hold and bleeding them now and then for good stowage, that he would ever have the pleasant task of compiling the history of one of the best known and most celebrated ships the world has ever seen.

Anyone desiring to inspect a correct model of this celebrated ship can find one in the Nautical Room, Golden Gate Park Museum. Although the model is named Emma, it is actually Three Brothers, and is rigged with four masts which Captain Cumming always claimed she should have had. This model, a magnificent piece of workmanship, was built aboard ship by Captain Cumming during a period of six years. Everything is in exact proportion and ship shape: each block, even the smallest, has its shieve and is in running order; the standing rigging is of silver wire, laid by Cumming, who also turned out of ivory, masts, yards, blocks, etc. The model was raffled off at the Merchants Exchange in December, 1882, and although the writer held a number of tickets, the lucky man proved to be popular Frank Middleton, master stevedore. The model was at that time appraised at upwards of $1,000.

Pacific Marine Review
The National Magazine of Shipping

576 Sacramento Street
SAN FRANCISCO, CALIFORNIA U. S. A.

Official Organ of the Pacific American Steamship Association

Subscription Price, per year (Domestic) $2.00
(Foreign) $3.00
Single Copies . . . . 25 cts

J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor

NEW YORK OFFICE
339 at 30 Church Street
M. B. STEWART, Manager

Pacific Marine Review is sold at all leading News Stands
Entered as second class mail matter at Postoffice
San Francisco, California

Published on the First of Each Month. Copyright
1921 in the United States by J. S. HINES

WHAT IS WRONG WITH THE AMERICAN MERCHANT MARINE?

MANY American citizens have been asking themselves during the past year the questions, "What is wrong with the American merchant marine? And with the United States Shipping Board?" There have been all sorts of attempts to frame up answers to these questions by Shipping Board officials, various members of Congress, senators, politicians, shipbuilders. In fact, all classes of the American people have in one way or another had a hand in the propaganda which has been appearing in the public press from time to time concerning these questions and a possible solution.

Practically all of the material that has appeared, however, seems to ignore the fundamental difficulty with not only American shipping but world shipping at the present time. A great deal of loose talk is indulged in concerning former American supremacy in merchant marine, concerning a return to pre-war prosperity in merchant marine matters, concerning tremendous sums of money alloged to have been paid annually to foreign ships for the carriage of American freight, and concerning so-called foreign propaganda at Washington for the destruction of the American merchant marine which has been built up at the cost of so much treasure.

We are continually having congressional investigations of the Shipping Board and Emergency Fleet Corporation, every investigating committee finding tremendous evidence of graft, of criminal carelessness, and of official incapacity, and every Congressional committee uniformly, after so finding, "whitewashing" everybory concerned and arriving at the point of departure in ballast just as they started out.

The chief difficulty today in the world's shipping is that there are too many ships and too little freight. One remedy for this—the laying up of ships—is automatically applied and has been applied in all ports of the world, both as regards American ships and as regards the ships of every other nationality. The other remedy—that of getting down to hardpan, going to work and producing more freight—seems to have been far removed from the mind of anybody who has any connection with this question.

There is some evidence quite recently that a considerable portion of the world's population is beginning to realize the necessity for applying this latter remedy, and that is the most hopeful sign on our shipping horizon.

WORLD SHIPPING

BRIEFLY stated in figures and using round numbers, there are 63,000,000 tons of shipping afloat today compared with 50,000,000 in 1914, an increase in the world's merchant tonnage of 13,000,000 tons. Under ordinary normal conditions this would represent approximately the normal rate of increase for world tonnage, and we would be in capacity for carrying freight on the same footing as we were in 1914. It is very commonplace to say that world conditions are not normal. They are so far from normal that actual figures show instead of an increase in tonnage of freight carried a tremendous decrease, so that today with 13,000,000 tons additional shipping we are carrying in the world's ships 35 per cent less freight than we were in 1914. That in a nutshell is the primal cause of all of the difficulties in world shipping.

We find a great many academical students of shipping referring to tremendous "invisible" exports depended upon by Great Britain for bringing to her somewhat of a fair balance in her export and import trades, these invisible exports largely consisting of freight earned by her sea tonnage.

Sir Frederick Lewis, chairman of Furness, Withy & Company, Limited, in his annual address to the stockholders of that great British shipping company calls attention to the fact that, while two years ago the gross freights earned by British shipping were between £350,000,000 and £400,000,000, the same method of calculation applied during the last fiscal year would show that these earnings had dropped to between £60,000,000 and £70,000,000, and that in using these figures, small as they were, for calculating the basis of invisible exports, it was necessary to deduct the coal purchased abroad during the coal strike and the joiners‘ work effected abroad during the joiners' strike, leaving an exceedingly small surplus to be contributed to that one-time potent adjuster of Britain's trade balance. In making public these figures, he emphasizes the fact that the £60,000,000 to £70,000,000 here referred to is not a profit on the operation of ocean-going shipping, but the gross returns, out of which expenses and depreciation have to be provided for, and that, consequently, a large proportion of this contribution of shipping to the invisible exports of Britain was made at a loss to the shipowning companies.

In predicting the outlook for the current year Sir Frederick speaks in parable. Says he: "A prudent traveler across the desert has his baskets full of bread and his bottles filled with water. There is no use disguising the fact that shipping has a difficult period to face, and it will take a good deal of time and patience before all our difficulties are overcome. But, to use a rowing expression, every man in the boat must pull his full weight. The principle of 'ca' canny' must be left behind as one of the specters of the past."

ONE WAY TO HELP

COUNTY COUNSEL A. J. HILL of Los Angeles has ruled that cotton stored at that point awaiting compression is subject to county taxation. He said in part: "While at the compress the cotton is not in control of the common carriers; that during the time that the cotton is in the hands of the city for the purpose of compression and not under a bill of lading, the consignee has full power of control, and disposition over it, and could withdraw the cotton and dispose of it as he might see fit; that the cotton is under control of the owner, with all the powers of absolute ownership."

The Japan Cotton Trading Company protested, in part as follows: "We hold that the cotton is not under our control and ownership while at San Pedro, by virtue of certain steamship contracts, under which we have obligated ourselves to deliver certain quantities of cotton after having same properly assembled and compressed. The necessity at times of holding certain bales at San Pedro is for the purpose of assembling a certain number of bales to meet the grade stipulations in our contracts of sale with the foreign buyers. We can show by our files that any cotton in transitory storage at San Pedro, for the purpose of assembling and compression, at noon, March 1, 1921, is not under our control for disposal as we might see fit, but that it is in transit in process of shipment, according to certain contracts of sale, which we have obligated ourselves to fulfill."

An opinion such as Mr. Hill's certainly is not likely to promote the foreign trade of Los Angeles.

ANALYSIS OF SHIPPING FIGURES

SIR FREDERICK LEWIS, chairman of Messrs. Furness Withy & Company, Ltd., makes a very shrewd and common-sense analysis of Lloyd's latest statistics and draws a very good moral for all shipping men to follow. While written from an entirely British viewpoint, the conclusions apply just as strongly on this side of the Atlantic. Without further comment we present the analysis in Sir Frederick's own words:

"I need not tell you that since we last met we have experienced a very heavy drop in freights. It is commonplace to say that this fall is due to the volume of overseas trade falling below the supply of ships, but while that is obviously the primary cause of the depression it is worth while analyzing the position somewhat more fully. A study of the statistics recently published in Lloyd's Registry of Shipping shows that of the total world's steam tonnage of 54,217,000 gross tons, there is, eliminating wooden vessels altogether, 11,703,000 gross tons of shipping afloat more than there was in 1914, notwithstanding the tonnage lost during the war. The approximate increase that would have occurred normally during this period of seven years is 15,000,000 gross tons—that is, on the assumption that there had been no war and no substantial increase in the shipbuilding plants of the United States. It will, therefore, be seen that there has been no over-production in the ordinary sense of the expression. Furthermore, these figures include a number of old vessels which, in the ordinary course of events, would have passed into the shipbreakers' hands long ago, and which have only been kept in service owing to the fact that during the war any seaworthy vessel, however old, could find employment. It is fairly safe to say that these vessels will never again be put into commission unless under exceptional circumstances, as the cost of repairs and surveys would exceed their value when completed. Vessels on the register of over 25 years of age represent 5,757,175 gross tons, of which 4,055,847 are owned abroad and 1,701,328 are owned in the United Kingdom. If for the purposes of estimating the effective world tonnage these are disregarded, we arrive at an increase of 5,945,825 gross tons over 1914. Of this increase, however, 2,940,000 gross tons is represented by the increase in bulk oil carriers, and whilst to some extent these may displace coal carrying, for ordinary general purposes of the world's trade, it may be said there are in effect only 3,005,825 gross tons more of serviceable vessels afloat today than there were in 1914. Notwithstanding these figures there is laid up in the world's ports an amount of tonnage which was recently estimated at round about 10,000,000 tons. It follows, therefore, that the principal cause of the decline in freight is due not so much to the over-production of tonnage as to the falling off in the world's overseas trade, and so far as shipowners are concerned, I can only see one practical thing to be done, and that is to reduce operating costs to such a level as will help forward a revival of international trade. Seamen's wages have already been reduced by mutual agreement; we have extended our self-insurance arrangements in order to minimize the expenditure on insurance premiums, whilst coal has been decontrolled, and has come down in price, but still not far enough."

UNEMPLOYMENT

WE are informed by statisticians that there are at the present time several million unemployed in the United States and that the number is increasing rapidly. While some authorities are sadly perplexed over this condition, others affect an optimistic view, and even the Secretary of Labor of the United States is reported in the public prints to be not at all discouraged by the situation, stating that "there is not any more unemployment today than there was in 1914."

Much as we desire to be optimistic, however, we cannot escape the conclusion that with the present high level of prices for the necessities of life and winter coming on, these unemployed are facing considerable hardship, and the conditions are serious enough to warrant the best thought and action of the wisest heads in the nation.

President Harding and his cabinet are attacking this problem very vigorously, and under the leadership of Herbert Hoover a conference is just now being held in Washington to see what can be done toward removing the causes of unemployment. At its best, however, Federal action must be slow in reaching the great mass of men affected by this condition, and local efforts are needed to supplement those from Washington.

We suggest that these local efforts should be directed broadly along two lines. First, all available funds for public improvements should be used as promptly as possible to bridge the gap; and second, every encouragement should be given private capital so that industrial and manufacturing firms will not delay improvements to plant.

In San Francisco, for instance, John McLaren, superintendent of Golden Gate Park, comes forward with the suggestion that he can use several thousand of the city's unemployed for a month or two in park extension and improvement work, if the supervisors will vote the necessary funds.

And again, for instance, in San Francisco we know that there are some millions of cash and salable bonds available for constructive improvement on the waterfront under the jurisdiction of the State Board of Harbor Commissioners. A very considerable amount of work in the Board's program is waiting only for the demands of business to initiate actively its program of extension. It would seem to us that there is ample argument for the immediate use of these funds and for the employment thereby of several hundreds, if not thousands, of men. In this connection the city's program for the leveling of Rincon Hill should be undertaken very promptly, as this will not only provide work for a large number of men, but will enable the Harbor Board more intelligently to initiate its program.

So much for San Francisco alone.

We know that in the region of Central California there is enough work needed to be done to provide employment for all the unemployed who reside in that territory, and that much of this work is delayed, not for lack of funds, but on account of lack of confidence in future business conditions.

Undoubtedly the same condition exists in the greater part of the United States.

If, therefore, the negotiations of the conference at Washington can restore confidence, it will take but a very short time to put all of the unemployed at work and so to create a further increase of confidence which will rapidly bring us back to stable normal conditions.

GOVERNMENT CONTRACTS

IN this connection the Federal government can immediately help the unemployment situation and at the same time go a long way toward restoring confidence in general business conditions by resuming work on its own contracts in cases where those contracts have been suspended in line with the present retrenchment program. In this particular phase of the question we are much interested because so large a proportion of the retrenchment has been directed toward marine work, both in shipbuilding affairs and naval affairs.

In the case of the suspension of the naval contracts the work had in large measure been started, commitments for materials had been made by contractors and sub-contractors in good faith, and the suspension of the contracts will in the long run simply mean that the United States government and the Navy Department will be under tremendously increased cost for the finishing of these contracts or for the satisfaction of contratcors' claims against the government.

We can, therefore, see no economy in such action by the Navy Department, and we can see on the other hand that the passage by the present Congress of a deficiency appropriation to meet the work in hand under these contracts will keep at work a large number of men who would otherwise be out of employment and will go a long way toward restoring general business confidence. For purely economic reasons, therefore, we urge—and ask all our readers to urge—upon Congress that such appropriation be passed during the present session.

We believe that the Federal government in all of its departments should be very careful to maintain a high standard of business ethics. "We should have more business in politics and less politics in business."

SCIENTIFIC EMPLOYMENT SERVICE

THE engineering societies of America have recently formed a consolidated organization which is known as The Federated American Engineering Societies and represents a combined membership of about 50,000, including in its ranks the most representative and best qualified professional engineers in the United States. This federated society has undertaken a wide range of activities and has been prominently before the American people in the public prints with an educational campaign for the reduction of waste in industry.

One very useful activity of the Federated Societies, the results of which in the nature of the case cannot be given prominence, is the employment bureau which acts as a sort of clearing house for the placement of engineers of every variety of training and experience. The only qualification for service from this bureau is that all applicants must be members of one of the affiliated societies and must submit a complete educational and professional record of their engineering experience. These records are carefully classified and collated, and as inquiries for men to fill positions are received, the records of men suitable to fill them are immediately available. The services of the bureau are free to employer and member alike, and all negotiations may be strictly confidential, is desired.

The high standards required for membership in any of the member societies insure the quality of the men available, while the number and the varied experience of the members of these societies provide a wide field of choice for a prospective employer.

The employment bureau of The Federated American Engineering Societies tenders its services to all engineering organizations in the building up and expansion of their personnel in preparation for the increased activity which is now manifest in the majority of our industrial centers.

A HEARTY ENDORSEMENT

WHEN H. H. Ebey, district director of operations of the Shipping Board, returned from Washington to San Francisco still seated securely in the saddle, the unusually active rumor that he was to be supplanted more or less summarily died a sudden death. Something doubtless occurred at Washington of which the public has no precise idea, for the prophecies of Mr. Ebey's forced retirement were too circumstantial to have been groundless, and many well-informed individuals thought that he was bound for decapitation. What caused the Shipping Board, or certains members thereof, to decide otherwise also may be left to speculation, but the following statement of the attitude of the Pacific American Steamship Association may have had some effect:

"In view of press reports of extensive reorganization within the board and having been in close personal contact with the situation here, we take the liberty of calling to your attention the efficient service rendered the Shipping Board and the splendid co-operation afforded your managing agents and private operators by Harold H. Ebey, district director of operations, and his assistants. We strongly indorse his administration and trust that your board and officials will see your way clear to its continuance." '

The telegram was signed by the following: Matson Navigation Company, Williams, Dimond & Company, Pacific Steamship Company, McCormick & McPherson, Robert Dollar Company, Struthers & Dixon, Pacific Mail Steamship Company, Sudden & Christensen, W. R. Grace & Company, Swayne & Hoyt, E. C. Evans & Sons, Oceanic Steamship Company, General Steamship Corporation.

JOSEPH E. SHEEDY

NEW EUROPEAN MANAGER U. S. SHIPPING BOARD

IF Honolulu should preen its feathers with undue care these days the purely terrestrial world doubtless will cast a tolerant eye on the Paradise of the Pacific. Another former resident of the Hawaiian metropolis has climbed high in the world of shipping. This time it is Joseph E. Sheedy, former general superintendent of the Inter-Island Steam Navigation Company, who has become European manager of the Shipping Board with full powers. Captain Frank E. Ferris, special commissioner with offices in London, and his entire organization will report to Mr. Sheedy. There will be an immediate reduction and Americanization of the European staff.

Coast Guard Officer

As an officer of the Coast Guard (then the Revenue Cutter service), Mr. Sheedy had training and experience practically identical with those of Annapolis graduates. He served with success as general superintendent of the Inter-Island Company, Honolulu; and late in 1916 became general manager of the Seattle North Pacific Shipbuilding Company. His first vessel, built during the rush of war-time, was launched within 84 days from the laying of the keel, the second within 89 and the third within 81. The first record was 42 days better than anyone had done prior to that time, the second 37 and the third 35, all of which indicates that Mr. Sheedy had built up a remarkable organization.

From the Seattle North Pacific yard he went to Seattle Construction & Drydock Company as assistant to the president and then was made manager of the Downey Shipyard Corporation, Staten Island, New York. While on the Atlantic he became a member of the United States government (Atlantic Coast) committee on bulkheads and freeboard, member of the technical committee of the American Bureau of Shipping, member of the planning and control committee of the Atlantic Coast Shipbuilders' Association, and also was connected with the Council of American Shipbuilders.

Also a Honolulan

Captain Ferris also is a former resident of Honolulu, having been there while Mr. Sheedy was with the Inter-Island. Their offices were so close together that a husky boy could have tossed a green cocoanut from one to the other. After serving as San Francisco superintendent of the Pacific Steamship Company and marine superintendent of the Union Oil Company of California, Captain Ferris, because of ill-health, went to Honolulu to take command of the British steamship Kestrel, which plied between Honolulu, Fanning Island and the Gilberts. He joined the Naval Reserve early in 1917 and became censor of cables at Honolulu; when the Dutch steamship Ophir was commandeered he took her to the Atlantic, where he served as commander of convoy. At the end of the war he became chief inspector of construction and repairs, South Atlantic District, Shipping Board, with headquarters at Jacksonville; from that position he went to the New York District as managing agent; and after a few months in private business became European special commissioner of the Shipping Board with headquarters in London.

The I Knew Him When Club of Honolulu doubtless will be holding some business sessions at Fort and Merchant streets, on the shady side of the Bank of Hawaii.

ANNOUNCEMENT

NATHAN J. GLASS, formerly vice-president and general manager with George E. Butler, for twenty-five years connected with that firm and for the last three years in entire charge of its business, has established independent connections and is now located at 250 California street with a very fine line of the highest grade nautical instruments, chronometers, watches and clocks.

A beautifully equipped repair shop will be maintained, extending to the marine trade of the Pacifis Coast the highest type of facilities for the adjustment and reconditioning of ships' clocks and navigating instruments.

"Nate" Glass, as he is familiarly known along the waterfront, needs no introduction to the marine fraternity of San Francisco harbor. We extend to him our congratulations and our best wishes for his success in this new venture.

SAFETY AT SEA

TO the ordinary layman the idea of a sea voyage immediately brings some thought of danger, hardship, exposure, if not actually of the cast-away-on-a-desert-island or cannibal stories which so often are associated with the sea in popular fiction, the "movies" and the daily press. It is rather curious that this idea should still prevail, especially in view of the fact that the majority of the people of America have what might be termed "sea blood" in their veins, but that the idea does prevail to a very great extent is shown conclusively by the manner in which the public press of America treats any opportunity to capitalize marine disasters.

Rather curious, too, is the popular idea that the sailorman who fails to become an actual hero in time of such disaster has something lacking—the captain is expected to go down with the ship, and every common sailor is expected to perform efficiently with coolness and daring tasks, which in many instances are absolutely impossible as far as any human agency is concerned.

No such ideas are prevalent in the popular mind with regard to any other mode of travel. Note that the heading over this article is "Safety at Sea" and not "Danger at Sea." Statistics show beyond any reasonable doubt that sea travel per passenger carried has less proportion of mishap to the life and limb of those passengers than any other mode of travel known on the face of the globe. Yet it is a phenomenon noticed by all steamship companies that after any prominent marine disaster there is a very decided falling off of applications for bookings and a very marked cancellation of bookings already made for all passenger steamers.

Much material published in the press recently has attributed to the mania for speed the danger to navigation along our coasts and in the North Atlantic, notwithstanding the fact that both on the Pacific Coast and in the North Atlantic ferry passage the companies which hold the record for speed are those most free from trouble. The Cunard Steamship Company, which holds the trans-Atlantic record, very proudly and truly boasts that for over fifty years it has not lost a life of a passenger at sea through ordinary marine mishap. Many lives were lost from the liners of this company through war risks in the late war, but that of course is a very exceptional condition which does not count in the present discussion.

A great deal of the treatment of recent disasters in the public press has emphasized the idea that much of the danger was due to the instructions issued by operating companies to their captains to make the schedule at all costs. This propaganda in the daily press is nothing short of libelous. It is a well known fact that practically all of the operators of passenger vessels issue instructions to their commanding officers which are directly in opposition to any such ideas. In proof of this we would like here to quote a letter written April 25 last by A. J. Frey, then general manager of the Los Angeles Steamship Company and now vice-president in charge of physical operations of the Emergency Fleet Corporation of the United States Shipping Board. Mr. Frey's letter is addressed to the commanding officers of the Yale and Harvard, and to them he says:

> "I cannot too strongly impress upon you that the vessel under your command is at all times to be navigated with caution and in a manner which will safeguard the lives of the passengers and crew, and the property placed under your charge. While it is desirable to make the advertised schedule of eighteen hours between Los Angeles harbor and San Francisco, you will clearly understand that this is only expected when weather conditions will permit of such schedule with safety, and that at no time are you to take any undue risks with the vessel under your command."

This letter is typical of the general instructions issued by the managers of steamship companies to the officers on shipboard.

Probably no subject connected with marine activities has been given greater consideration than the design, construction and equipment of passenger ships for greater safety in sea voyages. The British and United States patent offices are full of patented ideas with regard to new forms of construction, apparatus for working lifeboats, new forms of lifeboats, life rafts and life preservers, and the maritime laws of all maritime countries in the world are full of statute provisions for the inspection and equipment of passenger vessels to insure the safety of the passengers. International conferences have been held on this subject, and a tremendous amount of material is available for those who are fond of research.

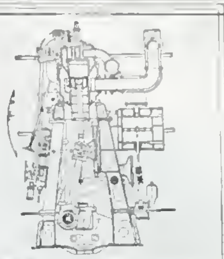
The coming of wireless telegraphy introduced a new era in passenger travel at sea. Today practically every passenger vessel is equipped with wireless apparatus. Practically the entire coast line of the United States, at least, is equipped with wireless stations of sufficient power and sufficiently close together so that a coasting vessel or any offshore vessel approaching the coast can in any condition of wind or weather almost instantly ascertain her true position by means of wireless.

As an auxiliary to this service and to insure the greater efficiency of our aids to navigation, every lightship and every lighthouse should be equipped with automatic wireless sets for sending out characteristic signals so that the wireless apparatus on any vessel in times of fog could easily pick up the position of these warnings of dangerous points.

Another form of equipment, which has not come into very general use on American ships but which is now being installed on practically all new passenger liners building in Europe, is an auxiliary Diesel or gas engine generating set located on one of the upper decks and sufficiently powerful to provide current for all of the deck and stateroom lights of the ship and for the operation of the steering gear, deck winches and anchor windlass. Such an installation in the case of flooded engine or boiler rooms could be instantly put into operation and might be at any time the means of saving the ship, and certainly would be in case of a night disaster the means of preserving the morale of the passengers and crew so as to make possible a very much more efficient working of boats and other life saving apparatus than would otherwise be the case.

We have here a very strong travel. We have here a very strong case because not only can we prove by statistics that travel by sea is the safest mode of travel, but we can also show that, notwithstanding that proven safety, the marine engineer, the naval architect, and all the law makers of maritime countries are constantly at work making this safest mode of travel more safe and more comfortable for the enjoyment of all passengers on our sea lanes.

Oil Engines and Motorships



PROGRESS IN MOTORSHIP BUILDING

THE figures for mercantile motorships shown in Lloyd's latest register indicate the remarkable growth of the motorship idea. There are now in service 1447 motorships aggregating 1,263,000 tons gross. This figure does not seem very impressive when compared with the total merchant tonnage of the world — 62,000,000 tons gross — of which it represents slightly over 2 per cent. It is only when the total for 1921 is compared with that for 1913 that the true significance of the figures is realized.

In the latter year there were in service only 290 vessels totaling 234,000 tons; in other words, in eight years the motorships in service have been increased by 600 per cent. Including motorships under construction, the grand total now reaches an aggregate of nearly 2,000,000 tons gross, and in judging these figures it must be considered that four out of these eight years were so abnormal, especially in relation to shipbuilding and marine problems generally, that they can hardly be considered. They really should be dropped out of the record. It might be said on a close analysis of these figures that during the past three years motorship building and the idea of the motorship as the most economical cargo carrier has advanced well over 1000 per cent; in fact, the only freighter ordered in Great Britain during the last five months is a Diesel driven motorship.

Bearing all this in mind, it is hard to understand why the United States Shipping Board does not more actively follow up the idea of converting many of its already antiquated new steamers into economical motorships.

In this connection we would invite our readers' attention to the suggested design reproduced on another page of this issue for the conversion of the standard Hog Island type of freighter from steam turbine drive to Diesel electric drive.

American manufacturers of Diesel engines should be turning their attention very seriously to the problem of designing oil engine plants for conversion work in the Shipping Board's great fleet of steamers. The great majority of these steamers is of the single screw, slow speed propeller type, running from 80 to 100 revolutions, the plants ranging from 1500 to 3000 H. P. There certainly should be no very great difficulty in meeting these conditions with a Diesel engine plant along any one of three lines: ordinary, straight, nonreversible Diesel engines connected to propeller shaft through hydraulic or mechanical gearing; Diesel electric drive; and, for some of the ships at least, directly connected, directly reversible Diesels of the long stroke, slow speed marine type.

In the present condition of the world's shipping market and of the world's foreign trading, it is not conceivable that there will be any very great demand for new ships, but it is very probable that there will be a large demand for a well designed, easily installed internal combustion engine plant for the conversion of freight steamers into more economical motorships. Practically all of the more experienced Diesel engine builders and shipbuilders of Europe are very busy just now on this problem, and our American shipbuilders have a great opportunity to prove that American ingenuity is still in the forefront in the design and erection of propelling machinery.

Prospects of a Revival

There can scarcely be any doubt that a small improvement has been noticed in European shipping circles during the past month or two and the number of vessels laid up has perceptibly diminished. What is, however, more important is the fact that after a period of complete stagnation one or two orders are now being placed by shipowners who see the possibility of returning prosperity and do not wish to be caught with insufficient tonnage when this happy state of affairs comes into existence. In all cases, however, the orders are for motorships, and it is now generally agreed that there will be a boom in motorship construction so soon as conditions return to anything like the normal.

Mr. Fred Olsen, the Norwegian shipowner whose name is well known on both sides of the Atlantic and who controls a large number of shipbuilding and shipowning companies in Scandinavia, has just placed an order for a 7000-ton motor cargo ship and has moreover given instructions for work on it to proceed with the utmost speed. This contract is of all the more significance when it is remembered that Mr. Olsen's ships trade to every part of the world, and his understanding of shipping prospects is probably at least as good as that of any other shipowner. Moreover he already has about half a dozen motorships building in various countries, and in his fleet seven or eight similar vessels are in regular service.

Another new order for a motorship that has just been placed is that which Hunting & Sons of Newcastle have just given to the Tyne Iron Shipbuilding Company, the machinery to be built by the North-eastern Marine Engineering Company, who have the license to manufacture Werkspoor Diesel engines. This vessel is of 10,350 tons with a length of 365 feet and will be equipped with a couple of engines totaling 2400 i. h. p. A third order for a motor vessel has been placed in Italy with the well known Ansaldo Company for a standard 8100-ton motorship equipped with two-cycle machinery of 2200 b. h. p., this new contract being to the order of the Roma Steamship Company. In the meantime there is no sign of any contracts for steamers being fixed, and on the whole, the prospects for rapid motorship developments in Europe are as bright as they have ever been, although it is obvious that no very great progress can be made until there is a general improvement in trade conditions.

Double Acting Engines

It has been assumed by some people that the future of the marine Diesel engine lies with the single acting type operating either on the two-cycle or four-cycle principle and that little is likely to be heard of the double acting engine. There are now grounds for believing that this is an incorrect view. In Germany there is still a strong body of opinion in favor of the double acting machine, and the confidence which is placed in this design is instanced by the order which the Hamburg Line have passed to the well known German shipbuilders, Blohm & Voss, for no fewer than eight cargo motorships of about 6000 tons, in each of which, it is stated, double acting Diesel machinery will be installed.

The advantage which is claimed for this class of plant is that the cost of construction is reduced, the weight and space occupied are less than with corresponding single acting engines, while the fuel consumption, although necessarily somewhat higher, shows comparatively little increase in view of the advantages enumerated. It cannot be said that the builders are without experience in this work, as they commenced the construction of their first double acting engine about 1911, and although only one ship is now in service fitted with Blohm & Voss engines, this has proved extremely successful and is now sailing under the British flag.

In Great Britain there is also some belief in the double acting type, and the North British Diesel Engine Works, which is now building a large number of four-cycle engines for installation in cargo and passenger vessels, has just developed its first double acting Diesel engine and carried out satisfactory tests. It will not be in the least surprising if, in the course of the next few years, some very important developments are made in connection with double acting motors, more particularly in their construction in very high powers for installation in big trans-Atlantic liners. The idea of obtaining two power strokes per revolution is obviously attractive, and if it can be carried into effect without any corresponding disadvantages it must ultimately make great headway. On the other hand, it must be remembered that the manufacturers of the single acting Camellaird Fullagar engine claim that they can build their motors actually smaller in dimensions and lower in weight than corresponding double acting engines, so that they are likely to see some interesting competition between various designs in the near future.

14,000-ton Motorship for the R. M. S. P. Co.

The number of important British shipowning concerns who have neither motorships on order nor in service is becoming steadily less, and the latest firm for which a first motorship has just been launched is the Royal Mail Steam Packet Company, which is, of course, one of the largest shipowning combinations in Great Britain. Few developments are more interesting in connection with oil engined vessels than the fact that competing shipowning firms are ordering ships of exactly similar dimensions and with similar machinery installations. The new boat for the Royal Mail Steam Packet Company, which has been named Loch Katrine is a sister ship to four built for the Glen Line, while three others are under construction, two for the Holland America Line and one for the Elder Dempster Company.

With the exception of the Loch Katrine, all of these are being built by Harland & Wolff, but this ship has been constructed by John Brown & Company, the famous Clydebank firm, to Harland & Wolff's design. We have thus reached a degree of standardization both in shipbuilding and shipowning that has never previously been recorded in normal times in connection with steamers. The advantages of such a policy are obvious since the shipowners obtain a vessel which they know from previous performance of similar craft is eminently reliable and economical and about which there are no uncertain factors.

The machinery for the Loch Katrine is being built by Harland & Wolff, and comprises a couple of their standard 3200 i. h. p., eight-cylinder sets, the largest engines of this class now being built. This type of machinery has already proved a success in connection with the Glen Line boats, and ships of the Loch Katrine class, carrying 14,000 tons of cargo at an average speed of approximately 12½ to 13 knots, consume only 20 tons of oil fuel compared with 80 tons of coal on a corresponding steamer, or 50 tons of oil on a vessel fitted with oil-fired boilers.

Such a difference in consumption is too great to be ignored, and there are indications that many of the other large British shipowners will shortly place orders for similar craft which have proved so eminently suitable for general cargo carrying, especially on long voyages. The Loch Katrine is 502 feet in length with a beam of 62 feet, and among the features which render her interesting to shipowners generally is the exclusive adoption of electricity for all purposes. This is, in fact, one of the newer marine developments coincident with the coming of the oil-engined craft, and although it is freely admitted that electrical machinery costs more than steam plant, the economy in operation is extremely large. In actual comparisons with corresponding ships it has been found that to run the electrical auxiliaries on a motorship costs between one-sixth and one-eighth the amount expended on a steamer when steam auxiliaries are utilized.

New Sulzer Installation

The completion of the first large British ship equipped with Sulzer Diesel machinery is noteworthy, this vessel being the Conde de Churruca, which ran her trials at the end of August from Armstrong's yard on the Tyne. She has been constructed to the order of a well known Spanish firm and is a tanker 370 feet in length with a cargo carrying capacity of 6500 tons. The speed is higher than is normally associated with tank vessels, and two engines, each of 1250 b. h. p., are fitted, giving an average speed at sea of 11½ knots.

Top Platform Control

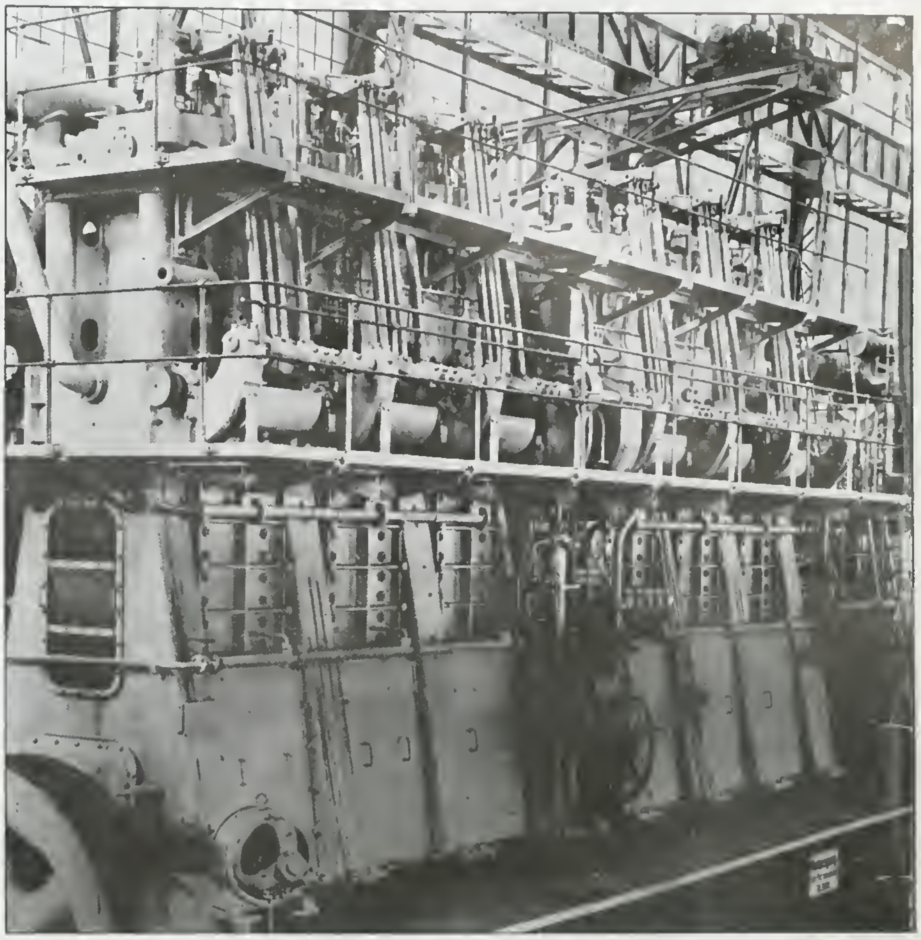
Several features of interest are to be noted in these motors. In the first place, an entire departure has been made in the control arrangement and the control station is arranged at the top of the engines instead of below, thus avoiding a great deal of gear which has normally to be provided, connecting the control wheel with the valve operating mechanism. It is claimed that, as most of the vulnerable parts of a Diesel engine are at the top, it is only logical that the control should be effected from this point, and there is a good deal to be said for this view. Each engine drives its own scavenging pump and air compressor, and by the elimination of scavenging valves, the number of valves in the cylinder cover is limited to one fuel valve, one starting valve and a relief valve. The fuel and starting valves are arranged in the same cage, so that actually only one large hole has to be drilled in the cylinder cover, thus minimizing the possibility of cylinder cover cracks developing. In the larger types of Sulzer engines, scavenging air is provided from separate electrically driven turbo blowers, but this system has not been employed on the new ship, as it is considered more suitable for engines of 1500 b. h. p. and over.

The largest vessel of any sort ever built in Norway is now approaching completion at the Rosenberg Mek Verksted at Stavanger and this is a motorship of 9000 tons deadweight. In the Handicap, as the new craft is named, a couple of 1350 b. h. p. Sulzer Diesel engines have been installed, supplied by Sulzer Brothers at Winterthur in Switzerland.

MOTOR SHIPBUILDING IN GERMANY

Vessels Totaling 175,000 Tons Under Construction

By R. Z. DICKIE



A Burmeister and Wain type 6-cylinder directly reversible marine Diesel engine as built by the A. E. G. Werks at Berlin

ACCORDING to the recently issued report of the Deutsche Werft A. G. of Hamburg, which is now the largest shipbuilding concern in Germany, although only established in 1918, contracts are in hand for ten motorships of about 61,000 tons, with 26,000 horsepower. It is of some significance as indicating the working of the minds of German shipowners that a note is added to the report to the effect that, in spite of the existing depression, "it is certain that in the last few weeks there has been a new demand for special types of construction, such as tankers and motorships." The contracts which the company has in hand insure full employment of the works at least until the middle of 1922. It will be remembered that the Deutsche Werft was established in connection with other large industrial concerns, and the machinery for the motorships now under construction is being built at the A. E. G. Berlin works.

The increasing number of orders that are being placed in Germany for motorships confirms the belief that the new German mercantile fleet will be built up largely of internal combustion engined craft. The full extent to which such vessels are being constructed in Germany is not known, but the list given here, which is believed to be correct, gives details of some of the boats of this class which are now on the stocks. These comprise a total of twenty-five vessels, with a deadweight tonnage of 175,000, propelled by machinery totaling 72,000 horsepower. It is probable that this considerably underestimates the work which is being carried out, for it is understood that at Blohm & Voss' yard very important developments are anticipated in the construction of motorships equipped with double-acting Diesel engines of the Blohm & Voss type.

Reduction Gears

In connection with the two motor vessels being built by Blohm & Voss for the Hamburg-Amerika Line, an interesting departure has been made which will be watched in Europe with considerable interest—that is, in each vessel will be installed two 3000 B. H. P. Diesel engines which were built at the Augsburg works of the M. A. N. and were originally intended for installation in submarine cruisers. The engines have ten cylinders and run at 390 r. p. m. and are of the four-cycle design with a high mean effective pressure of 100 pounds per square inch.

These engines will be equipped with reduction gear, reducing the propeller speed to about 100 r. p. m. and the speed of the boats will be from 13 to 14 knots.

On the Pacific Coast where it is believed this idea was first used it proved very successful, as the motorship Libby Maine, which is engined with two 320 horsepower Dow-Willans engines fitted with reduction gear, has been in operation several years with complete satisfaction.

German Competition

From the above statistics it will be seen that Germany will be an important competitor in marine circles in a very short time, as it will invest its new capital in motorships of the latest design, while other countries have fleets of steam vessels on hand which are rapidly becoming obsolete.

No. of Ships	Builders	Owners	Total D. W. Tonnage	Total H. P. of Machinery
8		Hamburg-Amerika Line	48,000	20,000
10	Deutsche Werft, Hamburg		61,000	26,000
2	A. G. Krupp, Kiel	Stinnes	6,000	2,800
1	Howaldtwerke, Kiel	Hamburg-Sud Amerika Line	14,000	5,000
1	A. G. Weser	Hansa Line	9,000	3,200
2	Blohm & Voss, Hamburg	Hamburg-Amerika Line	28,000	12,000
1	Tecklenborg	Hansa Line	9,000	3,000
25			175,000	72,000

FROM STEAM TURBINE TO DIESEL ELECTRIC

A Plan for the Conversion of Class "A" U. S. Emergency Fleet Corporation Ships

By JOHN L. BOGERT

IN the year 1911 were completed three motorships, the Selandia, Jutlandia and Christian X, that were destined to revolutionize the shipping industry. Ten years of steady, uninterrupted service find them still in excellent condition, just as economical of fuel in 1921 as in 1911; 500,000 sea miles of voyaging in the seven seas in all kinds of weather under various conditions of loading have demonstrated their economy in upkeep cost.

Denmark has every reason to be proud of the East Asiatic Company, who ordered them built, and of Burmeister & Wain, who designed and built their machinery. These ships are 370 feet by 53 feet by 30 feet, and can carry 7400 tons of deadweight on 23 feet 6 inches draft. Their twin Diesel engines of eight cylinders each were designed to operate at 140 r. p. m. and develop 1050 B. H. P. each at that speed, propelling the fully loaded vessel at 11 knots. In service the r. p. m. are usually about 126.

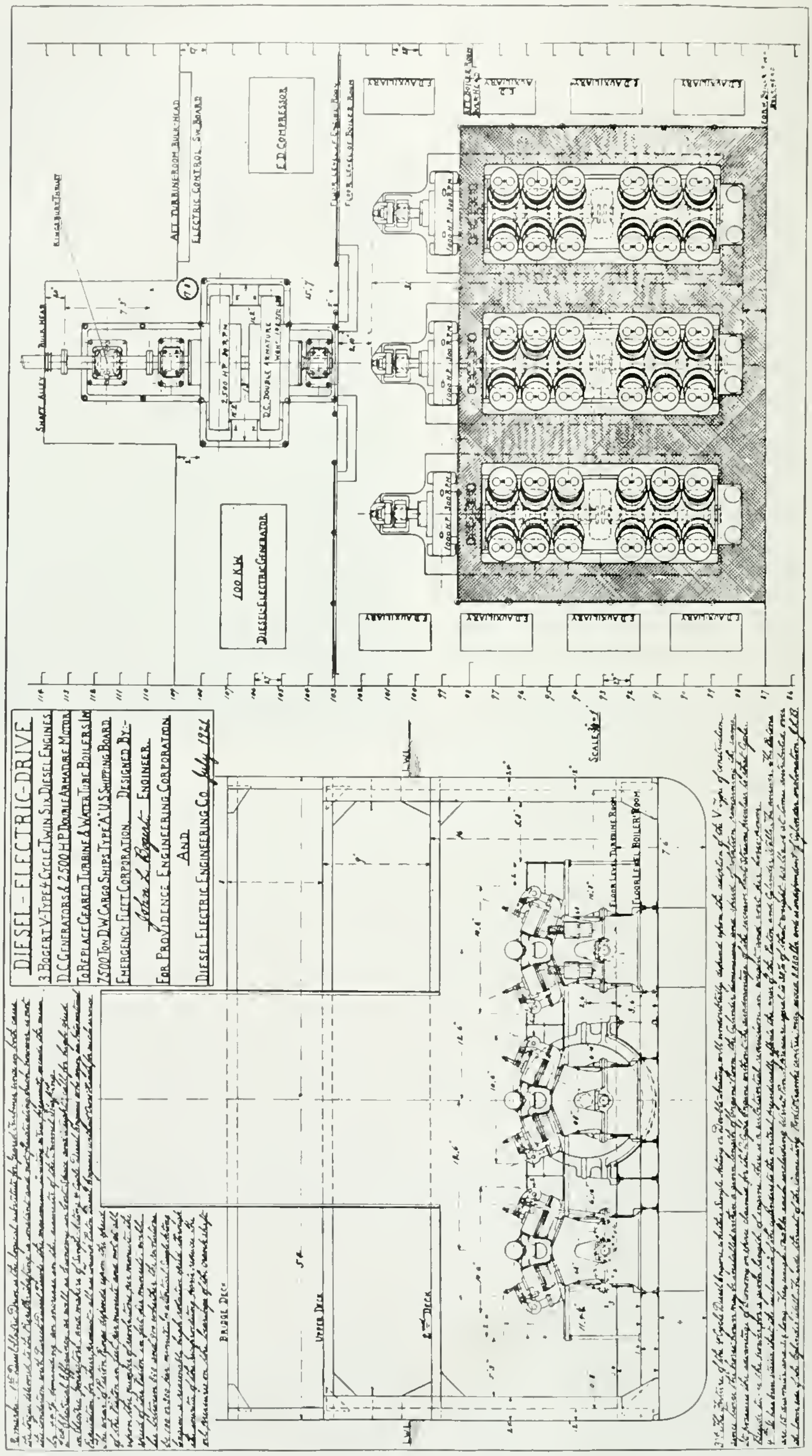
The Christian X was sold to the Hamburg American Line at the time of her acceptance trial, but the Selandia and Jutlandia have consistently earned large dividends for their original owners, and during this recent slump in freight rates have continued in regular service, while a large part of the world's steam tonnage has been laid up.

During the war the United States Emergency Fleet Corporation laid down a great many ships of this size in the shipyards of the country, no less than sixty being ordered at one time from the Hog Island plant alone. While of practically the same size as the Selandia and Jutlandia, they differed in that they were single-screw instead of twin-screw ships, and unfortunately they were all steam engine driven, not one of this immense fleet of 7500-ton ships being equipped with Diesel engines.

To the United States tax-payer, learning that such ships when motor-driven are capable of 60 per cent increased earnings over the same size steamship, comes the question, is it not possible and practical to replace the steam machinery of these steamers with some form of Diesel engine. The answer is that it is both possible and practical.

The writer of this article has spent considerable time on this problem and, thanks to the courtesy of the Pacific Marine Review, is able to show by means of the accompanying drawings one thoroughly practical way of making the conversion of any of the Class "A" Emergency Fleet Corporation steamers into first-class motorships.

The vast majority of these Class


DIESEL - ELECTRIC - DRIVE
3 BOGERT V TYPE 4 CYCLE TWIN SIX DIESEL ENGINES
D.C. GENERATORS & 2500 H.P. DOUBLE ARMATURE MOTOR
TO REPLACE GEARED TURBINE & WATER TUBE BOILERS IN
7500 TON D.W. CARGO SHIPS TYPE A U.S. SHIPPING BOARD
EMERGENCY FLEET CORPORATION. DESIGNED BY-
John L. Bogert ENGINEER.
FOR PROVIDENCE ENGINEERING CORPORATION
AND
DIESEL ELECTRIC ENGINEERING CO. July 1921
E.D. COMPRESSOR
AFT TURBINE ROOM BULK-HEAD
ELECTRIC CONTROL SW. BOARD
100 KW
DIESEL ELECTRIC GENERATOR
2500 H.P. 85 R.P.M.
D.C. DOUBLE ARMATURE
E.D. AUXILIARY
SHAFT ALLEY
BULK-HEAD
1000 K.W. 300 R.P.M.
SCALE
BRIDGE DECK
UPPER DECK
2nd DECK
FLOOR LEVEL TURBINE ROOM
FLOOR LEVEL BOILER ROOM

Proposed arrangement of Diesel electric drive for the conversion of United States Shipping Board standard 7400-ton deadweight Class A Hog Island steam freighters

"A" ships was propelled by steam turbines operating on the propeller-shaft through gearing, and it is one of the characteristics of the turbine that its torque is constant. Such, however, is not the case with the Diesel engines of the Selandia and Jutlandia. Their torque is a fluctuating one. This factor in the problem is an important one. A propeller or tunnel shaft that was abundantly strong enough to transmit 2500 shaft horse power from a turbine through gearing might fail when called upon to transmit the same amount of horse power at the same number of revolutions per minute coupled direct to either a six or eight cylinder Diesel engine similar to those that drive the Selandia and Jutlandia.

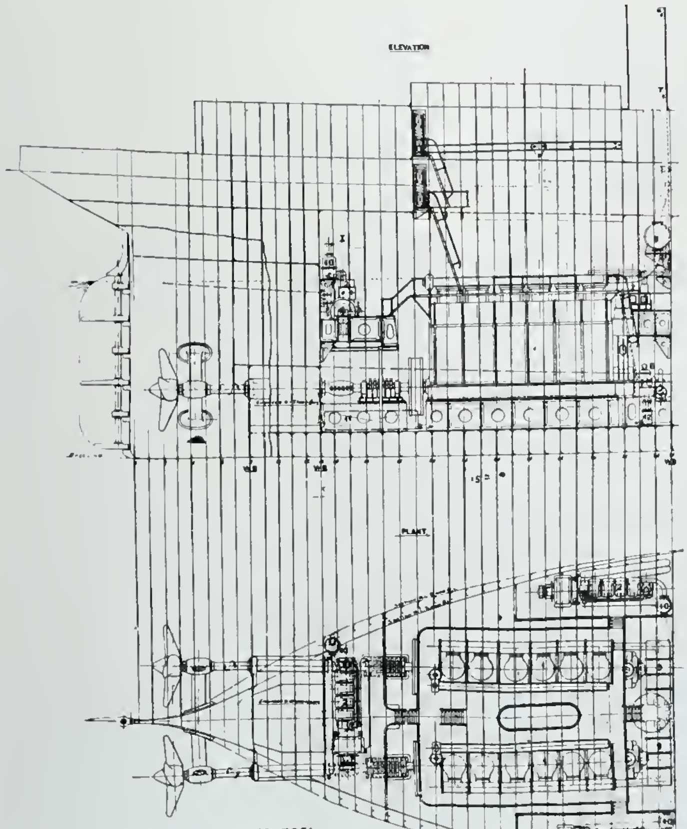
This means that the conversion of Class "A" Emergency Fleet Corporation ships by the substitution of direct-connected 4-cycle Diesel engines for the watertube boilers, turbines and reduction gearing might easily necessitate a change in the diameter of the propeller and tunnel shafting, and with that change a change likewise in the stern-frame to permit a larger stern-tube. If, however, the Diesel electric drive be adopted, no such problem will be faced. In the case of the electric drive the torque of the motor is not fluctuating but constant; it is similar in its uniformity of drive to the turbine.

To make this manner of conversion clear to the naval architect, marine engineer and ship owner, accurate scale drawings are herewith shown. The fluctuating changes in torque of the Diesel engines shown are all absorbed by the fly wheels and transmuted by the direct-connected electric generators into a uniform D. C. electric current. As a matter of fact, these conversion drawings show a power house such as might be erected anywhere on land. The space available dictated the form of Diesel engine selected, since the fore and aft space was limited by the position of the forward boiler room and aft engine room bulkheads. Because the V-type of engine permits double the horse power in the same length fore and aft, the size of cylinders and number of turns per minute being the same, that kind of Diesel engine appeared to be indicated by the conditions of the problem.

Three generating units are shown. In the opinion of the writer, for such cargo ships, the choice will ultimately fall between the adoption of two units or three. He fails to see any benefit to be derived from a larger number of direct-connected units, either with the same number of cylinders per engine but of smaller bore, or of larger bore but fewer in number per engine. Many engineers will undoubtedly cast their vote for but two Diesel engines with their direct-connected electric generators. Such a change, since it will necessitate larger cylinders, will call for a longer engine and a longer electric generator. The speed of rotation will be necessarily lower, which means a heavier engine and a heavier generator. There would be a gain, however, in the thwartship space occupied.

The solution of this problem of the conversion of the Class "A" Emergency Fleet Corporation ships from steam to Diesel engine power appears to call for the adoption of either two or three Diesel engine driven electric generators furnishing electricity to a double armature D. C. electric motor direct connected to the tunnel shafting and normally operating at a speed of 80 turns per minute.

CONVERSION PLAN FOR 8800-TONNERS



UNITED TOSI
MACHINERY ARRANGEMENT
OF A 8800 TON TWIN SCREW CARGO SHIP
2200 BRAKE HORSE POWER

The accompanying drawing shows an arrangement of machinery in the stern of a standard 8800-ton twin screw cargo ship. This layout is for two Tosi directly connected directly reversible marine oil engines of the true Diesel type, each engine developing 1100 B.H.P. There is going to be a great demand for conversion jobs such as that illustrated here, and American manufacturers of Diesel engines should be preparing for this demand by familiarizing their engineering staffs with all of the problems involved in making such an installation in our standard ships with a minimum alteration of the hull structure. The problem of conversion will be largely a problem of first cost, and it is up to the designer and manufacturer of Diesel engines to give the American shipowner a simple unit which can be installed in place of the present reciprocating or turbine steam plant.

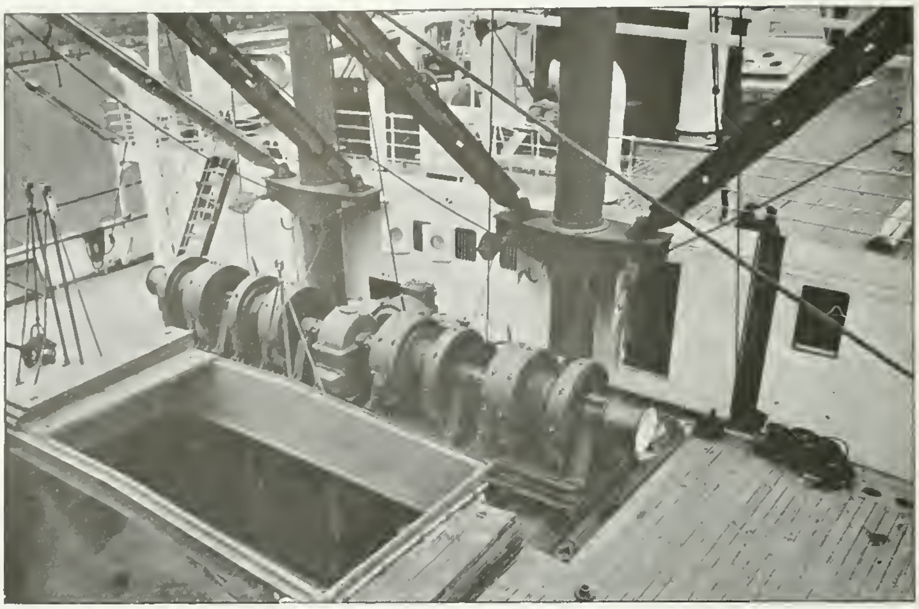
That some firms are busy on this job is shown by the two arrangements of machinery illustrated in this issue of Pacific Marine Review. The Tosi directly reversible marine oil engine is manufactured in San Francisco by the United Engineering Company, whose long experience in Pacific Coast commercial operating conditions enables them to thoroughly appreciate all of the nice adjustment between the hull structure and the propelling mechanism that are so necessary to the success of a marine power plant installation.

AN INTERESTING MOTORSHIP

Royal Mail Steam Packet Eliminating the Steam

CONSIDERABLE interest was displayed by San Francisco shipping men in the recent visit to this harbor of the fine new motorship Somersetshire, which is being operated by the Royal Mail Steam Packet Company under charter from the Bibby Line.

The Somersetshire has been described at some length in the motorship building notes in previous issues of Pacific Marine Review. She has a capacity of 12,000 tons deadweight on 28 feet draft, is 470 feet long, with 57 feet beam and a molded depth of 37 feet. She was built by Harland and Wolff at Belfast and engined by them with Burmeister and Wain type Diesel engines of the Harland and Wolff improved design. While on the coast at Puget Sound ports and at San Francisco she booked several passengers for the trip to Europe via the Panama Canal, having accommodations for twelve passengers in very nicely appointed quarters in her superstructure amidships. The fuel tanks of the Somersetshire have a capacity sufficient for a voyage of 45,000 miles under full load condition.



View of the new McFarlane winches on the British motorship Somersetshire

The Royal Mail Steam Packet Company have on order and under construction in British shipyards six motorships for the United Kingdom-North Pacific service, all of which will be very similar in most respects to the Somersetshire, an exception being that they will be fitted with a large amount of refrigerator space. Three of these vessels, the Loch Katrine, Loch Goil and Loch Monar, are now nearing completion and will go on berth as soon as they are outfitted.

One feature of the Somersetshire's equipment which attracted a great deal of favorable comment, especially from stevedores in San Francisco and Vancouver, was the new McFarlane system for deck winches for cargo handling. As will be seen in the illustration, this system provides for from one to any practicable number of winches mounted on a single shaft and connected thereto by suitable planetary spur gearing, the shaft itself being driven by worm drive from a single electric motor and power being transmitted to the individual winch drum by the use of brake bands on the housing of the planetary gear. This system has been found to work out admirably in the handling of mixed cargoes and is being installed on many British motorships.

The Royal Mail Steam Packet Company are agents in Seattle for the Holland-America Line. Their active organization has enabled that line to obtain a goodly share of the shipment of Northwestern apples and other agricultural products to Europe, and it is well worthy of note by American companies that this strong British line is installing such a large proportion of refrigeration space in its new carriers.

The motorship Somersetshire at a Puget Sound port, 12,000 tons capacity at 28 feet draft

EUROPEAN MARINE NOTES

Impressions of a Californian in Britain

This installment of "European Marine Notes" marks the beginning of a series of comments by a California marine engineer on conditions as he finds them in Europe and especially in Great Britain.

There has been a considerable amount of material in the public press of America and in certain marine and other trade journals concerning British propaganda in the United States and British efforts to strangle the American merchant marine. There can be no doubt in the mind of anyone who knows the situation that Great Britain is straining her every resource to retain her place as the greatest merchant marine carrier in the world, and it is perfectly right and proper that she should do so.

We in the United States should be watching this struggle with great interest, particularly as we own so many merchant marine vessels ourselves.

The purpose of these European marine notes is to keep the readers of Pacific Marine Review informed as to the trend of events in European shipping and shipbuilding so that we can the more intelligently shape American marine policies to meet European competition.

Any suggestions or questions from our readers will be gladly received.

ALTHOUGH the latest returns of Lloyd's show the United Kingdom to be the leaders in world shipbuilding, they do not bring any comfort to the mind of the British shipbuilder.

The figures are exceedingly interesting and well worth while analyzing by all who are interested in shipping and shipbuilding. The tonnage now afloat consists of 33,206 vessels aggregating nearly 62,000,000 tons. In the shipyards of the United Kingdom merchant shipping under construction is nominally 3,500,000 tons and in the shipyards of the balance of the world, including the United States, the tonnage under construction aggregates 2,500,000; in other words, we have under construction and afloat 68,000,000 tons of merchant shipping.

More Ships—Less Freight

Before the war the tonnage of the world aggregated less than 50,000,000 tons, and under the present depressed trade conditions the marine freight tonnage of the world, according to the best authorities, seems to aggregate from 30 to 40 per cent less than the amount that was carried by water in 1914. In other words, we have now afloat and under construction 35 per cent more tonnage than we had in 1914 and probably 35 per cent less freight to carry in that tonnage.

Under those conditions it is not at all surprising that ordinary freighters should be a drug on the market and that only the most experienced and long established shipping companies have any chance at competition in the carriage of the world's freight by sea. Everywhere in Britain the question of the causes of the present stagnation in shipping is discussed, and the almost universal answer seems to be —high costs of coal, steel and labor, and internal disturbances in Russia and Asia.

In the matter of coal there has been a very decided improvement since the settling of the labor troubles of the coal miners, and a marked improvement in the volume of export was shown during July. Comparative figures for exports of steel throw an interesting light on the lack of bulk cargo.

Cheaper Coal Needed

The Monmouthshire and South Wales Coal Owners' Association has published some very interesting figures on the present condition of the coal industry in Great Britain. Total shipments of coal from the United Kingdom in 1913 were, using round figures, 97,000,000 tons. In 1920 this amount had decreased to 40,000,000 tons. During the same time the United States' exports of coal increased from 4,500,000 to 22,000,000 tons. The total output of coal for the United Kingdom during the last two years has been at the rate of 230,000,000 tons per annum, a decrease of 67,000,000 tons when compared with the output for 1913. In the seven months just prior to the war Great Britain exported 42,500,000 tons of coal. In the same seven months of 1921 Great Britain's exports amounted to only 6,841,000 tons.

Great Britain has just as many mines and more miners, more docks and more ships than she had before the war. Steel, which largely depends upon coal in its manufacture, has dropped in export tonnage from 3,000,000 in the seven months just before the war to considerably less than 1,000,000 in the first seven months of 1921. Great Britain's capacity for the manufacture of steel has increased 50 per cent as far as plant is concerned. Only about one-sixth of the available plant is working today.

Labor Blamed

The blame for this state of affairs is laid mainly to the high cost of unit production, to low output, and high cost of labor. To put it very tersely, in the United States 500,000 miners produce 500,000,000 tons of coal a year, while in the United Kingdom over 1,000,000 miners are producing about 200,000,000 tons. The United States' output averages 20 tons per man per week. The British output is less than 4 tons per man per week. This is, of course, largely due to unfavorable natural conditions in the very deep mines of Britain and favorable natural conditions in American mines, but taking all of these things into consideration, the British mine owners feel that the British rate should be about one-half the American rate instead of, as shown, one-fifth.

American Competition

A generation ago the American rate was slightly under 8 tons per man per week and the British rate 6 tons per man per week. In 1913-14 the pit mouth cost of coal in Britain was about 10/— per ton, 7/— of this being absorbed in miners' wages. In the first quarter of 1921 miners' wages absorbed very nearly 30/— per ton. Wages to the miner had not increased in this proportion, but the reduced output per man placed this burden against the ton of coal. Today after the recent reduction in miners' wages, a ton of British coal is costing for pit labor alone 25/— at the pit mouth as against a little under 7/— comparable cost in the United States.

What is needed is increased output per man, and the conclusion of this report of the Monmouthshire and South Wales Coal Owners' Association is that about one-half of the miners now employed in British coal mines should be diverted to other labor and the output per week per man doubled.

Steamers Laid Up

There are at the present time over 100 steamers laid up on the Humber and more than 200 on the Tyne, a total tonnage of over one million and a half, and a corresponding number in other British ports, with a consequent almost unparalleled slump in freight rates and in the value of ordinary freight steamers.

The official statistics relating to traffic from principal ports of the United Kingdom show total arrivals for the month of June, 1921, 6,596,000 tons, total departures 6,500,000 tons. In 1920 these figures were, respectively, for June, 10,177,000 tons and 10,600,000 tons. It is figured that the practical stoppage of coal exports accounts for about 2,300,000 tons of the year's decrease in export tonnage. It will be borne in mind that the total figures given above represent domestic as well as export and import trade.

Vessels are being run to Australian and South American ports practically in ballast, bringing home grain cargoes at low rates, and taking a loss of from £20,000 to £30,000 on the round trip.

Joiners Strike Over

One cheerful note comes in the ending of the ship joiners' strike, making it possible for many of the ships now on the ways, which had been delayed, to be rushed to completion. It has been a very sore point with the British merchant, the ship owner, and the shipbuilder that so many of Britain's ships have on account of this strike had to be finished in continental yards, a notable example having been recently the splendid new Cunard liner Scythia, just now on her maiden voyage to New York. The ship joiners have been out for between eight and nine months and have accepted the same terms now which were available to them in June.

Yarrow's to Close

Yarrow and Company have considerably startled the British shipbuilding world by posting the following notice at their Scotstoun yard:

> Owing to repeated strikes, reduction of output, and demarcation disputes which have taken place in various industries throughout the country, the cost of shipbuilding has become excessive, in addition to which it is impossible to promise dates of delivery.
>
> With the greatest regret we have therefore decided to temporarily close our works, with the exception of our experimental and research department, on or about November 30.
>
> We shall reopen when conditions enable business to be carried on with some chance of success.
>
> We give this early notice of our decision so that our employes may have every opportunity of obtaining work elsewhere.

Yarrow established a yard at Poplar-on-the-Thames in the London district and built there many splendid vessels, specializing in shallow draft construction for use on rivers and lakes in all parts of the world. After a few years the burdens of local taxation and heavy labor costs began to be irksome, and in 1906 they acquired the present site at Scotstoun on the Clyde and there have been building torpedo boat destroyers, river gunboats, and mercantile light craft. Your Pacific Coast readers will be interested in the present action of this firm, as they have a very active yard in British Columbia and about a year ago there was considerable rumor to the effect that they would concentrate the bulk of their work at that yard, gradually deserting the yard on the Clyde. Under normal conditions from 1000 to 1500 men are employed at Scotstoun.

World's Biggest Liner

Much interest is being evidenced in marine circles here in anticipation of the delivery of the White Star liner Majestic, ex-Bismarck, which will be ready for service between Southampton and New York early next spring. The Majestic will be the largest ship afloat, having a displacement of 56,000 tons, making her nearly 10,000 tons larger than the Olympic and about 2000 tons larger than the Leviathan.

The human interest figures on this greatest of passenger liners are rather striking. The hull, for example, if stood on end beside the Woolworth building, New York, would overtop that champion skyscraper by 164 feet. Her three smokestacks are each 30 feet in diameter, which would allow ample room for two New York subway trains to pass abreast. The tops of these stacks are 184 feet above the keel, which is about equal to the height of an ordinary twelve-story building. There are nine decks, and the ship is liberally equipped with electric elevators. When carrying a full passenger list she will be inhabited by 5200 people, divided into 4100 passengers and 1100 crew. One thousand passengers are in the first class, 700 in the second, and 2400 in the third.

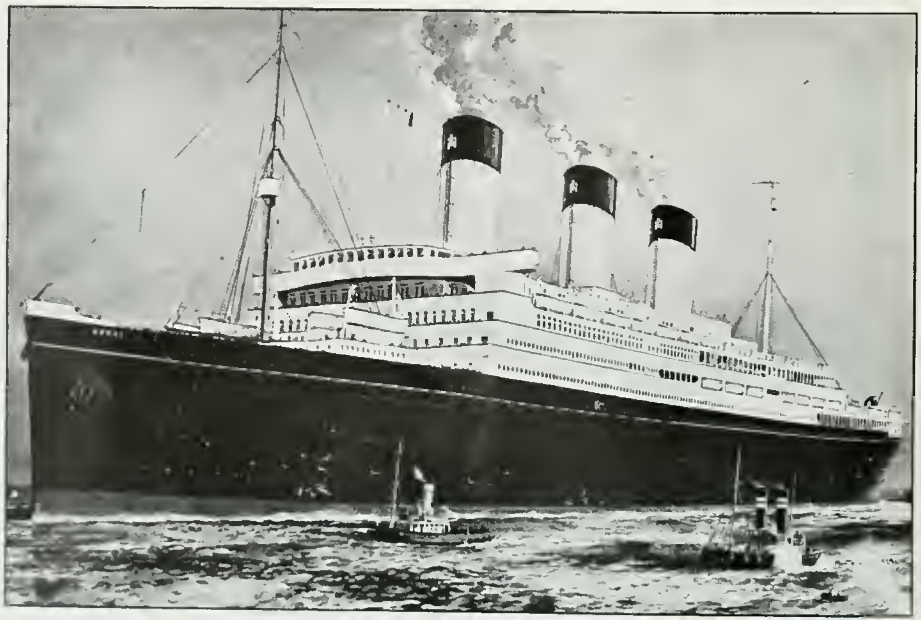
Grand Reception Hall

Perhaps the most interesting and unusual feature in the construction of this vessel lies in the arrangement of the uptakes from the boilers to the stacks. The uptakes to each stack are arranged to be brought up outboard, arching together over the ceiling of the saloon deck and uniting under the stack. The grand staircases are also arranged at the sides of the ship, giving a clear sweep of unimpeded space amidships for the great public rooms. Through these rooms there is an unbroken vista of apartments 250 feet long.

The appointments are very luxurious and include a large gymnasium, electric and Turkish baths, a mosaic and marble Pompeiian swimming bath with a bottom area of 820 square feet, a depth of 9 feet, arranged with a gallery for spectators and with 30 dressing rooms.

Thirty Miles an Hour

The power plant consists of four turbines working on four propeller shafts and delivering a total of 62,000 H. P. Normally the propellers will turn 170 r. p. m., driv-



White Star liner Majestic, 56,000 tons gross, 62,000 H. P., 23 knots sea speed, 956 feet long over-all—the world's largest ship ing the ship at 23 knots. The maximum speed is 194 revolutions, and this is expected to drive at 26 knots, or better than 30 statute miles an hour. She will be fitted with fuel oil burning boilers and is expected to consume about 11,400 tons of fuel oil in a round trip.

The watertight bulkheads in the hull are fitted with heavy hydraulically operated, electricaly controlled watertight doors. The ship's decks have a total area of seven and one-half acres, and four times around her promenade deck gives the passenger a constitutional of one mile.

The Majestic is being finished by Blohm and Voss of Hamburg under special arrangement between the Allies and the German government and under the supervision of the representatives of the White Star Line.

Holland-America Liner

Speaking of big liners, while the Cunard Company and practically all the British passenger lines are confining themselves to what might be called intermediate class liners around 20,000 tons displacement, Harland and Wolff have recently laid down in their new Musgrave Channel yard at Belfast a 32,000 ton passenger liner for the Holland-America Line, which will bear the name of Statendam. This is the largest vessel laid down in the United Kingdom since the beginning of the war.

The first Statendam was launched at Queens Island yard of Harland and Wolff in July, 1914. She lay unfinished when the war broke out, was ultimately completed for the British government as a cargo carrier, renamed the Justicia, and turned over to the White Star Line for management. Near the close of the war she was torpedoed and sunk off the coast of Ireland.

The new vessel is the first of a large program which the Holland-America Line have projected. There are two 18,000-ton vessels at the Glasgow yard of Harland and Wolff and a dozen smaller vessels are being built in Dutch yards and are to be engined by Harland & Wolff.

Teutonic Broken Up

Speaking of Harland and Wolff ships reminds us that the famous old White Star liner Teutonic built by that firm in 1899 was sold the other day to a Dutch firm of shipbreakers and will soon be reduced to the junk pile. The Teutonic was one of the first transatlantic liners to break into the five-day class, when in the early '90's she made the trip from Queenstown to New York in 5 days 16½ hours.

Exchange Rates

One rather humorous phase of the shipbuilding situation, which is proving a boomerang to John Bull, is brought about by the curious condition in exchange. It will be remembered that when just after the armistice the American dollar became the standard and sterling exchange dropped very heavily, the American press saw an opportunity to tie knots in the lion's tail and were very jubilant over the situation, but the idea began to creep into their intelligence that the situation was entirely to the advantage of John Bull, as far as world trade was concerned, and it soon became very apparent that British financial circles were very glad to have the exchange stay at its low ebb; in fact, there was considerable evidence that London was, so to speak, "pegging" the exchange rate.

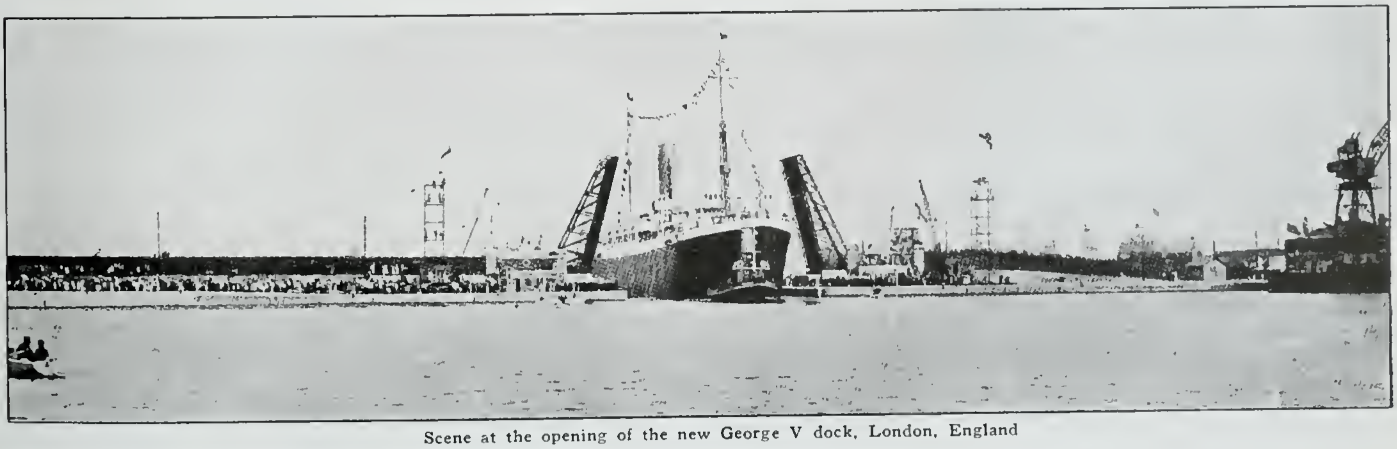
As soon, however, as Germany, Belgium, and northern France began to get their breath after the war and settle down to real work, the exchange as between sterling and continental currency began to show up much to the disadvantage of John Bull, and now it appears that our friend John is very suspicious that Berlin and Rotterdam are "pegging" the exchange rates. Strange to say, he cannot see the humor in that situation.

Shipbuilding Costs

In shipbuilding circles it amounts now to John having brought his shipbuilding costs down to a point where he can possibly take orders for standard freighters at about £16 per deadweight ton. Under normal rates of exchange it might just be possible that freighters of the same standard type could be built in America at competitive prices, but at present dollar to sterling exchange rates John has the edge on his American cousin by approximately 20 per cent. On the other hand, due to continental exchange and other "extenuating circumstances" Hans can build this freighter for £11 and has the bulge on John by about 30 per cent. However, as our friend Goldberg remarks, "it doesn't mean anything," because nobody wants the freighter, and if he did want it he could go out and buy it from its present owner for about £6 per deadweight ton.

Special Types

When it comes to special types of passenger vessels, motorships, shallow draft steamers, floating cranes, and other varieties of craft in which a specialized knowledge of certain marine engineering phases enters as largely as economy in throwing a hull together, the work seems to go to the firms that know how to produce it so that we find Dutch steamship lines ordering from British yards, the Japanese navy ordering from an American yard, British corporations ordering from Dutch crane builders, and a general interchange, so to speak, of work among all nationalities in the same way that we Californians are used to receiving orders from South Africa for mining machinery or from Australia for special fruit handling equipment because we have learned by experience to produce the machine that will give results along those lines.



Scene at the opening of the new George V dock, London, England

THE BLOW-OFF COCK

The Cost of Ocean Freight from a Marine Engineer's Standpoint

By SEA FLAME

THE transportation of cargoes by sea is entirely dependent on the profits made. If the shipowner loses money, he will lay up his fleet. If operating and overhead expense exceeds income, some one must lose. This is inevitable. All this being so, consider the cost of carrying freight in American-built ships. We are all anxious to see the "Grand Old Flag" floating over our ships on the seven seas, but when it comes to paying the bills, that's another story. We will not thrash over again the labor costs, but will take up, seriously, costs of operation.

First the initial price of the vessel must be considered; also her depreciation, which can hardly be less than 10 per cent per year; then her upkeep and repairs, her running expense, including fuel, food, paint and other supplies, and wages.

Construction Costs

Commencing at the beginning, take construction. It is safe to say that at least 25 per cent of initial cost could be saved by cutting out wasteful and useless things on American ships. Do not think the writer is unpatriotic, but the "contraptions" on American-built vessels are not seen on what we call "foreigners." Note the usual Shipping Board freighter, like the one the writer is at present chief engineer of. She has in the officers' quarters four highly finished porcelain water closets, flush tanks also porcelain, fitted with ball-floats and nickel fittings, entirely unsuitable for salt water; has twelve expensive porcelain hand wash bowls, with nickel fittings with fresh water supply. There are three six-foot porcelain bath tubs, with nickel fitted water heaters and showers; tiled floors in toilets and bath rooms. The crew are almost equally well provided for, as they have three hot and cold showers with nickel heaters, self-flushing water closets, with the petty officers' rooms supplied with porcelain wash bowls. The pantries have five nickel plated, highly finished coffee urns, porcelain sinks, etc.

Now all this costs tremendously when the labor of running drains, steam lines, etc., is added, together with the valves and fittings. And, unfortunately, these expensive arrangements are not appreciated by those for whom they were supplied. True, a few appear to have some ideas regarding the use and care of the articles, but the majority do not.

Here is a department wherein we invite all of our readers to get rid of their surplus steam or their scavenge gases.

We had thought of calling this department "The Safety Valve," but a San Francisco daily has already appropriated that name, and anyway a safety valve is a fitting used only in great emergencies. The engineer who is right on the job often has use for his blow-off cock, and his boiler seldom needs to use the safety valve.

Pacific Marine Review will not be responsible for any of the opinions given or conclusions reached in articles contributed in this department.

For instance, here is our old friend Sea Flame breaking out like a regular Bolshevik against what he calls the "bunk" of the "high standard of the American workman." We do not follow him here at all, and we would like to get some expressions along this line from our readers.

So, Mr. Mariner, when you get up a good head of steam here is an opportunity to unburden your mind.

Freighters De Luxe

In addition to pantry and lavoratory fittings of a most ornate and expensive type, the electric installation expense is great—fans in every room, and in some two; call bells in most of the rooms; elaborate curtains and blinds; copper screens to doors and ports; fine carpets in rooms; best of bed and other linen. All of this runs into big money, and is for the most part carelessly handled by those for whom it is supplied. The old cry of the labor leaders of the "high standard of the American workman" is, in my opinion, insofar as it applies to seafaring men, all "bunk." The average man going to sea, be he American, Dutchman, Limey or Dago, is of about the same type. He has little care for anything that is supplied him gratis. All the various fancy things on our American ships are in most cases wasted, and in a year or two destroyed and worthless. My old friend, Mr. R. P. Schwerin, was right when he said that the average white oiler was a pig. The old-timers in the Pacific Mail Company will remember the condition of the oilers' quarters and the alleys near them before the Chinese were engaged.

Engine Room Junk

The engine rooms, too, are crowded with expensive and intricate devices and so-called improvements, whose initial cost is enormous. While in theory they are presumed to effect great savings in fuel, etc., in practice the reverse is the case. One reason for this is that the average engineer does not know how to properly handle many of the lately installed additions.

Back to the Simple Life

The writer is aware that a long howl will arise when he says that if American steamship owners would make a revolution in building they might make money and thus carry our products in our own ships. All useless and "mollycoddling" things must be cut out. Build a strong and able hull. Fit her with a rugged and plain engine and good Scotch marine boilers, with no superheaters or other foolishness. Have one dynamo for night use only. Leave out cold-storage and wireless on freighters. Have the main feed, air pump, circulator, bilge and sanitary pumps work off main engines. Have one general service pump. Cut out all fresh water supply to all rooms. Have a hand pump in the galley and another on deck, and no more. For the general crew have plain, substantial toilets and wash rooms. Cut out steam heaters, electric fans, porcelain wash bowls, baths, etc. Build a plain, strong, fool-proof job, and then you can compete with the "foreigner."

Of course the objection will arise that no one will go to sea in such ships. Don't be afraid of that. You will get men, and probably better men, for they won't be "sissies" or tourists. In the old days there was no lack of men, and those days will come back.

A CRANKLESS RECIPROCATING ENGINE

MR. A. G. M. MICHELL, inventor of the Michell thrust block, has recently developed a high speed reciprocating engine on the swash plate principle, using the Michell thrust block to take the thrust of the piston against the swash plate. The swash plate principle is not new and has been applied in the past by numerous inventors, but has always failed in a practical way through lubrication difficulties.

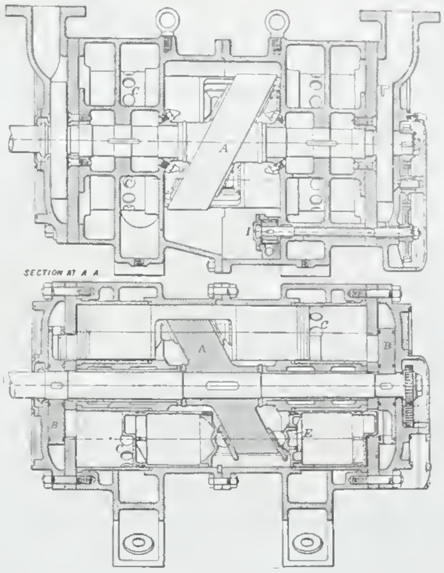
The Michell thrust bearings are good for a load of at least 500 pounds per square inch and have been in every-day use under loads many times greater. Mr. Michell carefully worked out the proportions of his trial engine so as to get a perfect balance between the weights of the reciprocating pistons and the swash plate and has succeeded in producing an engine which runs perfectly at a speed of 1200 r.p.m. and promises good operation at much higher speeds.

As will be seen from the illustration herewith, the cylinders of the engine are arranged concentrically about the shaft and are rigidly connected in pairs on opposite sides of the swash plate. The swash plate is keyed to the shaft which carries also on keys at the outer ends of the groups of cylinders a rotary valve controlling the admission of steam to the cylinders. The engine is designed to work on the uni-flow principle, the exhaust steam being discharged through the ports marked "C."

The test engine has eight cylinders, each five inches in diameter, arranged four on each side of the swash plate. With a gauge pressure of 150 pounds per square inch and a condenser vacuum of 26 inches, a horsepower was developed equal to 0.92 i. h. p. per cylinder per 100 r. p. m. The engine, as stated, was run successfully under load at 1200 r. p. m., and it is believed that it will be entirely safe to run it at 1500 r. p. m.

On this test engine the swash plate was made at an angle of 27½ degrees. The tests have shown this angle to be larger than necessary, and Mr. Michell states that in future engines the angle will be 22½ degrees or less.

It is very evident that this design, if successful in ordinary practice, will make a very compact and light unit. The test unit as described would have an outside diameter of about 20 inches and an over-all length of 3 feet. At 1200 r. p. m. it would produce 88 horsepower and at 1500 r. p. m. 110 horsepower, working on a comparatively low steam pressure. It will be evident to engineers that this design lends itself very readily to the internal combustion type of engine, and we may have here the solution for the generation of large powers in light compact units with all the economy of the direct application of heat energy from fuel oils.



Sectional elevation and plan of the Michell swash-plate reciprocating steam engine

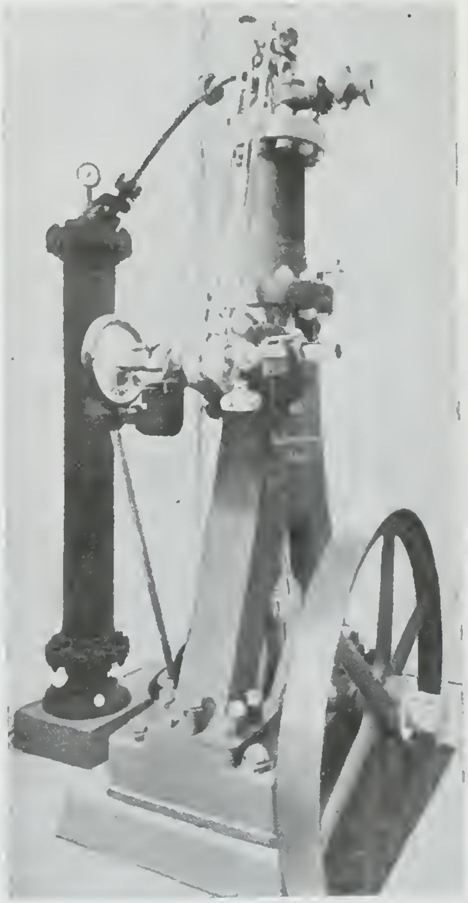
The design as worked out permits of easy accessibility to all parts for repairs and adjustments, provision being made for adjusting the distance between the Michell blocks on opposite sides of the swash plate by means of a screwed sleeve with a notched head. Lubrication of the swash plate is provided through an ample supply of oil maintained by means of a gear driven pump.

Applied to marine propulsion, there would probably be two units geared to one propeller shaft, the gearing problem being easily taken care of in a single reduction by gears of moderate dimensions.

Burning Fuel Oil

SET the burners open wide,
Do not touch the valves at side;
Keep the pressure on the pump,
And up the bally steam will jump.
If the smoke is black and thick,
Open up the fans a bit;
If the smoke is thick and white,
To slow the fans will be quite right;
For when sufficient air is given,
No smoke ascendeth up to heaven.
If the jets refuse to squirt,
Assume the cause is due to dirt.
Should the flame be short and white,
You have combustion clear and bright;
But should the flame be yellow and long,
Combustion is entirely wrong.
A wise man to his heater sees,
And keeps it 200 degrees;
To have it more is not quite wise,
Because the oil may carbonize;
A little lower has been found
To give as good results all round.
If the filters are kept clean,
No rise in pressure will be seen;
But should the pump kick up a ruction,
There's likely air within the suction.
The pressure governs the supply,
So do not keep it very high.
If these instructions you will follow,
You'll beat the other fellow hollow.

From the Proceedings of the I. M. E., London.


The first Diesel engine

NEW COAST GUARD CUTTERS

The Union Construction Company Delivers a Turbo-Electric Drive Vessel to the United States Treasury Department

JUST a year ago in Pacific Marine Review for October, 1920, we published a detailed description, illustrated with plans, of the new Coast Guard cutters building at the Union Construction Company, Oakland. The first of these four cutters, the U. S. S. Tampa, has just completed her official trials satisfactorily and has been accepted by the Treasury Department. Through the courtesy of the Union Construction Company we publish herewith a fine picture of the Tampa on her trial run.

Briefly, the Tampa is a splendidly built, well designed, seaworthy vessel, 240 feet long over-all, 220 feet long on the water line, of 39 feet molded breadth, and 25 feet 6 inches molded depth, having a displacement of 1600 tons when loaded to 14 feet mean draft, this displacement including 90,000 gallons of fuel oil, 24,000 gallons of fresh water, and 35 tons of stores. For a more detailed description of the general features refer to the article on page 114 of Pacific Marine Review for October, 1920.

Power Plant

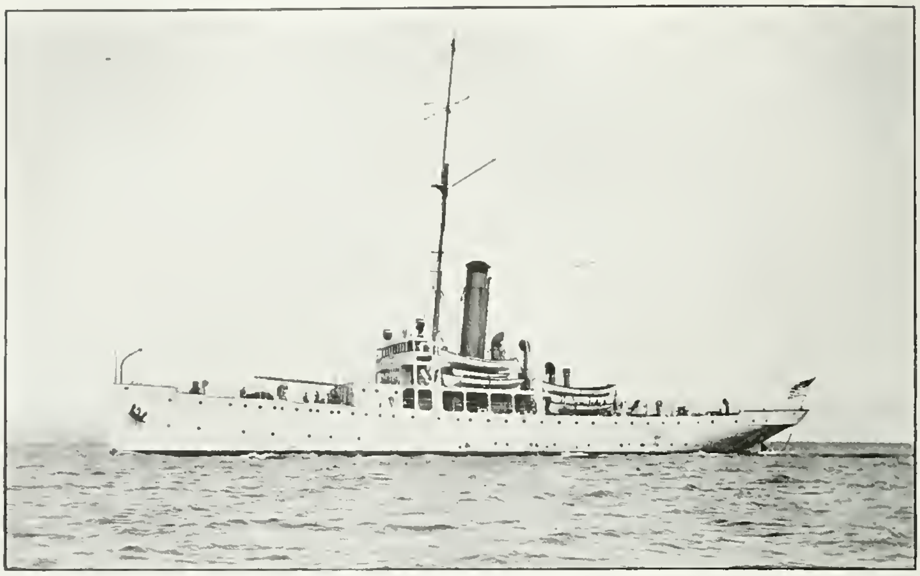
Two Babcock & Wilcox watertube boilers supply steam for the turbo generator. The working pressure is 200 pounds with 50 to 75 degrees superheat. The boilers are fitted with the closed stoke-hole system of forced draft and have a total heating surface of 5800 square feet and a total furnace volume of 600 cubic feet. They are equipped for oil burning with mechanical atomization.

Turbine

The turbine is of the Curtis-General Electric type directly connected to a General Electric a. c. 3-phase, 2-pole generator running about 3000 r. p. m. with an output of about 2100 K. W. This generator supplies current at 2300 volts, 50 cycle, to a synchronous 46-pole 2600 H. P. motor directly connected to the propeller shaft and turning over at full power 130 r. p. m. The propeller is 13 feet in diameter, 4-bladed, of cast steel.

On her trials over the measured mile the Tampa developed 16.3 knots per hour average speed.

Two separate exciters, one being a spare, furnish current for the excitation of the generator and motor fields and also power for driving various auxiliaries, such as the ventilating motor, steering gear motor, gypsy head motor, radio apparatus, refrigerating plant, electric washing machine, and lights for the ship.



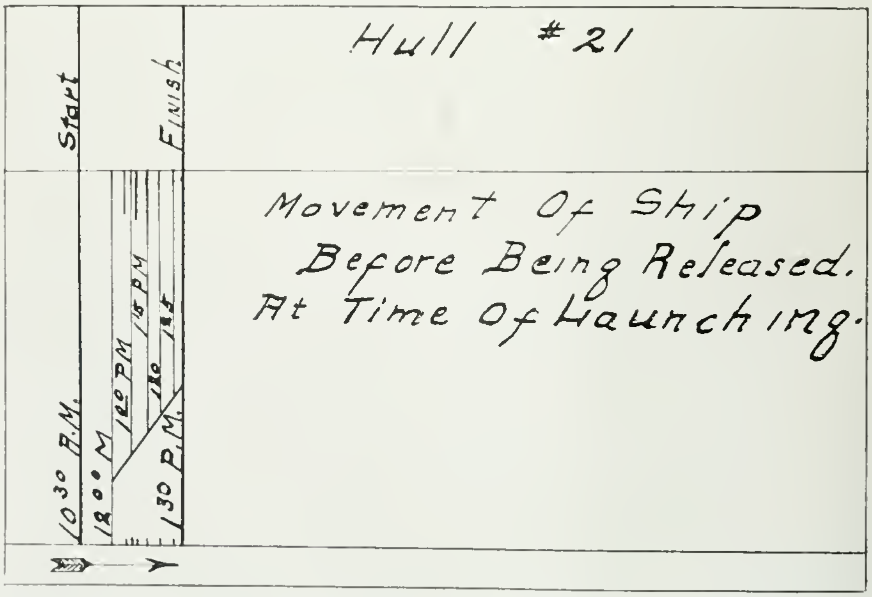
The United States Coast Guard cutter Tampa on her trials in San Francisco Bay

Control

The control equipment is so arranged that it can be operated electrically from a distance or in case of emergency by hand. On the trial the control functioned perfectly, all of the necessary maneuvers being effected with efficiency and dispatch. One very noticeable feature of the electric drive as installed on the Tampa was the entire lack of vibration and the uniformity of torque on the propeller. This feature of automatic control in electric motors of this character absolutely prevents racing of the propeller in rough seas.

We shall hope in a future article to be able to present to our readers the complete trial data of one of these vessels so that comparison may be made between this drive and other types for economy of operation.

The Tampa will certainly make a very welcome addition to the fleet of the Treasury Department and should be of great service in coast patrol, and marine rescue work.



Exact reproduction of card markings secured at the launching of the Achatina, an 8400 deadweight ton oil tanker for the Anglo-Saxon Petroleum Corporation. These markings show the movement of the sliding ways upon which the hull rests from the time that work is commenced, removing the shores from under the ship, until the time that the trigger is released allowing her to slide into the waters of the bay. This very slight movement shows the skill with which the launching cradle on the sliding ways is constructed and adjusted to gradually receive the weight of the hull as it settles on removal of the permanent shoring. The Achatina, was built by the Union Construction Company, Oakland, California.

UNCLE SAM'S LATEST DREADNOUGHT

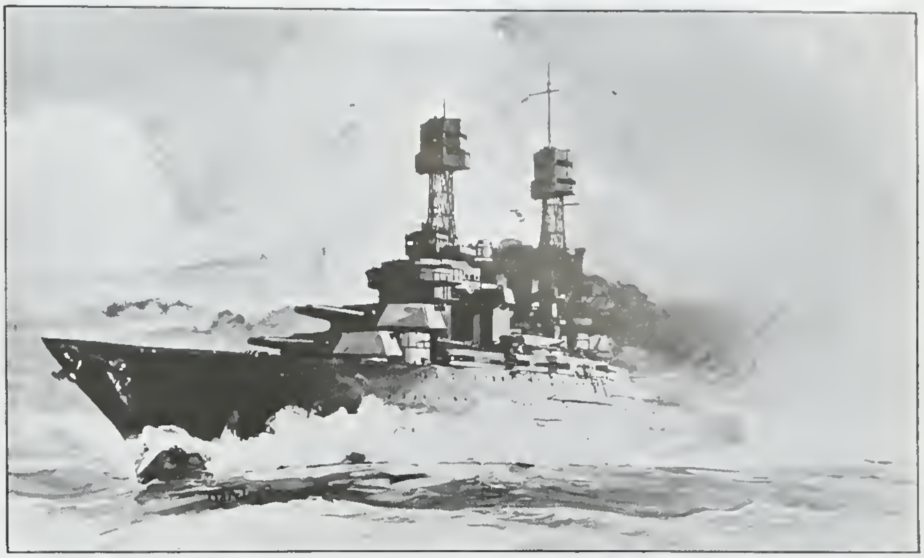
New York Shipbuilding Corporation Launches the Electrically-Propelled Battleship Washington

On September 1 the United States superdreadnought Washington was launched at the Camden plant of the New York Shipbuilding Corporation. The 16,800 tons of steel forming the uncompleted hull was officially named Washton by a ten-year-old lady, Miss Miss Jean Summers, of Walla Walla, Washington, assisted by a bottle of perfectly good California champagne.

The Washington is a sister ship of the Colorado, which was launched from an adjacent way at the same yard last March. Although authorized in 1916 and contracted for in January, 1917, construction of these two superdreadnoughts of the most powerful type afloat was not begun until the spring of 1919, as the Navy Department purposely deferred its capital ship program during the war so that all available shipbuilding capacity could be concentrated on the construction of troop and supply ships and torpedo boat destroyers to meet the immediate emergency.

The main dimensions of the vessel are as follows:

Length, on water line	600′-0″
Length overall	624′-6″
Breadth, extreme	97′-5¾″
Depth, to main deck	47′-2″
Draft, normal	30′-6″
Displacement (weight), normal load, tons about	32,600
Displacement, full load, tons about	33,600



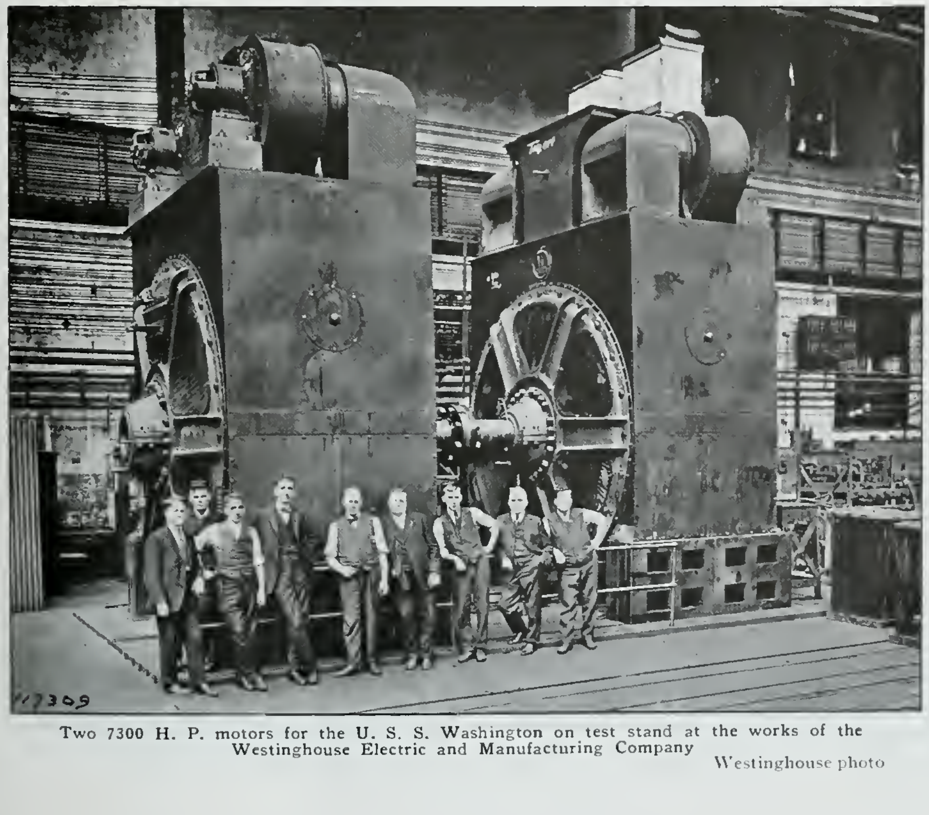
Artist's conception of the completed U. S. S. Washington

Like all recent United States capital ships, the Washington will be electrically propelled. Her main engines will consist of two 15,000 H. P. Westinghouse turbo-electric generators, which will generate electricity to operate four 7300 H. P. Westinghouse motors, one for each propeller. The steam will be generated by eight watertube boilers fired by oil.

This electric drive is superior in several particulars to other methods of propelling a warship. A most important advantage is due to the fact that the main turbines are not connected mechanically with the propellers and no long shafts run through the ship. In consequence, the main turbines can be located in the most convenient position with reference to the ship's military requirements, such as protection from under-water attack, ammunition storage and handling, turret construction, and so on. An electrically driven battleship can therefore be made more efficient as a fighting machine than can one driven by any of the older methods, and the United States Navy is far in advance of other nations in the development of this type of propulsion.

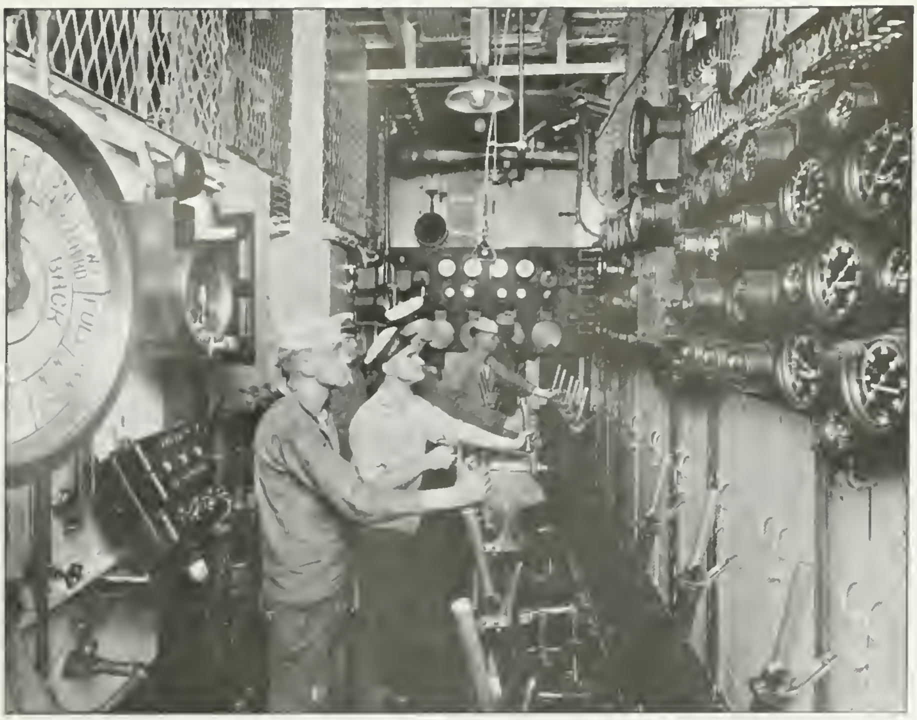
Electric drive also provides great maneuvering power, because the propellers can be almost instantly reversed with full power. In addition, the turbines operate under the best possible conditions for high economy, which means that the ship possesses a greater radius of action than one with a less economical form of drive. In the recent trials of the U. S. S. Tennessee, which is also equipped with Westinghouse electric propulsion, and is similar in tonnage and horsepower to the Washington, it was found that this great vessel could be brought to rest from full speed within three minutes, turned on a circle like a destroyer, and driven backward at fifteen knots, all of which are believed to be records and prove the excellence of her propelling machinery.

The main battery of the vessel will consist of eight 16-inch, 45-caliber, breech-loading rifles, mounted in four turrets, two forward and two aft. Each of these monster rifles, of which there will be two in each turret, will be over 60 feet in length.



Two 7300 H. P. motors for the U. S. S. Washington on test stand at the works of the Westinghouse Electric and Manufacturing Company

Westinghouse photo



View in the control room of the U. S. S. Tennessee. The propelling equipment of the Tennessee is identical with that to be installed in the Washington

Westinghouse photo

The secondary battery will consist of fourteen 5-inch rapid-fire guns placed in advantageous positions. For protection against hostile gunfire from enemy ships all vital parts of the vessel will be adequately protected by heavy armor. This will be arranged in accordance with the best American practice.

All four turrets in which the main battery is mounted, as well as the barbettes, which contain the intricate mechanism for turning the turrets and their guns in any desired direction, are entirely encased in heavy steel armor.

Probably almost as important as the armor itself, from the standpoint of protection against gun fire and torpedo attack is the watertight subdivision of the huge fighting craft. The portion of the vessel above the splinter deck, which is practically at the load water line, is very well subdivided by watertight bulkheads, but below this deck the vessel is divided honeycomb-like into a multitude of comparatively small watertight compartments. This is accomplished by closely placed transverse bulkheads throughout the length of the ship and several watertight longitudinal bulkheads.

Each of the eight watertube boilers is in a separate watertight compartment, as is also each of the two turbo-generators which generate the electrical energy for the operation of the main propelling motors. The four main propelling motors are located in three watertight compartments. With this subdivision even if torpedo damage should penetrate into the portion of the vessel occupied by the propelling machinery, the vessel would not be put out of commission, since the simultaneous flooding of one or more of the boiler compartments, one turbo-generator compartment, and one or more propelling motor compartments would neither sink the vessel nor render it unnavigable.

To operate this well nigh impregnable floating fortress a complement of forty-six commissioned officers, twelve warrant officers and 1022 enlisted men, including seventy-one marines, will be carried. Accommodations for commissioned and warrant officers will be located aft on the second and third decks. The crew's quarters will be forward and amidships on the main deck and second decks.

In general appearance the Washington will resemble the other capital ships recently added to our navy. Forward her shell will have a very pronounced flare outward from the water line to the upper deck. This flare, carried undiminished forward, naturally results in the vessel's clipper stem, intended to facilitate the stowing and handling of her anchors, of which there will be three. This clipper stem is practically the exact opposite of the ram type of bow in almost universal use on battleships a generation ago. The pronounced flare also makes possible a roomy deck in spite of the very fine water line forward. The upper deck is the weather deck from the stem to abaft amidships. Here the main deck, next below the upper deck, becomes the weather deck and extends as such to the stern. The stern is of the cruiser type, now common to most large war vessels.

The launching of the battleship Washington comes just fifteen years after the delivery by the New York Shipbuilding Corporation of the armored cruiser Washington, since renamed the Seattle. At the time of her delivery in 1906 the old Washington was the last word in naval construction and her size and armament form an interesting comparison with present-day developments.

Length, on load water line	502′-0″
Length, overall	504′-5½″
Breadth	72′-10½″
Depth	42′-2¼″
Draft, normal	25′-0″
Displacement, normal load, tons	14,500

Between the delivery of the first Washington and the launching of the battleship by this name, New York Shipbuilding Corporation has built for the United States Navy seven battleships, forty torpedo boat destroyers and a destroyer tender, and now has under construction the battleships Colorado and Washington and the battle-cruiser Saratoga.

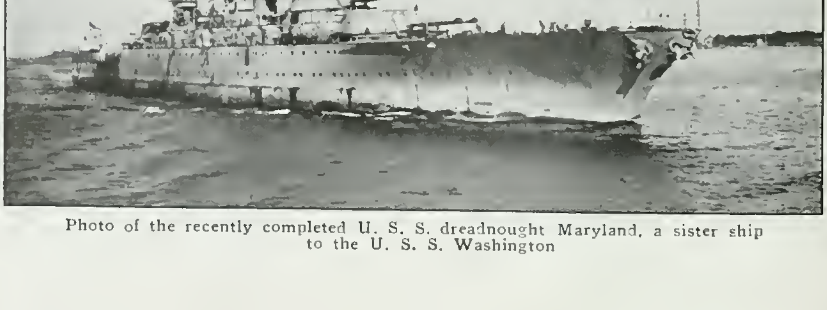


Photo of the recently completed U. S. S. dreadnought Maryland, a sister ship to the U. S. S. Washington

NIPPON YUSEN KAISHA

Japan Mail Steamship Company Celebrates Twenty-fifth Anniversary of Its Seattle-Oriental Service

IN 1885 the Kyodo Unyu Kaisha (the Union Transport Company) and the Mitsubishi Kaisha (the Three Diamond Company) amalgamated to form the Nippon Yusen Kaisha (Japan Mail Steamship Company). The capital of the combination at that time was 11,000,000 yen, and the combined fleet included 58 steamers aggregating 68,700 tons. The new company gradually extended its Japanese coastal operations to include Korea, North China and Vladivostok, and in 1893 inaugurated a regular ocean service to and from Bombay in the interests of the cotton industry in Japan.

In 1896 its capital was increased to 22,000,000 yen, and three more lines of passenger and freight services were established under a mail contract with the Japanese government. These three lines were the European, the American, and the Australian. We are principally interested on the Pacific Coast in the American line, which was established for fast freight, passenger and mail service between Puget Sound ports and Yokohama.

In 1914, after the outbreak of the war, the Nippon Yusen Kaisha established new freight and passenger lines; in 1915 again doubled its capital to 44,000,000 yen; and in 1916 opened a regular freight service between the Far East and New York via the Panama Canal and also initiated a freight service to New Zealand. In 1918 the capital was again increased to 100,000,000 yen. In the maintenance of its European services during the war the company lost four mail steamers and one fine new freight carrier. At the present time the Nippon Yusen Kaisha has 102 steamers aggregating one-half million tons gross, and its plans in the not far distant future

One of the "Big Four" at a Seattle dock

The Nippon Yusen Kaisha steamship Kashima Maru on the quiet waters of Puget Sound call for the construction of a further half million tons gross, including many fine passenger steamers.

On the American line running out of Seattle this company places its main reliance on what are known as the "Big Four," with sailings every three weeks. Running westward the ports of call are Seattle, Victoria, Yokohama, Kobe, Nagasaki, Shanghai, Manila and Hongkong. Eastward the ports of Keelung, Yokkaichi, and Shimidzu are included in addition to the others. The "Big Four" include the Fushimi Maru and Suwa Maru, 21,000-ton displacement steamers with a length of 525 feet, 63 feet beam, 37½ feet depth, and a sea speed of better than 17 knots; and the Kashima Maru and Katori Maru of 20,000 tons displacement, 510-foot length, 61-foot beam, 36½-foot depth, and 17½ knots speed.

The Kashima Maru, whose pictures illustrate this article, takes care of 126 first-class, 56 second-class and 200 third-class passengers. All four of these vessels were transferred from the European line to the American line early in 1918. They are new vessels of the very latest type of construction, twin or triple screw, with ample weight and stability to insure comfortable, steady running even in exceptionally rough weather, and provide a splendid service for Oriental tourists or commercial travel.

INTERNATIONAL CONCLAVE OF PORT AUTHORITIES

AUTHORITIES on harbor development from the greatest ports of the world are speakers on the program of the great international conclave to be held in Seattle October 11-14, under the auspices of the American Association of Port Authorities.

Word has reached Seattle that the foreign relations committee of the Senate has favorably reported on a resolution authorizing President Harding to ask foreign nations to send official delegates to the convention. This will add tremendously to the significance of the conclave, which will consider port development and cargo handling topics.

The program as announced follows:

P. D. Donald, chief engineer, Clyde Navigation Trustees, Glasgow, "The Port of Glasgow."

J. Ross Hanahan, president Chamber of Commerce, Charleston, S. C., "Ports of Charleston, S. C."

R. E. Armstrong, secretary St. John Board of Trade, St. John, N. B., "The Port of St. John, Canada's First Winter Port."

H. McL. Harding, consulting engineer of the State of New York on barge canal terminals, "The Appraisal of Waterfront Terminals and Properties."

L. A. P. Werner, secretary and general manager of the Mersey Docks and Harbor Board, Liverpool, "Port Management."

Harry Pillans, mayor of Mobile, Ala., "The Enlargement of a River Port by Reclamation in the Bay as Its Outlet."

Alexander R. Smith, New York, "The Port of New York, the Greatest Port in the World."

Captain F. T. Chambers, Washington, D. C., "United States Government Co-operation in Port Development."

Frederick H. Fay of Fay, Spofford and Thorndyke, Boston, "The Port of Portland, Me."

Lieutenant Colonel H. C. Boyden, Portland Cement Association, "The Practical Side of Scientific Concrete."

M. H. Bronsdon, city engineer, Providence, R. I., "Cargo Unloading Apparatus."

J. B. Strauss, Strauss Bascule Bridge Company, Chicago, "Harbor Transit Sheds."

Frank G. White, chief engineer Harbor Commission, San Francisco, California, "Ship Worms and Other Marine Borers."

B. O. Allin, director of the Port of Houston, Texas, "Dock Aprons."

Cyrus Kehr, chairman Joint Board of Nation Planning, Washington, D. C., "Seaports and National Planning."

M. F. Steinberger, special engineer Baltimore and Ohio Railroad, Baltimore, "Co-operation with Railroads by Steamships and Export Interests."

William H. Adams, consulting engineer, Detroit, Michigan, "The Analysis of Values of Waterfront Property."

Colonel John Millis, Corps of Engineers, Fort Sheridan, Illinois, "The Regulation of the Great Lakes."

Justin Greiss, vice-president McMyler Interstate Company, Bedford, Ohio, "Recent Developments in Bunkering Cranes, Cargo Coal Loading Equipment and Shipbuilding Cranes."

W. R. Sinks, manager grain elevator department of James Stewart & Co., Chicago, Ilinois, "The Evolution of a Grain Elevator."

N. Rufus Choate, chairman San Diego Harbor Commission, "The Port of San Diego, California."

M. B. Rider, Lakewood Engineering Company, San Francisco, California, "Freight Handling Problems."

Commander Walter H. Allen, public works officer, U. S. Naval Training Station, Great Lakes, Illinois, "The New Naval Harbor on Lake Michigan."

P. R. Hicks, Chicago, Illinois, "The Economic Value of Creosoted Wood in Wharf Construction."

D. J. Owen, general manager and secretary Belfast Harbor Commissioners, Belfast, "Docks and Harbors, General Structural Layout, Systems of Control, Operation and Charges."

John N. Cole, commissioner Department of Public Works, Boston, "The Port of Boston."

J. Spencer Smith, vice-chairman of the Port of New York Authority and president of the New Jersey Board of Commerce and Navigation, "Port of New York Authority."

Charles T. Leeds, Los Angeles, "Prevention of Silt Deposits in Southern California Harbors."

The convention will open formally at 10 a. m. on Tuesday, October 11, with addresses of welcome by Governor Louis F. Hart, Mayor Hugh Caldwell and Dr. Christensen. The sessions will continue through four days.

FULL SPEED AHEAD

EDITED BY ANDREW FARRELL

Deep-sea Shipping

Full Speed Ahead: Deep-sea Shipping, 605; Marine Insurance, 611; In the Shipyards, 617; With the Exporters and Importers, 625; Personals, 630.

35 Cents a Ton

What will happen on the Pacific Coast in the event that the Shipping Board decides to supplant the present M04, under which government vessels are operated by private companies, with a bareboat charter form is something that cannot be predicted. Uncertainty as to what the board's form may be prevents even a guess. But this may be said positively: unless the bareboat charter is liberal, most of the freighters in operation today will be tied up; what will occur in the case of the combination vessels managed by Matson, Pacific Mail and Pacific Steamship depends upon the terms offered by the board for these craft.

A Difficult Task

No action has been taken by the Pacific American Steamship Association regarding a bareboat form because the association has had no intimation as to the board's plans. Apparently Messrs. Frey, Smull and Love intend to draft a form and then say to the operators: "Here it is. Take it or leave it." For such a course there is justification, considerable difficulty having been experienced by the former board in arriving at an operating agreement in conjunction with the different companies concerned, and calling the private operators into conference on a bareboat form probably would result in similar delay. On the other hand, the Shipping Board faces a difficult task in preparing a plan that will end its enormous losses and at the same time make it possible for private operators to charter vessels; unless, indeed, the board really wishes to withdraw its tonnage and sees in a stringent charter form the best means to accomplish that end without making an open confession. If that motive were attributed to the board the outcome of course would be foregone.

Some private owners would welcome a bareboat form; the larger the charter money demanded the better they would be pleased. They would receive more cargo in the event that government tonnage were tied up generally, and rates also would rise immediately, both developments being of very great advantage to the old-time owner who knows his business and who has had an opportunity to write off a large portion of his valuation. The non-owning operator, the man, that is, who is managing government vessels exclusively, finds himself facing extinction, for even if rates were quite reasonable he might not feel warranted, having regard to trade depression, in chartering any bottoms whatever.

6 Shillings for Foreigners

Just how difficult is the board's task may be gathered from a statement prepared by a Pacific Coast shipping man. He compared the Shipping Board steamship West Ira, a standard 8800-tonner, with a foreign vessel, British or Japanese, chartered at the current rate of about 6 shillings a deadweight ton a month on the so-called "government" time form. He discovered that the Shipping Board would have to make a bareboat rate of 35 cents a deadweight ton a month in order to attract charterers; even with such a low rate in effect, he said, operators might prefer to take a foreign vessel at the current rate of 5 shillings for a long term. Lacking information as to what the proposed bareboat form of the board might be, he fell back upon the plan formulated by the American Steamship Owners' Association in the spring. Under both this form and the "government" time charter the charterer would pay for fuel, port charges, pilotage, agencies, commissions and consular fees; but under the bareboat plan of the association he would be subject to several charges from which he would be exempt under the government form; these are: manning the vessel, including liability insurance; provisioning; repairing; drydocking and painting, which in the aggregate would involve considerable expense. In the following comparison of costs, the charterer is shown as bearing the expense of manning and provisioning the vessel but not of repairs and drydocking and painting, the first of which scarcely could be estimated:

S. S. WEST IRA, U. S. BAREBOAT CHARTER

5879 gross; 8759 D.W.T.; 3643 net.
Reciprocating engines; 3 Scotch boilers; 2800 I.H.P.
Crew of 40. Wages a month, $4007; wages a day, $133.57.
Subsistence a day, $40, at $1 a man; stores a day, $50, estimated.
Total a day, $223.57, or $6707.10 for a 30-day month.
$6707.10 divided by the deadweight tonnage, 8759, equals 76.6 cents a deadweight ton a month, cost of wages, subsistence and stores.
At exchange of £1 equals $3.74, the "government" time charter at 6 shillings would cost $1.12, or 35 cents more than crew and stores under a bareboat charter. In other words, the Shipping Board would have to fix a rate of 35 cents, if the charterer pays crew and furnishes stores, in order to equalize a 6-shilling rate. But this is not all; repairs, drydocking and painting have not been taken into account. Before 35 cents could appeal the board would have to shoulder these costs.

What prospect is there of the present allocation system being continued in conjunction with bareboat charters? Apparently little. Assigned tonnage could not compete with chartered. Some few routes of allocated vessels might be left untouched; the majority, it would appear, would be closed. If the board has any plan whereby these obstacles might be overcome, whereby allocations and charterings might go on together, American maritime circles will be interested in the details. That the board has some such plan, or intends to delay the application of a bareboat charter, is indicated by statements emanating from Washington. Retrenchments, it was said, would be made by withdrawing vessels from competing services, and the bareboat plan would be applied principally to new tonnage and to other vessels only after mature consideration.

The Pacific Mail Changes

During the last few years no development in Pacific Ocean shipping has aroused more of a stir than the resignation of John H. Rosseter as vice-president and general manager of the Pacific Mail Steamship Company and the appointment by George J. Baldwin, president, of Thomas A. Graham to succeed Mr. Rosseter as general manager. Announcement of the changes was made by Mr. Baldwin August 25 in the form of copies of letters that had passed between himself and Mr. Rosseter and of an announcement to the public. The pertinent paragraph was in Mr. Rosseter's letter to Mr. Baldwin:

"As a result of depression and adverse conditions facing American shipping, we have unhappily reached a point of irreconcilable differences of opinion. This concerns questions of administration and operation as well as the future of the company."

Nothing Radical Planned

To this statement neither of the two principals has added anything of a material nature, although, of course, the customary rumors were audible in San Francisco, one of which had it that the break came over the employment of Shipping Board tonnage in the trans-Pacific trade, the privately-owned vessels of the Pacific Mail having been withdrawn for the intercoastal service. Such rumors remain only rumors, and may be taken with as large a grain of salt as the hearer desires.

All indications are that nothing of a radical nature will be done by the new management. Mr. Graham said emphatically that the company was considering no new extensions and no changes. He reiterated this reply when he was asked categorically whether the company had plans for the construction of trans-Pacific liners. This might be interpreted as meaning, of course, that any changes under consideration were not imminent; on the other hand, it must be taken as setting at rest fears of any sudden upheaval, such as unfortunately characterize many shifts of management.

Their Undivided Attention

In one respect, however, things have changed. Mr. Rosseter, as is well known, was compelled to divide his time between W. R. Grace & Company and the Pacific Mail. Mr. Graham, on the other hand, and Cary W. Cook, assistant to the general manager, appointed with him, are quartered in offices on California street, adjoining the Pacific Mail building. The significance of this is that they are giving their personal and undivided attention to the company's affairs. Both are "approachable," a fact not without weight in creating for the reorganized company a favorable public opinion. Mr. Graham shows a marked ability to meet visitors and to dispose of them quickly, thus satisfying the public and at the same time conserving his own minutes.

Thomas A. Graham

To steamship operators Mr. Graham is not so well known as he is to railroad officials. As assistant freight manager of the Southern Pacific Company, with headquarters in San Francisco, he made a name for himself as one of the foremost traffic men of the United States. His name, if not a household word, was known in railroad offices in every state. The following biographical sketch is from the Southern Pacific Company:

Mr. Graham began his railroad career as office boy for the North Pacific Coast Railroad in July, 1878. He remained with that company until December, 1881, when he joined the Southern Pacific's San Francisco force. In his forty years' continuous service with the Southern Pacific Company he won his way to the forefront among the leading traffic executives in the transportation industry.

Days of Huntington

Mr. Graham's service dates back to the days of Huntington, Stanford, Hopkins and Crocker. From the present full train schedules and fast service, he looks back to the time when there was but one train a day between San Francisco and Los Angeles and between San Francisco and Ogden; to the time when it took nine days to haul immigrant trains (each passenger with his sleeping outfit) from the Pacific Coast to the Missouri River; to the days of coal oil lamps, bell cords, hand brakes, and the picturesque old "Silver Palace sleepers."

Born in San Francisco September 11, 1864, Mr. Graham has grown up with the West. He was not quite fourteen years old when he took his first job with the North Pacific Coast Railroad.

On Puget Sound

Transferring to the Southern Pacific Company in December, 1881, he was clerk and later chief rate clerk in the San Francisco general passenger office until December, 1889, when he became district passenger and freight agent at Tacoma and Seattle He was a pioneer for the company in the Puget Sound country, where he remained for ten years. On March 1, 1899, he was made district freight and passenger agent at San Jose, California, serving in that capacity until October 19, 1901, when he became assistant general freight agent at San Francisco.

In August, 1905, he went to Los Angeles, where he assumed the position of assistant general freight and passenger agent. This he held until March 1, 1911, when he was returned to San Francisco as general freight agent. On July 15, 1912, he was made assistant freight traffic manager, retaining this position until his present change to the Pacific Mail Company.

His associates attribute his success to a remarkable capacity for detail combined with a broad sound judgment on matters of policy. They say he has never been content to know everything about his own job, but that he has kept himself thoroughly informed on all phases of the transportation industry as well. He does not start anything until after careful consideration, they say, but once started he is persistent and aggressive. He has a reputation for his "long distance memory."

Cary W. Cook, who has been appointed assistant to the general manager, takes a long steamship experience to the Pacific Mail. He was Pacific Coast general manager of the American-Hawaiian in the days when that line had the greatest fleet under the American flag, when it was one of the very few large American operators. He is, therefore, of the old school. Mr. Cook was the choice of a large number of Pacific Coast operators for appointment to the new Shipping Board, preferably as chairman, but he was too much of a shipping man for appointment to a political board.

Daulton Mann, assistant general manager, remains with the company in that capacity.

China Mail Ready for Action

Walter S. Penfield of Washington, D. C., attorney for the China Mail Steamship Company, has spent several weeks in San Francisco and Honolulu perfecting the company's case for the expected tussle with the government over the employment of the company's American-flag vessels, China and Nanking, in the San Francisco-Honolulu trade. That a tussle is imminent is indicated by Mr. Penfield's statement that he had advised his clients to decline to pay a fine of $5000, imposed by the collector of customs, Honolulu, for transporting twenty-five cabin passengers from San Francisco. By taking this course the China Mail will force the government to make the next move.

Constitutionality Questioned

Mr. Penfield said that the company questioned the constitutionality of Section 38, Merchant Marine Act, which prohibits any company engaging in coastwise trade unless 75 per cent of its stock is owned by American citizens. As to what arguments will be advanced to prove unconstitutionality, Mr. Penfield would make no statement. He did acquiesce in a suggestion, however, that there was doubt of the power of Congress to pass an act destroying what could be described as vested rights, which accrued to the steamship China when she was granted American registry in 1898 and to the Nanking because of her construction in an American yard, both of these events having occurred prior to the passage of the Jones bill. If such an argument should have weight with the Supreme Court, both the points brought forward by the attorney-general's ruling, that the China was foreign-built and was owned by a company not complying with Section 38, would fall together.

Regarding the foreign build of the China, which was dwelt upon at length in Pacific Marine Review last month, Mr. Penfield made the comment that all rulings issued by the attorney-general's office were not necessarily prepared by Mr. Daugherty himself; and he added that other government departments disagreed with this particular ruling.

History of Section 38

Mr. Penfield said that Section 38 grew out of the insistence of a single American company, which must compete with Canadians, that the Jones bill prohibit any vessel engaging in coastwise trade unless she were 100 per cent American-owned and in foreign trade under the American flag unless 75 per cent owned. Fortunately, he said, such a rigorous provision failed, but the bill did demand 75 and 50 per cent ownership. He took occasion to criticize the action of the Shipping Board in denying coastwise privileges to the China Mail when the board itself owned competing vessels; he spoke also of notice being served on the company only a few hours before the scheduled time of the Nanking's sailing, when many passengers had been booked and some were already aboard the vessel; and he dwelt at length on the fact that the China Mail was an American company, incorporated in California, a large portion of the stock of which was held by American Chinese, and that the company had restored the American flag to the trans-Pacific route.

Herbert N. Thomas

In the meantime the China Mail is shut out of the coastwise trade. It has made its position stronger, however, by dispatching the British steamship Nile, heretofore employed in the Oriental service, to the East Coast of Asia, where she will be used as a feeder to the Nanking and China. These vessels will not call at Singapore after one more voyage, and the Nanking will serve them by plying between Singapore, Batavia, Hongkong and Shanghai. In this manner the China Mail's trans-Pacific line will be made entirely American flag.

The China Mail has not purchased the Canadian Pacific steamship Empress of Japan and has no intention of buying her, an official of the former company said.

Thomas Succeeds Garland

Alexander M. Garland, who has been in charge of operations of the China Mail, has resigned and has been succeeded by Herbert N. Thomas, general passenger agent, who also retains the latter position. Mr. Thomas became a ticket-seller of the Southern Pacific in San Francisco in 1905, serving one year, after which he went with the Cook travel agency; and in 1907 became booking clerk and later chief clerk of the passenger department, Pacific Mail. When A. G. D. Kerrell, general passenger agent, died, Mr. Thomas succeeded him. The Pacific Mail sold its large vessels in 1915, and Mr. Thomas went to the China Mail, in the organization of which he had a part, and has remained general passenger agent since. In handling the passenger business of the China Mail Mr. Thomas has pursued a policy of "courtesy first," and as a result made a good showing indeed, despite the relatively small accommodations of his vessels.

Navy May Withdraw Transports

"Transport Service of the Government": This pamphlet contains a report of hearings before the House committee on the merchant marine and fisheries, May 25, June 9 and 16; it consists of 165 numbered pages and a few others not numbered; it weighs 6¾ ounces; except for the printing that clutters up its pages it would make good blank paper. Its contents are characterized by two curious facts: the United States Army, concerning the nautical ability of which there is grave doubt, wishes by all means to continue the operation of its slow, expensive and wasteful transport service; the United States Navy, concerning the nautical ability of which there is no doubt whatsoever, wishes to employ commercial lines. Those few words tell us the story briefly and make it unnecessary for anyone to read the 165 numbered pages.

Merchant Vessels Preferred

This attitude of the Navy Department is not of the lips only but is being given concrete embodiment. Washington is considering the abolition of the trans-Pacific transport service and the turning over of the business to private companies. It may be, of course, that the decision of the department will be against any discontinuance; but that there is a good prospect of favorable action is indicated quite clearly by the statement of Captain A. W. Marshall, office of naval operations, director of ship movements, before the House committee.

"We really prefer, if space can be obtained, to use merchant shipping and wherever we can we always do it—we take advantage of it in every case," said he. "We do not consider that the Navy should operate vessels where they would compete with merchant vessels, and we cannot operate them as economically as we can obtain cargo space from well-established lines."

Apart from the general movement looking toward the abolition of the Army and Navy transport services, provided for in H. R. 5348, an agitation was begun in San Francisco by two exporting companies, both of which desired to have more space for Guam cargo than was offered by the Navy. These companies interested private steamship lines, which presented their case to the Twelfth Naval District; the district, in turn, compiled a "statement of facts" for the perusal of Washington. This statement, it is emphasized, was not a recommendation.

Two Companies Affected

Struthers & Dixon and the Pacific Mail are the two companies more immediately concerned, although any commercial line might have some interest. The vessels of the former line, all Shipping Board tonnage, now ply from San Francisco to the Orient, Manila included, and easily might be diverted to Guam and Manila on the westbound voyage, thus making China and Japan ports last. Guam might be made a port of call of the 502's of the Pacific Mail's Manila-East Indies service. These latter vessels could transport passengers as well as freight; those of Struthers & Dixon, not being passenger liners, could carry explosives.

What this Hawaii - Guam - Manila business would mean to a private company may be gathered from the following statement submitted by Captain Marshall, covering the year June 1, 1920, to June 1, 1921:

	Transport Newport News	Transport Pensacola
Cost of operation	$220,736	$192,520
Passengers carried		
First	29	129
Enlisted	193	228
Cargo carried, tons	11,000	20,000

Would Keep One Vessel

"The cargo transported by these two vessels would have cost, if transported commercially, $465,000," Cautain Marshall wrote; "the passengers would have cost $102,650. A total of $567,650 would have to be added to the Navy appropriations in order to move all of this freight and passengers commercially. One vessel would have to be retained for operation by the Navy Department in order to meet military requirements and about half the freight would be transported in this vessel. Therefore, the increase in the appropriation required would be about half of the amount set forth, or $238,825. The saving to the government by placing the other vessel out of service would be $206,128."

Some explanation of the above quotation is necessary. Cost of operation does not include any such charges as overhead, insurance, depreciation, interest on investment, port dues, repairs. In estimating the cost of commercial transportation, Captain Marshall put the trans-Pacific freight rate at $15 a ton, and he was inclined to doubt that freights were much lower when he appeared before the committee. Nonetheless, the estimate appears high. He believed, moreover, that it would be necessary to retain one transport, in part because Guam is a closed port, and in part, apparently, because of the necessity of transporting explosives. The latter does not appear efficacious; the second undoubtedly would have to be faced, but Representative Edmonds said in this connection: "That would have to be changed. There is no reason why it should be a closed port. I have been there personally and I cannot see any reason for it whatever."

A Bit of Nonsense

To Senator Wesley L. Jones and the gentlemen of the National Merchant Marine Association:

One of you, that is to say, the senator from Washington, has forwarded to Chairman Lasker of the Shipping Board a statement prepared by an unnamed railroad man, in which the non-enforcement of Section 28 of the Merchant Marine Act is blamed in large part for the situation in which American shipping finds itself; the others, that is to say, the gentlemen of the National Merchant Marine Association, sponsor in this connection such statements as "had Section 28 of the Merchant Marine Act been put into operation, it may be confidently stated that few, if any, Shipping Board vessels would now be tied up for lack of cargo."

This Helps No One

This, gentlemen, is sheer absurdity. Such propaganda benefits no one, least of all the United States merchant marine. Reiteration of such statements, if unchallenged, will tend to confirm the nation in its habit of looking to Washington for remedies instead of setting to work in its own behalf. Many of our laws are burdensome and should be changed, of course; but to attribute all our woes to non-enforcement of some certain retaliatory law is nonsense. Nonsense, gentlemen, nothing less.

The Merchant Marine Association apparently believes that the shipping depression is largely confined to the United States, for a statement of the organization says: "The marked shrinkage in the volume of ocean freight due to the trade depression of the past year has affected American shipping far more severely than foreign, the proportion of our foreign commerce carried by our own vessels having fallen from more than 50 per cent of the total in 1920 to barely more than 30 per cent this year." We may accept the figures as correct and still ask whether they prove the assertion of the first clause; we may go farther and inquire what Section 28, among other suggested remedies, might avail in the existing situation?

What Is Section 28?

Section 28, which aroused such a furor on the Pacific Coast in the summer of 1920, prohibits the granting of special import and export railroad rates to goods transported in foreign bottoms, but the Shipping Board is empowered to determine whether adequate American facilities exist. What sections of the country have enjoyed import and export rates? The Atlantic not at all, although a beginning is being made now; the Gulf slightly, both on freight originating in and near the Mississippi Valley and some coast goods destined to Europe that the Southern Pacific attempted to divert to the Sunset-Morgan route; the Pacific Coast very largely. In fact, import and export rail rates, speaking broadly, were purely of the Pacific, being designed to enable the transcontinental-Oriental route to compete with all-water transportation from the Eastern seaboard in the handling of products bound to or from the trans-Rocky section and particularly the manufacturing states of the East, which exchange finished products for raw materials of the Orient. In short, if Section 28 had any bearing whatever it was on the Pacific Coast's transcontinental business to and from the Orient.

Where the Trouble Lies

Quite a stir was aroused on the Pacific Coast when the meaning of Section 28 first was apparent, because there was general fear that foreign lines would be forced to the Atlantic. The fear was groundless; Section 28 has not been enforced, despite an evident superfluity of tonnage on the Pacific; but another factor was of more importance: trade that formerly flowed from the East through the ports of the Pacific Coast began to seek the Atlantic - Panama - Pacific route in greater volume, until the Pacific Coast saw quite clearly that it could not hope to regain its old transcontinental business. At the present time the Atlantic is trading directly with the Orient, to such an extent that a recent shipment of 400 tons of Pittsburgh steel through Seattle or San Francisco is a subject of much comment.

What bearing has the non-enforcement of Section 28 had on this situation? None whatever.

Two Disconcerting Facts

Attention may be invited to two singular facts, singular and disconcerting. To replace the Oriental trade lost by the opening of the Panama Canal the Pacific Coast had but to turn to Europe, which demands the agricultural products of the West and in turn seeks to supply the West with manufactured goods. Despite the curtailment of European buying power, the trade is most promising. Well, who holds it? Two American lines have entered, the Isthmian and the European-Pacific service of Williams, Dimond & Company, the latter of which is being supplanted by the American-Hawaiian. They must compete with foreign lines whose name is legion and whose resources are almost limitless. Consider also the Atlantic-Panama-Far East trade. The combined cargo movement in both directions in the calendar year 1920 was 1,827,913 tons, more than twice the Pacific-European tonnage. Japanese and British vessels are in the great majority. Why have Americans been so blind to the march of events?

No, Senator Jones and gentlemen of the National Merchant Marine Association, there is something else wrong besides the non-enforcement of Section 28.

A.-H. and the Board

Beginning with the sailing of the steamship Alaskan from ports of the Pacific Coast in October, the American - Hawaiian Steamship Company will handle with its privately-owned vessels business heretofore conducted by Williams, Dimond & Company, American - Hawaiian agents, with Shipping Board tonnage under the name of the European-Pacific Line. When Williams, Dimond & Company made the first announcement of this new service a few weeks ago, considerable interest was aroused, inasmuch as the action was altogether voluntary and the trade route involved is the best, except for the intercoastal, from the Pacific Coast to any part of the world.

All Vessels Returned

This action would have been taken sooner than it was if several steamships had not been under charter or engaged in government service. Making the change sooner would have involved the operation of a mixed fleet, some vessels being privately-owned and others Shipping Board; at length, however, the company recovered use of its entire fleet and now will employ it in a trade that has excellent prospects. In making this move the company was not actuated by any desire to sever relations with the government fleet, for its experience with the Shipping Board was altogether satisfactory, except for the inevitable tribulations connected with any dealings with any government agency. The change, besides, is a sequence to the policy of the Shipping Board, of developing trade routes that can be taken over by private companies. In view of an impending bareboat charter, too, the American-Hawaiian has wisely made itself independent of any disruption of services that may ensue.

May Be Used Coastwise

In another important respect the company finds itself in a stronger position. The vessels of the new European line may be employed in the intercoastal trade whenever desired, whereas allocated steamships could not be so used because of the Shipping Board's policy of limiting competition with privately - owned tonnage. Although shipments from Europe to the Pacific Coast are increasing materially, vessels have been compelled to sail with small cargoes, so that they have had space available for westbound intercoastal freight.

In its competition with foreign lines in the European trade, the American-Hawaiian has gained a good advantage in deciding to offer through bills of lading from interior cities of the Pacific Coast. Arrangements practically have been completed with the Western Pacific, Southern Pacific and Santa Fe for the issuance of such documents, although negotiations with the Northern railroads have not progressed so far. A through bill of lading is negotiable, whereas a local bill is not, so that shippers will be able to receive cash from their bankers much sooner than formerly.

Canada and Tolls Remission

Free passage for United States vessels using the Panama Canal is in a state of quiescence today and probably will remain so until a few minor questions, such as disarmament, the Shantung cession and Yap, have been settled. But sooner or later Senator Borah or Senator Jones or another will press the point to a finish.

The merits of the contention that our treaty with Great Britain does not prohibit favorable and discriminatory treatment of United States vessels had best be left to those who understand Egyptian hieroglyphics, Chinese politics and Einstein's theory, especially the last. No ordinary man is fit to discuss the meaning of diplomatic papers. But there is some cause for surprise in the attitude assumed by an influential body of opinion in Canada, the proponents of which say that even the exemption from tolls of vessels engaged in the United States coastwise trade would work to the detriment of our northern neighbor. They reason thus: being exempt from tolls, a United States vessel might load a part cargo at Boston and the remainder of her freight at Halifax or Montreal, and transport the whole to Seattle at lower rates than could be offered by a Canadian vessel in the Halifax-Seattle trade; or might have a similar advantage in moving goods between Philadelphia and Vancouver.

A Word from Canada

In this contention there is much merit. Perhaps discussion is useless now, in view of the vigorous effort being made to exempt all United States vessels regardless of their trades; yet if the latter effort should fail, and exemption of coastwise craft only be brought up, Canada doubtless would have a word for our ears. Then it might be well to be fortified with a counter-attack. Such a campaign might be prepared by proposing to exempt United States coastwise vessels from tolls only on the basis of cargo moving between United States ports; that is, to exempt the cargo ton and not the vessel ton. Such a plan would work out as follows: a vessel has, let us say, 8000 tons of cargo, of which 6000 tons is for Seattle and 2000 for Vancouver. Her tolls (on her Panama Canal measurement) are $4000, or at an average rate of 50 cents a cargo ton. Let her be exempt for $3000, the tolls due for 6000 tons of United States cargo, but liable for $1000 for Canadian cargo. In transporting freight to Canadian ports she would have, therefore, no advantage over a Canadian vessel; except that, of course, the American might decline to pass on the amount of the exemption to the American shipper and, using the saving as an indirect subsidy, cut rates on the Canadian cargo. Our neighbors might retort, too, that the scheme after all would give Boston an advantage over Montreal in trading with San Francisco. Such considerations, however, approach the precession of the equinoxes a trifle closely in their finedrawn characteristics. On the whole the plan appears feasible and may be worth discussion.

Regarding the Philippines

During the calendar year 1920, United States vessels carried 5,509,247 tons of cargo through the canal and paid tolls aggregating $4,724,494.66, the total cargo of all vessels being 11,236,119 tons and tolls being $10,295,362.21. If all American vessels were exempt, therefore, earnings of the canal, based on 1920 experience, would be reduced 40 per cent. In United States coastwise trade, including Atlantic to Hawaii, the tonnage movement was 1,185,727, or more than one-fifth. Exemption of vessels engaged in the coastwise trade probably would have cost the canal about $1,000,000, no precise figures of the tolls paid by those vessels being available.

There is one more aspect of the coastwise exemption plan that should be considered. After February 1, 1922, the President may by proclamation extend the application of the coastwise laws to the Philippine Islands. If any act should be passed granting free passage to vessels engaged in the coastwise trade, there should be a specific statement made as to whether vessels plying between the islands and the United States are included. Inasmuch as Manila may become a serious rival of Hongkong, Great Britain probably would object to the inclusion of United States-Philippine vessels, even though other criticisms were met. During 1920 55,144 tons of cargo moved from the Atlantic Coast of the United States to the Philippines and 72,350 tons in the opposite direction.

The Canal's Fiscal Year

Herewith is shown in tabular form the commercial traffic through the Panama Canal for the fiscal year 1921, by nationality of vessels. An analysis of this traffic shows American and British vessels far in the lead of those of any other nation, says the Panama Canal Record. In cargo tons, American vessels carried approximately 45 per cent of the total traffic passing through the canal, and British vessels 32 per cent, with Japanese vessels third with approximately 7 per cent, and Norwegian vessels fourth with a little less than 6 per cent. The vessels of these four countries carried 89 per cent of the commercial cargo through the canal.

For 1921, the tons of cargo passing through the canal was greater by 23½ per cent than for any previous fiscal year. The tonnage and tolls have kept pace with the cargo; the tolls for the past fiscal year exceeding by $2,762,956.46, or 32½ per cent, the greatest amount collected during any preceding fiscal year.

In addition to the commercial traffic, as shown above, 426 government vessels transited the canal during the fiscal year, with tonnage as follows: Panama Canal net tonnage, 476,503; displacement tonnage, 898,663. (Displacement tonnage represents battleships, carriers, etc., where Panama Canal tonnage is not obtainable.) These vessels transited the canal free of tolls, carrying 453,769 tons of merchandise.

The canal completed seven years of operation at the close of business on August 14, 1921, having been opened to commerce on August 15, 1914. During the seven years of operation the total number of commercial vessels which made the transit through the canal was 13,416. The aggregate net tonnage of these vessels, according to the rules of measurement of the canal, was 45,869,942. The cargo they carried totaled 51,578,920 tons of 2240 pounds.

The foregoing traffic was made up of 6388 vessels of 21,933,325 net tons, carrying 22,215,402 tons of cargo, from the Atlantic to the Pacific, and 7028 vessels of 23,936,617 net tons, carrying 29,363,518 tons of cargo, from Pacific to the Atlantic.

	No. of ships.	Tonnage.				Tolls.	Tons of of cargo.
		United States equivalent.	Panama Canal net.	Registered gross.	Registered net.		
Belgian	2	6,309	8,092	10,144	6,188	$7,886.25	12,700
Brazilian	1	3,511	4,566	5,472	3,523	4,388.75	6,700
British	970	3,230,830	3,965,613	5,035,686	3,150,061	3,976,395.33	3,721,932
Chilean	63	104,727	159,727	201,231	116,413	147,023.75	61,737
Chinese	4	10,564	12,098	16,645	10,624	13,187.10	14,400
Costa Rican	16	2,606	2,784	2,983	1,971	2,952.78	2,112
Cuban	1	578	702	1,050	577	722.50	1,200
Danish	60	197,504	236,512	287,579	188,667	241,411.86	322,059
Dutch	50	185,561	248,801	279,261	182,151	229,248.94	216,488
Finnish	2	4,293	4,281	4,620	4,361	5,137.20	7,101
French	44	143,113	155,889	204,727	134,638	164,575.94	132,836
German	19	51,561	67,334	81,023	50,421	62,908.95	73,837
Italian	25	82,610	102,783	147,507	87,689	103,206.60	47,988
Japanese	136	538,205	613,245	808,961	527,693	655,176.51	758,617
Jugo-Slav	2	3,902	4,508	6,370	4,068	4,877.50	8,325
Mexican	4	4,133	5,032	5,884	3,553	4,354.36	3,785
Norwegian	140	462,890	548,227	719,138	453,777	523,311.94	637,887
Panaman	8	1,382	1,370	1,568	1,340	1,463.50	1,500
Peruvian	60	86,786	157,495	239,045	127,292	107,160.64	105,322
Russian	4	9,725	11,279	15,844	8,641	12,156.25	11,343
Spanish	44	101,141	117,400	155,150	100,995	118,548.41	143,076
Swedish	25	74,665	113,661	119,810	90,134	93,331.25	128,919
United States	1,212	4,037,270	4,874,177	6,172,717	3,984,464	4,797,463.60	5,179,350
Totals	2,892	9,343,866	11,415,876	14,522,415	9,239,241	11,276,889.91	11,599,214

Panama Canal business fiscal year 1921

Briefs

The Submarine Boat Corporation is reported to be considering the inauguration of an intercoastal freight service with 5300-ton steamships, of which it owns 32. Announcement of entering the service was made several months ago, but the company did not place any vessels in the trade.

* * *

The Navy Department has awarded contracts for the transportation of coal from Hampton Roads in American vessels as follows: 5000 tons to Portsmouth, $1.20; 5000 tons to Boston, $1.10, both to Crowell & Thurlow; 3500 tons to Boston, $1.10, Pendleton Brothers, Inc.; 7500 tons to San Diego, $4.48, Munson Steamship Line.

* * *

The Shipping Board 535 Silver State arrived at Victoria September 1, having made the voyage from Yokohama in 9 days, 18 hours and 23 minutes at an average speed of 18.02 knots. This is held to be a record for American vessels in trans-Pacific trades. She is operated by the Pacific Steamship Company.

* * *

The Texas Transport & Terminal Company, with the Trans-Oceanic Company as sub-agent at San Francisco, Portland, Seattle, Vancouver, and Los Angeles, has been appointed general agent of the Compagnie Generale Transatlantique's Pacific - Europe service.

* * *

The Cunarder Aquitania arrived at New York from Cherbourg September 9 after a voyage of 5 days, 16 hours and 57 minutes, which is a post-war record.

Marine Insurance

CHARLES F. HOWELL,
Eastern Contributing Editor

Rate War Opposed

Despite constant pressure from influential quarters it is improbable that the American Marine Insurance Syndicates will yield to a demand for lower rates and, throwing all reserve to the winds, launch upon a rate-cutting campaign with foreign marine underwriters. In the judgment of the best informed, this would be suicidal. As is well known, the British hull market has had to make startling reductions in values and rates under spur of the violent competition among marine insurers resultant from the collapse of the Hull Agreement, to which extended allusion has been made in this department in recent issues. This movement has brought marine rates in the London market to a losing basis. Naturally enough, our own shippers and shipowners have, in consequence, found themselves with a competitive disadvantage in overhead and they have been urging the Shipping Board authorities to use their influence with the syndicates to bring down American rates; indeed, they are anxious to see a wide-open rate war with the London market. But, fortunately for our marine insurance interests, the majority of the managers of the syndicates are determinedly set against any further reduction, feeling that they have gone as far as they could when they lowered the rates in June from 15 to 20 per cent on Syndicate B vessels. Further action along this line would seriously imperil even a slight prospect of profit to the companies. Up to the line of safety they are willing to go, but they should not be expected to cross it.

New Syndicate Appointment

Thomas Spencer has been appointed resident surveyor at Philadelphia for the American Marine Insurance Syndicates, in the place of J. H. Messerol, who has resigned to engage in other work. Mr. Spencer's supervision will cover the Delaware River district. He has had a long experience as a seagoing chief engineer, and was formerly surveyor of the port of New York for the American Bureau of Shipping.

Certificate Not a Policy

Nothing has disturbed marine insurers for a long time so much as the recent decision of Justice McCardle, of the King's Bench Division of the English High Court of Justice, to the effect that a purchaser of marine insurance under a c. i. f. contract is entitled to an original policy instead of a certificate issued by an insurance company against an open policy, and that the latter may not be substituted for the policy. It will be borne in mind that in England they do not employ a certificate because of the necessity of having a marine policy stamped within ten days of the arrival of a cargo. They have a method closely approximating it, however, in their employment of "permanent covers." British laws impose a penalty of from £100 up for violation of the stamp requirement, but it is the common thing for shippers over there to take a chance and ignore the requirement on this point.

American insurance companies have been employing certificates for the past half century, and foreign companies domiciled here do likewise. So useful and convenient are they that their issue has extended widely beyond the United States, and there can be no question that their discontinuance would be deplored by shippers everywhere. No reputable American underwriter has ever sought to repudiate them, no matter whether they carried the British tax stamp or not. In the opinion of marine underwriters this matter will blow over, and the use of the time and trouble saving certificate continue as before. Banks and brokers are, it is true, considerably excited over the McCardle decision for the moment; but so they were, a year ago, when the subject of brokers' certificates was under fire; that sensation soon subsided, although there was more reason for it than there is for this, and brokers' certificates are in use right along today.

The matter has been under consideration by a special committee of the American Institute of Marine Underwriters, consisting of T. H. Allen of Chubb & Son, F. H. Osborn of F. H. & C. R. Osborn, and Hawley T. Chester of Platt, Fuller & Company. This committee has reported certain recommendations back to the institute, but the question has been referred back to the committee and final action postponed. A wide difference of opinion prevails among American marine underwriters as to what action would be wise and equitable, and there is a general conviction that the importance of the court's decision has been greatly exaggerated and that no revolutionary changes in the American practice will have to be made once the temporary excitement has subsided. At first a number thought the case should be carried to a higher British court, but this idea has rapidly lost ground because that is a slow process and the likelihood is that a natural inclination to sustain the lower court would prevail anyway.

Justice McCardle's sum-up was as follows:

> I do not think that the act of 1906 covers the document now before me. In my humble view a document of insurance is not a good tender in England under an ordinary c. i. f. contract unless it be an actual policy and unless it falls within the provisions of the Marine Insurance Act, 1906, as to assignment and otherwise. I must therefore hold that the buyers were entitled to reject the documents upon the ground that no proper bill of lading and no proper policy of insurance were tendered by the sellers in conformity with the c. i. f. contract. I abstain from amplifying this judgment by the citation of other authority or the mention of further reasons in support of the conclusions I have deemed it my duty to state. It may well be that this decision is disturbing to business men. It is my duty, however, to state my view of the law without regard to mere questions of convenience. I desire to add four remarks:
>
> 1. That there is no finding or evidence before me of any course of dealing between the parties;
> 2. That there is no finding or evidence before me of any custom or general usage which modifies the long and clearly established legal rights of a buyer under a c. i. f. contract. If any such custom or usage be asserted then the point can be dealt with in some further action in the commercial court. Whether such an assertion can be proved may well be a question of doubt in view of the matters appearing in the Manlie case, 1919, 1, King's Bench, at page 206. See, too, the Wilson Holgate case, 1920, 2, King's Bench, at page 8, where Mr. Justice Bailhache said: "I am not satisfied that since Ireland vs. Livingstone was decided any custom has arisen which obviates the necessity for a tender by the seller of a policy of insurance if the buyer requires it."
> 3. It may well be that legislation is needed to enlarge the operation of the Bills of Lading Act, 1885, and the Marine Insurance Act, 1906.
> 4. That the difficulties indicated in this judgment can be easily, promptly and effectively met by the insertion of appropriate clauses in c. i. f. contracts.
>
> For the reasons given I find in favor of the buyers with the results stated in the award. The sellers must pay the costs of the proceedings before me.

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME
JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON
E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.
FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Slow Premium Payments

Among all classes of marine underwriters there is loud complaint because of the extreme difficulty of collecting premiums from shipowners for business already on the books. This condition has reached a point where underwriters are canceling risks rather than submit to the indifference of certain clients who are willing to take their chances and "pass the buck" to their insurers. They are quick enough to send in a check for premiums when they scent a loss, but otherwise they take their time, realizing that they can always haggle over the premium comfortably once the vessel has passed safely through its hazards. Underwriters know from bitter experience the trouble involved in getting their pay for a risk that has already been survived. Most of the leading offices are spending much time and anxiety in liquidating overdue premium accounts, and it is eminently unjust that they should have to do so. Their condition is all the worse because of the slowness in securing their reinsurance, and also because of the pernicious habit of certain brokers in retaining in their possession for an unnecessarily long time the premium money they have received from their clients. It seems that this difficulty in premium collections is general; British underwriters are also complaining about it; but the latter have a great advantage over their American confreres in that the British broker is responsible for premiums, whereas in our country the insurer has to collect from the insured. It is suggested, here and there, that it might be well to take a leaf from the British book in this particular and fix the responsibility upon the broker. A little sobering responsibility would do no harm.

Towing Increases the Risk

The arrival at New York within a few days of each other of two vessels carrying cargo and with disabled steamers in tow has emphasized the seriousness of this practice from the underwriting point of view. Picking up disabled vessels and towing them long distances substantially increases the cargo underwriters' risk on the towing steamer and should properly be made the subject of an additional charge. The tower earns large fees for this service and he should be billed by cargo interests for the additional premium chargeable by the underwriters. Hull underwriters are not entitled to additional charges on this account on annual policies, because the towing privilege is granted in the contract; but if the towing vessel is covered for the voyage only, underwriters ought to be entitled to an additional premium.

Packing Supervision Helpful

As has frequently been pointed out in these columns, marine underwriters are exercising a careful supervision over the packing of merchandise, and the results are proving of great advantage to our shippers. Before the late war foreign buyers of American products were continually complaining of the wretched condition in which goods reached them, largely due to the inferior containers used on this side. Several important foreign interests had announced their intention of no longer buying in this market on this account. Then came the epidemic of theft and pilferage, with the result that shippers found increasing difficulty in securing insurance against these hazards and were obliged to become amenable to the requirements of the underwriters in the matter of better methods of packing. Excellent improvements have resulted from this spur, and if important experiments continue as happily as in the recent past there is a prospect of our shippers soon finding themselves possessed of containers superior to any employed anywhere.

South American Claims

Claims continue to pour in from South America, and the disquieting feature is that they frequently arise rather from market conditions than from actual insured perils. It is felt that underwriters' representatives in foreign countries should and could do much to prevent this state of things, but unhappily they seem generally disposed to aid the consignee in his attempts on the pocketbook of the underwriter. Some action toward meeting this condition may be undertaken in the near future.

C. F. H.

British Average Adjusting

Consul Leslie E. Reed of London reports as follows:

The Association of Average Adjusters held its annual meeting in London on May 20, 1921, when the chairman, Howard B. Hurd, gave an address on certain marine-insurance questions which, because of its authoritative character, should be of interest to underwriters and all persons concerned with marine insurance. On the subject of the rate of exchange to be adopted for the adjustment of claims on marine-insurance policies he said:

A leading principle is that a policy of marine insurance is a contract of indemnity, and the primary consideration is the extent of the assured's actual loss, subject to the qualification that it is not a perfect form of indemnity in consequence of, among other things, the insured value not necessarily being the actual value and the different methods adopted for the adjustment of claims relating to ships and goods, respectively. In the case of ships the measure of indemnity is the reasonable outlay for repairs without applying the depreciation by reason of the damage to the insured value, while in the case of goods the application of the rate of depreciation to the insured value may give less or more than an indemnity.

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA
W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING
F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK
AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

Another principle to be borne in mind is that the assignment of a policy of marine insurance from the seller to the buyer does not affect the insurers' liability (see marine insurance act, sec. 175 [2]). This has an important bearing on claims on goods where there has been a fluctuation of exchange between the time of the purchase of the goods and the time when the right of recovery accrues in respect of a claim under the policy.

The Rate of Exchange

Claims under foreign general-average adjustments present the most difficulty, and I think that the principle that the foreign adjustment is binding on both sides is subject to the governing principle that a policy is a contract of indemnity, and that there is nothing in the foreign general-average clause to prevent the conversion of the contribution shown in the foreign statement in foreign currency into sterling at such a rate of exchange as will give the assured an indemnity, and nothing more than an indemnity, in respect of his loss as shown in that foreign statement.

The whole question of the rate of exchange to be adopted for the adjustment of marine-insurance claims is one of considerable complexity and difficulty. It seems impossible to arrive at exact logical conclusions which meet every case. Subject to any express terms in the policy as to the rate of exchange to be adopted, the main principle to apply seems to be that a policy of marine insurance is intended to be a contract of indemnity whereby the assured is to be reimbursed with respect of his actual loss.

As regards foreign disbursements generally which form the subject of marine-insurance claims, it may be taken that where an assured has incurred expenses in foreign currency, which he has liquidated by the remittance abroad of a sum of money in his own currency, he is entitled to be reimbursed by the insurer for his actual outlay; in other words, the rate of exchange to be adopted is that at which the money was remitted abroad, provided there was no undue delay which would operate to the disadvantage of the insurer.

Where the expenses incurred in foreign currency have been paid out of freight or other funds to the credit of the assured in the country where the expenses were incurred, the correct rate of exchange to adopt would appear to be that ruling at the time the freight or other funds could have been remitted to the assured had they not been utilized for the payment of the expenses.

General Average Adjustments

Further on in his address the chairman considered the laws of war at sea, one of the questions now occupying the attention of the Maritime Law Committee, and finally took up the question of general average adjustment, on which he spoke as follows:

Various suggestions have been made from time to time for the abolition of general average, but they have not materialized, and there are very strong arguments in the common interest of sea-borne trade why it should not be abolished. The utility of the custom justifies its universality and permanence. It is not by revolutionary but by evolutionary methods that we can obtain a solution of this question, and in the progress already made there is to be noted the improved methods adopted by adjusters to meet the changing conditions of modern commerce.

The increase in the size of ships and in the number of cargo interests in one bottom has vastly increased the work involved in a single adjustment, but to meet this development a system has been generally adopted for summarizing facts and tabulating statistics. A large part of the work involved in a modern general average adjustment is outside the actual work of the apportionment of disbursements, and is done to meet the wishes of underwriters in recording the settlements made by them respecting claims for loss and damage to cargo and general average deposits.

In 1896, arising out of a resolution brought forward by two of our representative members on behalf of underwriters, we adopted a rule of practice requiring average adjusters to ascertain the names of underwriters who had settled claims for loss and damage to cargo and general average deposits and to insert their names in the adjustment in order to safeguard their interests in the distribution under the final adjustment. It cannot be denied that this has been an important and most essential improvement.

Discussion of Deposit System

The general average deposit system is not without its objections. In the majority of cases the rate of deposit has to be fixed on very meager information as to the probable extent of the ultimate loss, and provision has necessarily to be made for a margin to meet contingencies. In 1908 this association invited a conference consisting of shipowners, merchants and underwriters to consider the question of a standard form of guaranty for use in such cases where the method of dealing with general average was resorted to by the parties concerned.

The discussion at the conference showed that there was considerable diversity of opinion as regards the expediency of the general adoption of underwriters' guaranties in lieu of deposits, and the views of underwriters were not favorable to the course, with the result that it was not found possible to draw up a standard form of guaranty which met the views of those immediately concerned. The shipowner, being responsible to all the interests to see that adequate security was taken, obviously could not accept anything short of a full guaranty, whereas underwriters were not prepared to guarantee more than to the extent of the insured value of the goods and objected to the time that would necessarily elapse before they could know the extent of their liability under the guaranty. While the position of average adjusters on such a matter is a neutral one, they were pleased to co-operate with the object of endeavoring to promote any scheme which might facilitate adjustment and meet the wishes of those immediately concerned; and while the efforts were not successful, the discussion which took place served a most useful purpose in having both sides of the question ventilated.

A Suggested Solution

The only possible solution would apparently be a compromise between the two views by taking an unlimited guaranty with a time limit of, say, three or six months, during which period it should be possible to ascertain the probable extent of the loss and to arrive at a provisional collection which would more nearly approximate the ultimate contribution than is possible when the rate of deposit has to be fixed before the delivery of the cargo to the consignees. This would obviate the objection frequently raised that the deposit sometimes largely exceeds the contribution. It would also have this further advantage, that after the investigation which such an interval would allow it might be possible in some cases to dispose of the cargo's contribution by this provisional collection being accepted as a final discharge of the cargo's indebtedness. By keeping in view the fact that general average adjustment is more a practical than an academic question and by the co-operation of all concerned, it should be possible to devise means to adapt the methods of adjustment to meet the changing conditions of sea-borne trade.

The international aspect of general average is of importance not only from a legal standpoint but also with regard to international relationships. Having regard to the success of the York-Antwerp rules, it may be possible in time to reach a wider basis of agreement and achieve the double object of obtaining a greater uniformity of practice and extending community of interest, thereby promoting the cause of friendship between nation and nation, which is the surest foundation of peace.

In connection with the changed aspects of marine insurance law it is interesting to note that a new edition of the standard legal authority thereon, "Arnould on the Law of Marine Insurance," has just been issued. It has been revised in accordance with the practices developed in consequence of the war.

The Canadian Importer

Reasonable doubt may exist as to the good judgment displayed by Captain Carl P. Bissett, master of the Canadian Government Merchant Marine's Canadian Importer, but there can be no question regarding the captain's dogged courage. He refused to quit his ship when she apparently was sinking; not only that, he declined a tow; he and his crew watched the other steamship disappear over the horizon and with that they too vanished from the sight of men for six days. The prospect of the Canadian Importer being brought into port appeared very poor indeed, but the Canadian government refused to abandon hope, and she was discovered after persistent search. Underwriters properly should be grateful to Captain Bissett for having averted a heavy salvage claim; they applaud his determination as of a sort rare enough nowadays; but what they would have said if ship and crew had disapeared may be left to the imagination. The question as to the judgment displayed by the captain, his remarkable courage being heartily conceded, may be summed up in this manner: was his chance of remaining afloat until rescued sufficiently good to justify his refusal of a tow; in other words, if his action were repeated many times, would underwriters win or lose? All this is beside the greater question of life. But Captain Bissett succeeded, which is sufficient answer to any criticism; and his conduct would have been good to think upon even if he had failed.

Log of the Voyage

The Canadian Importer, commanded by Captain C. R. Bissett, departed from Vancouver August 12 with 3,500,000 feet of lumber and general cargo for Auckland. On August 19 she had some trouble, as a result of which her hold and engine-room were flooded and her wireless was disabled, so that she could send no messages. When the Canadian Importer was 625 miles southwest of the Columbia River lightship, on August 25, distress signals were picked up by the steamship Cordova, which went to her assistance. The Canadian Importer declined to accept a tow, however, preferring to wait for a tug from Vancouver. The Cordova therefore proceeded upon her voyage, after calling for a tug, and the Canadian Importer disappeared, despite repeated search. In addition to passing vessels that kept a lookout, the Canadian Observer searched carefully and finally was rewarded August 31 by finding the derelict about 600 miles off Eureka. The two vessels and the salvage steamer Algerine and the tugs Sea Lion and Sea Monarch arrived at Victoria on September 13. When the Canadian Observer (the name is fitting enough) sighted a burning beacon of the Importer in evening of August 31, the derelict had a list of 33 degrees.

The Bulkhead Held

"The cause of the leak will not be definitely determined until after the vessel has been drydocked," said Captain Bissett. "We know, however, that the water entered No. 2 hold and, bursting the bulkhead, flooded the engine-room. At one time there was 26 feet of water in the engine-room and it was gaining upon us at the rate of two feet daily. We were in a precarious position, I must admit, as there was always the danger of the increased weight of water carrying away the other bulkhead, and then there is no telling what might have happened. But the bulkhead held, and here we are."

G. C. Foote, wireless operator, rescribed his sensations when he heard searching vessels communicating with one another, himself unable to send a message:

"It was agonizing. I heard the ships report that they had abandoned hope, and that they were searching for possible survivors, and I was helpless."

Adrift in Boat

The following vessels were reported as searching for or assisting the Importer at one time or other: Cordova, Manukai, Canadian Winner, Snohomish, Algerine, Canadian Observer, and tugs Sea Lion and Sea Monarch.

While on her way to pick up the Canadian Importer, the Sea Lion found eleven members of the crew who had quit the disabled vessel August 19 to seek assistance. They had been adrift fifteen days. All were in good condition.

In connection with assertions that the Canadian Government Merchant Marine had suffered severe losses through the mishaps of the Canadian Importer, Canadian Exporter, Canadian Warrior and Canadian Recruit, the Department of Marine and Fisheries issued the following statement: "The ships of the Canadian Merchant Marine, in conjunction with the practice which obtains in other mercantile shipping offices, in every case are adequately insured." This should dispose of statements that the government was not protected against loss.

Business Improves

A marked increase in the volume of shipments, both foreign and domestic, from Pacific Coast ports was apparent during September. Underwriters generally reported more business as a result, and collections were greatly improved, one large company having only a little more than $10,000 outstanding.

Although practically all underwriters received more business than they had in July and August, there was divergence of opinion as to the reliance that could be placed on the change. One man phrased it as "we are definitely over the top"; while others characterized the showing as "spotty." In this they were joined by operators, who were inclined as long ago as July to doubt the trustworthiness of improvement, inasmuch as general cargo was not moving, shipments being largely lumber and seasonal goods. It is true now, also, that a great deal of freight, such as salmon, is purely seasonal; on the other hand, Japan is in a position to buy more, or at least, soon will be, in view of increased shipments of raw silk to the United States. More purchases by the United States is a necessary precedent to Japanese buying, for the excess of Japanese imports over exports during the first six months of 1921 amounted to yen 223,001,000. The aggregate of foreign trade declined 50.2 per cent from 1920.

By and large, despite the "spotty" appearance of things, the Pacific Coast's export trade appears to be well over the worst. This means more cargo insurance and improved payments of overdue hull premiums.

Alaska Suit Brought

Frank G. Germano, a passenger on the wrecked steamship Alaska, has brought suit in Portland for $13,011.50 damages against the San Francisco & Portland Steamship Company, operator of the vessel. He charged that the captain was negligent and that the crew was incompetent. Mr. Germano's loss in money and personal effects was $1961.50, he said.

Surviving officers of the Alaska have been exonerated by Inspectors Turner and Dolan, San Francisco. The inspectors found that each officer remained by the vessel to the end.

Captain John Alwen, master of the West Hartland, which rammed and sunk the steamship Governor in Puget Sound April 1, has brought suit in Seattle to restrain Captain William Fisher, supervising inspector, from suspending his license for two years. Captain Fisher's decision was upheld by Inspector General Uhler and Secretary of Commerce Hoover; but Captain Alwen maintains that Fisher had no legal right to consider the case independently after the local inspectors had exonerated Alwen, inasmuch as no appeal ever had been taken.

Home Capital Increased

Directors of the Home Fire & Marine Insurance Company, San Francisco, have voted to increase the capitalization from $500,000 to $1,000,000. The increase has been approved by the stockholders. The stock will be offered to the present stockholders, share for share, at $25, $10 of which will be applied to capital and $15 to surplus. Stock not subscribed by shareholders will be taken by the Fireman's Fund, which underwrote the entire issue. By the end of the year the company will have surplus of about $1,000,000, paid up, and more than $4,000,000 gross assets.

J. B. Levison, president, who also is head of the Fireman's Fund, said that the time apparently had passed for the successful conduct of small companies, the best evidence of which was to be found in recent increases of capitalization, even by the largest American companies.

The Japanese Market

Marine insurance contracts, which have been on the decrease since the business slump of March last year, have begun to show an increase, says the Japan Advertiser, Tokyo. The business situation has somewhat improved since that time, as is evidenced by the increase in ocean shipments. New contracts made during January last numbered 158,374, involving a total value of yen 555,296,000, but by the end of May the respective figures had increased to 252,064 and yen 953,132,000. The increase in new contracts, however, has not been sufficient more than to offset the lapse of old contracts, with the result that the outstanding contracts show rather a decrease compared with January. The following figures give the monthly total value of new and outstanding contracts, represented in units of yen 1000:

	New Contracts	Outstanding Contracts
January	555,296	1,992,155
February	586,519	1,960,836
March	942,408	1,808,991
April	698,395	1,778,052
May	953,132	1,943,099

Marine insurance companies are considering a proposal for the acceptance of risks on fishing motorboats. The number of such craft has considerably increased in this country of late, the present total number being about 5000, according to the Japan Marine Industry Association. Hitherto marine insurance companies have refused to take risks on these boats, which they regard as very dangerous. The owners of such ships, as this sort of craft is not covered by insurance, find it difficult to obtain financial facilities on the security of their boats and they have approached the insurance companies with a request to undertake the risks. This proposal is now under consideration by the insurance firms. But it is doubtful if a favorable arrangement will result, unless the owners of fishing motor-boats are prepared to pay very high rates. Even in the case of large wooden vessels, the insurance companies refuse to take risks except in regard to those used on specially safe routes and those at rates much higher than those for ordinary steel ships.

Ship's Liability Discussed

The conference of the Maritime Law Committee of the International Law Association in London yesterday was devoted to summing up the results of discussions at the earlier sessions, said a recent issue of the London Times. On the question of whether freedom of contract on the part of the shipowners with regard to the carriage of goods by sea should be absolute, or limited by legislation, the majority of the committee favored a uniform law among maritime states for liability for losses caused by defect of ships, or default in the handling and custody of goods to be obligatory upon the shipowners. The provision was suggested that, following the Canadian statute, if the owner exercised due diligence to make the ship seaworthy and properly manned, equipped and supplied, neither the ship nor the owner, agent nor charterer should become responsible for loss or damage resulting from faults or errors in navigation, or in the management of the ship or from latent defect.

No Objection to Acknowledgment

On the question of whether legislative control should be exercised to secure for the shipper an express acknowledgment of receipt of the goods shipped, the shipowners' expressed view was that there was no objection in principle, subject to certain conditions, to a compulsory requirement of a plain bill of lading evidencing the fact of the shipment of goods specified therein.

The general view of the committee was that a basis of agreement upon a uniform system for the statutory determination of rights in respect of goods carried by sea would probably be most readily arrived at upon the lines of the Canadian statute and the report of the Imperial Shipping Committee.

MARINE INSURANCE BUSINESS TRANSACTED BY COMPANIES IN WASHINGTON DURING THE YEAR 1920.

NAME OF COMPANY	Gross Risks Written	Net Risks Written	Gross Premiums Written	Net Premiums Written	Losses Paid	Losses Incurred	Premium Tax
Aetna Insurance Company	$5,411,329 00	$1,295,121 00	$124,149 10	$8,521 27	$10,898 98	$5,904 84	$187 23
Agricultural Insurance Company	543,800 00	372,100 00	....	....	....	....	....
Alliance Insurance Company of Philadelphia	1,892,361 00	1,869,941 00	13,700 03	12,345 85	9,431 69	5,367 86	277 78
American Alliance Insurance Company	3,240,527 00	....	11,535 34	....	....	....	....
American Eagle Fire Insurance Company	166,183 00	35,538 00	2,364 09	480 67	35 25	391 25	10 81
American Insurance Company	1,562,455 00	292,874 00	18,558 55	3,236 09	293 43	1,587 55	72 81
Automobile Insurance Company of Hartford	2,163,119 00	1,854,929 00	23,878 79	19,762 49	202 05	2,224 34	444 66
Boston Insurance Company	32,500 00	32,500 00	86 25	67 50	35 28	35 28	1 52
British & Foreign Marine Insurance Company, Ltd.	5,099,637 00	5,085,808 00	34,501 37	34,311 42	899 45	119 35	772 00
Camden Fire Insurance Association	2,226,499 00	1,723,345 00	23,757 46	18,871 69	777 88	1,066 88	424 61
Canton Insurance Office, Ltd.	17,151,143 00	16,271,380 00	32,595 62	27,955 92	9,687 43	6,279 54	629 01
Columbia Insurance Company	790,920 00	450,528 00	6,021 42	4,510 96	506 25	812 24	101 50
Commercial Union Assurance Company, Ltd.	2,381,814 00	2,361,814 00	3,560 14	3,554 80	2,520 00	2,520 00	79 98
Concordia Fire Insurance Company	208,878 00	187,656 00	5,289 38	4,810 15	631 14	1,035 14	108 23
Continental Insurance Company	390,161 00	341,698 00	4,102 87	3,780 00	47 00	124 00	85 05
Eagle, Star & British Dominion Insurance Co., Ltd.	3,668,560 00	3,620,594 00	16,331 07	15,847 27	539 51	2,374 79	356 56
Equitable Fire & Marine Insurance Company	587,488 00	....	8,522 16	....	....	....	....
Federal Insurance Company	856,998 00	776,254 00	28,014 60	22,828 09	16,361 23	16,361 23	513 63
Fidelity-Phoenix Fire Insurance Company of N. Y.	390,161 00	341,698 00	4,102 89	3,749 88	2,235 16	1,225 00	84 37
Fire Association of Philadelphia	105,341 00	103,341 00	1,185 89	489 63	2,955 93	2,955 93	11 02
Fireman's Fund Insurance Company	93,744,594 00	63,202,600 00	560,337 55	249,358 51	286,643 29	87,270 11	5,610 57
Firemen's Insurance Company	1,181,013 00	1,095,105 00	4,946 56	3,296 16	234 81	214 81	74 16
Franklin Fire Insurance Company	3,718,649 00	3,672,013 00	35,580 68	34,280 25	10,402 64	10,413 64	771 31
Glens Falls Insurance Company	351,931 00	296,816 00	3,911 74	3,517 50	....	....	79 14
Globe & Rutgers Fire Insurance Company	2,482,503 00	2,026,505 00	42,451 78	32,289 16	10,952 20	8,303 51	726 51
Great American Insurance Company	6,775,362 00	6,442,170 00	39,668 49	31,194 65	5,797 76	13,250 58	701 88
Hanover Fire Insurance Company	138,813 00	117,429 00	1,680 45	1,563 84	....	522 46	35 19
Hartford Fire Insurance Company	7,816,685 00	7,815,605 00	8,730 88	8,087 69	280 94	280 94	181 97
Home Fire & Marine Insurance Company	5,738,484 00	5,577,200 00	31,238 38	29,178 55	11,115 55	8,606 62	656 52
Home Insurance Company	13,379,240 00	11,711,143 00	34,412 01	27,297 76	24,381 23	23,496 51	614 20
Hudson Insurance Company	9,689 00	9,689 00	40 27	40 27	....	....	91
Importers & Exporters Insurance Company of N. Y.	207,805 00	193,155 00	8,996 19	8,677 38	25 50	25 50	195 24
Indemnity Mutual Marine Assurance Company, Ltd.	79,968 00	69,968 00	1,642 52	901 10	4,399 20	4,399 20	20 27
Insurance Company of North America	9,578,730 00	8,763,607 00	198,350 97	158,391 87	79,924 92	54,030 32	3,561 79
La Fonciere Marine Insurance Company	282,593 00	258,625 00	1,545 30	1,339 35	21 33	....	30 13
Liverpool & London & Globe Insurance Co., Ltd.	1,976,642 00	1,852,780 00	18,901 26	16,403 10	....	....	369 07
London Assurance Corporation	31,439 00	31,439 00	54 83	54 83	....	....	1 23
Marine Insurance Company, Ltd.	416,027 00	416,027 00	1,897 13	1,897 13	....	....	42 69
Massachusetts Fire & Marine Insurance Company	694,619 00	509,170 00	2,111 73	1,487 17	489 28	251 13	33 46
Milwaukee Mechanics Insurance Company	1,354,313 00	1,144,858 00	4,969 41	4,179 44	1,855 11	2,254 10	94 04
National Union Fire Insurance Company	2,234,860 00	2,202,763 00	18,055 12	17,415 81	51 56	51 56	391 85
Newark Fire Insurance Company	1,023,961 00	946,461 00	3,832 93	3,602 24	1,465 49	1,125 49	81 05
Niagara Fire Insurance Company	559,539 00	388,394 00	7,160 09	5,098 49	....	....	114 71
Norske Lloyd Insurance Company, Ltd.	4,255,595 00	4,142,839 00	31,063 25	27,305 08	15,519 73	19,072 73	614 36
North China Insurance Company, Ltd.	94,000 00	94,000 00	3,720 95	3,485 80	....	....	78 43
Northwestern National Insurance Company	....	....	116 51	28 48	37 02	6 60	64
Phoenix Assurance Company, Ltd.	7,228,265 00	6,545,659 00	2,222 52	2,039 14	2,379 89	3,514 89	45 88
Phoenix Insurance Company	3,967,404 00	2,324,677 00	33,467 01	23,063 40	15,490 49	12,324 82	518 93
Providence Washington Insurance Company	2,521,244 00	2,028,126 00	22,091 05	15,924 09	13,077 85	8,427 85	358 29
Queen Insurance Company of America	28,288 00	28,288 00	90 71	90 71	....	....	2 04
Queensland Insurance Company, Ltd.	2,031,529 00	1,587,272 00	9,362 20	6,943 35	2,053 77	2,053 77	156 23
Royal Exchange Assurance	621,159 00	605,603 00	1,781 73	1,282 94	3,213 77	3,213 77	28 86
Royal Insurance Company, Ltd.	243,200 00	243,200 00	1,286 16	1,270 98	82 73	1,732 73	28 60
Scandinavian American Assurance Corporation, Ltd.	5,091,202 00	5,032,779 00	43,860 15	40,781 98	25,585 75	29,863 77	917 59
Sea Insurance Company, Ltd.	108,339 00	108,339 00	1,096 25	1,096 25	....	....	24 66
Security Insurance Company	458,535 00	397,114 00	7,235 97	6,500 99	73 90	85 90	146 27
Standard Marine Insurance Company	16,402,533 00	11,937,713 00	96,080 37	61,788 65	18,657 40	4,395 76	1,390 24
St. Paul Fire & Marine Insurance Company	3,069,768 00	2,890,119 00	11,565 09	10,974 73	21,693 35	21,274 36	246 93
Switzerland General Insurance Company, Ltd.	8,820,282 00	8,584,177 00	26,439 32	24,476 25	1,128 04	1,128 04	550 71
Thames & Mersey Marine Insurance Company	5,507,623 00	5,342,802 00	30,364 76	27,067 49	11,104 53	11,104 53	609 02
Tokio Marine & Fire Insurance Company	1,580,766 00	1,536,566 00	4,356 83	4,173 59	4,251 23	4,400 00	93 91
Union Marine Insurance Company, Ltd.	297,589 00	297,589 00	1,857 45	1,828 05	417 10	417 10	41 13
United States Fire Insurance Company	1,162,480 00	1,054,037 00	8,980 95	6,063 18	3,756 76	3,760 00	136 42
United States Lloyds, Inc.	549,955 00	528,055 00	7,597 26	5,589 21	3,876 77	4,445 53	125 76
Vulcan Fire Insurance Company	739,855 00	739,855 00	8,177 84	8,177 84	4,883 07	2,569 64	184 00
Westchester Fire Insurance Company	1,307,473 00	1,160,877 00	10,686 56	8,710 76	3,958 52	3,365 52	195 99
Western Assurance Company	2,868,989 00	2,601,856 00	22,847 13	19,925 20	2,080 95	4,299 45	448 32
Yangtsze Insurance Association, Ltd.	17,172,713 00	11,006,982 00	133,656 09	82,356 10	—2,990 59	—10,809 42	1,795 70
Totals	$288,776,219 00	$226,579,165 00	$1,912,777 99	$1,215,330 17	$646,026 40	$395,520 04	$27,287 57

Mr. Edward F. Nicholls, representing the underwriters, emphasized the absolute necessity in the interests of overseas commerce of ability on the part of shipowners to limit in clear terms the liabilities incurred by them by means of the contract of affreightment.

It was decided to refer the following questions to the conference of the International Law Association, to be held at the Hague in September:

(1) Whether it is desirable in the interests of seaborne trade that the rights and liabilities of the cargo owner and shipowner under all contracts for the carriage of goods by sea should be controlled by state action.

(2) If so, to what extent.

The preparation of a draft code of regulations embodying the views expressed by the majority at the meetings of the conference was referred to a drafting committee.

New Honolulu Agency

Fred L. Waldron, Ltd., a shipping and commission house of Honolulu, has added an insurance department in charge of J. G. Zabriskie, formerly of C. Brewer & Company and Alexander & Baldwin. The Waldron company will represent the Yangtse Insurance Association in the marine field, and the Royal Exchange Assurance of London in fire and automobile.

* * *

T. J. Byrnes, secretary of the Universal Insurance Company and also of Talbot, Bird & Company, is making a visit to the Pacific Coast.

* * *

The O. S. K. steamship Shoshu Maru, of 1532 tons gross, built at Glasgow in 1891, struck in the Loochoo Islands in a typhoon August 12 and was lost with all hands except one man who had attempted to summon assistance from shore. Forty-four men perished. Loss of vessel and cargo is estimated at five hundred thousand dollars.

In the Shipyards

New Construction

A model of a proposed combination vessel for the Inter-Island Steam Navigation Company of Honolulu will be towed in the University of Michigan tank about October 1. If the test be satisfactory, the plans will be completed in detail and sent to Honolulu for final approval. It is possible that there will be some delay in calling for bids, but there appears to be no doubt whatever that the vessel will be built. Keen competition for the contract is in the offing. Due to the desire of the company to have the steamer built on the Pacific Coast, where supervision will be easier and where builders are better acquainted with the needs of the Hawaiian service, Western builders will have an advantage over their Eastern competitors. A yard unacquainted with the demands of the Hawaiian service might follow specifications to the letter and still produce a vessel unsatisfactory in some respects; therein lies the strength of the West, but if bids of the Pacific are too high the contract will go East.

The Puget Sound Navigation Company, Seattle, is reported to be planning a $500,000, 19-knot steel ferry for its Seattle-Bremerton service, construction to be begun in 1922.

Red D Bids Low

Ten bids were received by the Red D Line July 18 for the construction of two 4300 deadweight ton combination vessels for the New York-Venezuela service. Bids ranged from $1,100,000 to $1,800,000 a vessel, which appear to be quite low.

"It is said that the present actual cost of the ship, without making any allowance for overhead expense, is somewhere around $1,400,000," says the Atlantic Coast Shipbuilders' Association. "The shipbuilding yards, facing a shutdown unless further orders are forthcoming, are anxious to keep their organizations together and are showing a disposition to accept contracts at cost."

Bids have been asked by the Western Union from British and French as well as American yards for the construction of a Diesel-electric cable ship.

Several grain barges and carfloats may be built by the New York Central Railroad for New York harbor work.

Bids have been asked for the construction of two ferries and slips for the Philadelphia & Camden Ferry Company. If costs of construction are not too high a contract will be placed.

Contracts Let

The Vineyard Shipbuilding Company, Milford, Delaware, is reported to have received a contract from the government of Bahama for the construction of a combination tug, tender and dispatch boat, 120 feet L. O. A., 28 broad, 10 deep, of wood, equipped with a 500 I. H. P., fore and aft compound engine and one Scotch boiler.

The Midland Range Company, Midland, Pennsylvania, is said to have been awarded contracts by the United States Engineers' office, Nashville, for the construction of two steel barges to cost $13,880 each.

The Newburgh Shipyards, Inc., with a price of $10,257, is reported to be the low bidder for the supplying of fifteen bell buoys, fixed counterweights with bell, for the Department of Commerce, lighthouse service, Tompkinsville, New York.

A contract for three steel deck barges, 120x32x7 feet, to be constructed for the United States Engineers, Pittsburgh, has been awarded to the Dravo Contracting Company September 2. Of ten bids submitted by various companies for the work, the Dravo company's was lowest at $13,425 a barge.

Last U. S. S. B. Freighter

The Los Angeles Shipbuilding & Drydock Company launched its thirty-fifth and last steel freighter for the United States Shipping Board September 19. She was christened West Chopaka by Mrs. Fred L. Baker, wife of the president of the company. Five of the vessels, the West Chopaka included, were 11,000-ton flush-deck freighters; the others were 8800-tonners. The Los Angeles yard received the first contract of the Shipping Board's program, the document having been executed May 13, 1917, and the same company now has launched the last freighter for the board.

Oriental Line Planned

Following the launching, the company's guests were taken on a cruise around Catalina Island on the steamship Harvard. During the cruise Mr. Baker and Erle M. Leaf, vice-president of the Los Angeles yard and secretary of the Los Angeles Steamship Company, of which Mr. Baker is president, held a meeting with several prominent guests to discuss with Meyer Lissner, Shipping Board commissioner, plans for the formation of an Oriental steamship line for freight and passenger service. Plans are taking shape, it is stated, with the aim of making the Los Angeles Steamship Company, operator of the Yale and Harvard, the nucleus of a large organization, which should open an Oriental service on the ground prepared by the Los Angeles Pacific Navigation Company, formerly an operator of Shipping Board tonnage. Messrs. Baker and Leaf were the chief executive officers of this last-named corporation.

Although the West Chopaka is the last vessel under construction, the Los Angeles Shipbuilding & Drydock Company will remain in business as a drydocking and repair plant, following upon the original plans of Messrs. Baker and Leaf.

The West Chopaka launching was the last of any freighter building for the Shipping Board. One passenger vessel, the Nutmeg State, remained on the ways at Sparrows Point, Bethlehem, September 1.

Work at Shanghai

Kiangnan, Shanghai, expected to dispatch the third 10,000-ton freighter, the Oriental, to the United States in late September. One vessel, the Cathay, remains building for the Shipping Board. Her keel was laid April 5, 1919, and she was launched May 26, 1921. The date of keel-laying may have some bearing on the point raised in Pacific Marine Review last month, as to whether she and her sisters were owned by the United States at the time of passage of the Merchant Marine Act.

Authoritative information from Washington is to the effect that small appropriations will not result in delay to new Shipping Board construction or in payments for vessels already delivered.

Pacific Building

On September 1, according to returns compiled by Pacific Marine Review, there were 13 ocean-going steel merchant vessels of 162,490 deadweight tons under construction in yards of the Pacific Coast of the United States. Four vessels of 37,800 tons were delivered in August as follows: freighter, Shipping Board, 1 of 11,000 tons; tanker for Shipping Board, 1 of 10,000 tons; tankers for foreign private account, 2 of 16,800 tons. No contracts have been let.

Active construction will continue on the Pacific Coast longer than had been expected, for work on most of the vessels is not being pushed at the former rate. This is due largely to the falling-off in the demand for tankers.

Canada delivered one vessel of 8390 tons to the Canadian Government Merchant Marine in August.

The following tabulation is of work under way September 1:

American Yards	No. Vessels	Agg'te D.W.
Freighters, U.S.S.B.	2	22,000
Tankers, private	7	83,690
Freighters, private	2	40,000
Tankers, foreign	2	16,800
Totals	13	162,490
Canadian Yards		
Freighters, Gov't	3	25,090
Comb'n, private	1	600
Totals	4	25,690

World Building

The world's merchant shipping in June, 1921, as reported by Lloyd's Register, comprises 33,206 vessels of 100 gross tons or over, aggregating 61,974,653 gross tons, the returns covering a considerable number of vessels on which work has begun but is not yet completed. The corresponding returns in June, 1920, reported 31,595 vessels of 57,314,065 gross tonss. The accompaning table is a summary according to nationality, the last item, "flags not recorded," comprising former German steamers not yet definitely allocated among the allied nations and various other ships.

Different sets of figures have been compiled to show the increase in the world's shipping since 1914. One statement puts the net increase at 11,703,000 gross tons of steel and iron steam vessels, of which the United Kingdom had 411,000 tons; the United States, 10,477,000; other countries, 6,311,000; less a German loss of 4,444,000 and Austro-Hungarian of 1,052,000. Another tabulation shows a net increase of 12,779,944 gross. Lloyd's statistics show, however, that there is 5,757,175 gross tons of steel steamers at least twenty-five years old. If this aggregate and 2,940,000 tons of new tankers is deducted from the increase, the growth of the cargo fleet proper is seen to be about 3,000,000 tons. But the normal growth prior to 1914 was 2,000,000 gross tons a year, whence the optimists deduce that, aside from trade depression, there is an actual shortage of shipping.

Shipping Board Work

On July 1 the status of Shipping Board tonnage was:

	No.	D.W. Tons
Keels to be laid	0	0
Ships on ways	4	48,000
Ships outfitting	20	228,800
Ships delivered	2288	13,359,911
Totals	2312	13,636,711

Country.	Steamers and motor vessels.		Sailing vessels.		Grand total.	
	Number.	Gross tonnage.	Number.	Gross tonnage.	Number.	Gross tonnage.
British:						
United Kingdom	8,579	19,320,053	455	251,501	9,034	19,571,554
Australia and New Zealand	570	672,146	45	21,791	615	693,937
Canada—						
Coast	541	835,275	348	135,080	889	970,355
Lakes	72	163,756	....	....	72	163,756
India and Ceylon	147	186,884	43	10,485	190	197,369
Other dominions	415	410,492	218	63,335	633	473,827
Total	10,324	21,588,606	1,109	482,192	11,433	22,070,798
United States:						
Sea	3,779	13,511,142	1,179	1,185,946	4,958	14,697,088
Northern Lakes	468	2,163,144	26	91,786	494	2,254,930
Philippino Islands	96	72,098	3	1,886	99	73,984
Total	4,343	15,746,384	1,208	1,279,618	5,551	17,026,002
Argentine	163	145,801	46	21,353	209	167,154
Belgian	253	546,641	3	4,390	256	551,031
Brazilian	351	476,436	51	22,889	402	499,325
Chilean	101	99,567	23	13,880	124	113,447
Chinese	122	163,037	....	....	122	163,037
Cuban	44	50,178	15	8,375	59	58,553
Danish	587	883,052	211	81,412	798	964,464
Dutch	1,004	2,208,433	65	17,354	1,069	2,225,787
Esthonian	35	29,779	55	11,404	90	41,183
Finnish	145	106,255	185	92,097	330	198,352
French	1,662	3,298,795	382	353,454	2,044	3,652,249
German	1,090	654,407	165	63,043	1,255	717,450
Greek	342	587,250	20	12,679	362	599,929
Italian	893	2,467,537	378	183,036	1,271	2,650,573
Japanese	2,033	3,354,806	....	....	2,033	3,354,803
Latvian	43	40,052	56	13,290	99	53,342
Norwegian	1,730	2,371,051	159	213,007	1,889	2,584,058
Peruvian	28	57,176	40	29,991	68	87,167
Portuguese	158	250,121	126	46,726	284	296,847
Rumanian	37	73,973	....	....	37	73,973
Russian	450	403,676	15	8,783	465	412,459
Spanish	689	1,111,563	139	53,978	828	1,165,541
Swedish	1,125	1,085,984	228	74,227	1,353	1,160,211
Uruguayan	40	73,104	14	12,782	54	85,885
Other countries	270	207,263	34	11,502	304	218,765
Flag not recorded	371	765,398	46	16,866	417	782,264
Total	28,433	58,846,325	4,773	3,128,328	33,206	61,974,653

World's merchant shipping in June, 1921

The output of United States yards in the last twelve fiscal years has been:

Fiscal Year	D. W. Tons
1910	513,102
1911	436,743
1912	349,003
1913	519,232
1914	474,375
1915	337,683
1916	488,119
1917	996,718
1918	1,951,302
1919	4,989,931
1920	5,694,567
1921	2,863,465

Japanese Strike Over

As most strikes made during business depression are likely to do, the great shipyard strike of Kobe has resulted in a definite defeat of the men. They have returned to work, unquestionably beaten this time, but having learned the valuable lesson that there is nothing sacred about the Japanese industrial system and that Fuji is not likely to erupt merely because a few thousand human beings chose to quit work for a month or so. Considered in this light the strike is a victory for the men of Kobe and for employers and workmen of all the world, who have the greatest interest in seeing Japanese costs of production brought to a higher level. That the strikers appreciated the truth of things is disclosed by the following quotation from a statement issued when they trudged back to forge and hammer: "We have resolved to return to work, but we have not abandoned the cause for which we declared the strike. . . The near future shall see us in the enjoyment of rights obtained by our real power from our employers." The statement continues to say that the danger to which the strike exposed shipbuilding impelled a return to work, and then lets the cat out of the bag by adding: "The realization of the increasing misery to which we have brought our families has also contributed to aid in ending the strike." Success in strikes requires a fund; a fund is difficult to raise when a day's wages is low; yet a beginning has been made, to which the future will bear witness.

A digest of the last few weeks of the strike follows:

July 29—Serious riots at Kawasaki yard. Police use sabers, injuring many.

July 30—Police raid homes of agitators, arresting 300. Another riot.

August 2—Kawasaki officials decline to accept mediation, preferring to deal directly with men. More men return to work.

August 5—Mitsubishi against mediation or recognition of union.

August 6 — Mitsubishi workmen protest against mediation.

August 7—Men decide to return to work, but refuse to concede defeat.

August 12—Fujinagata yard, Osaka, adopts system of joint control, the first in Japan to do so.

August 16—Sumitomo company's manufacturing plants adopt shop-committee system. The committee of each plant is to be one of investigation only, without power to enforce its rulings, although it may take the initiative in considering questions as well as discussing those referred to it by the management.

Progress of Work

Pacific Launchings

UNITED STATES

West Chopaka, 11,000 D.W.T. cargo U.S.S.B., Los Angeles Shipbuilding & Drydock Company, September 19.

La Purisima, 7500 D.W.T. tanker Union Oil Company, Southwestern Shipbuilding Company, September 10.

Mojave, Coast Guard cutter, Union Construction Company, September 7.

CANADIAN

Canadian Transporter, 8350 D.W.T. cargo C.G.M.M., J. Coughlan & Sons, August 31.

Princess Louise, 4300 gross combination C.P.O.S., Wallace Shipbuilding & Drydock Company, August 29.

Eastern Launchings

UNITED STATES

Knoxville City, 6400 gross cargo U.S. Steel, Chickasaw Shipbuilding & Car Company, August 6.

S-51, Submarine U.S.N., Lake Torpedo Boat Company, August 20.

Washington, battleship U.S.N., New York Shipbuilding Corporation, September 1.

Steel derrick boat for Alleghany, Monongahela and Ohio river service, Dravo Contracting Company, August 19.

John D. Archbold, 20,300 D.W.T. tanker Standard Oil of New Jersey, Newport News Shipbuilding & Drydock Company, August 20.

Chattanooga City, 6400 gross cargo U.S. Steel, Chickasaw Shipbuilding & Car Company, September 12.

Pacific Deliveries

UNITED STATES

West Greylock, 11,000 D.W.T. cargo U.S.S.B., Los Angeles Shipbuilding & Drydock Company, August 29.

Tamiahua, 16,340 D.W.T. tanker Southern Pacific Atlantic Lines, Moore Shipbuilding Company, September 23.

Tampa, Coast Guard cutter, Union Construction Company, September 15.

CANADIAN

Canadian Scottish, 8390 D.W.T. cargo C.G.M.M., Prince Rupert Drydock & Shipbuilding Company, August.

Eastern Deliveries

UNITED STATES

Three car-floats, American Bridge Company.

Pecos, fuel-ship U.S.N., Boston Navy Yard, commissioned August 25, delivered September 15.

Yankee Arrow, 12,500 D.W.T. tanker Standard Transport, New York Shipbuilding Corporation, August 2.

Six barges, builders' account, Doullut & Williams Shipbuilding Company.

CANADIAN

Topdalsfjord, 6400 D.W.T. cargo Norwegian-America Line, Canadian Vickers, July 22.

Atlantic Keel-layings

UNITED STATES

Fireboat City of Philadelphia, Merchant Shipbuilding Corporation, September 15.

Kamoi, fuel ship Japanese navy, New York Shipbuilding Corporation, September 14.

Pacific Coast, United States

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Purchasing Agent: O. W. Street.

Submarines USN: S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145; S-41, hull 146; all launched; outfitting proceeding slowly.

Alameda Works

Chilore, hull 5309, combination ore and coal carrier Ore Steamship Co; 571-6 LOA; 550-1 LBP; 72 molded beam; 44 molded depth; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; Curtis turbines with Falk reduction gears, 5000 SHP; 3 Scotch SE boilers, 17-6x12, each 4287 sq ft; oil burners.

Lebore, hull 5310, combination ore and coal carrier Ore Steamship Co; sister to above.

F. H. Hillman, hull 5311, tanker Stand Oil Co of Cal; 500 LBP; 68 beam; 25-11 loaded draft; 11 loaded speed; 15,000 DWT; rec engs, 4000 IHP; 3 Scotch marine boilers, 16x12-9; keel Jan10/21; launch July28/21; deliver Oct15/21, est.

H. M. Storey, hull 5312, tanker Stand Oil Co of Cal; sister to F. H. Hillman; keel Jan19/21; launch Sept 28/21, est.

W. S. Rheem, hull 5313, tanker Stand Oil Co of Cal; sister to F. H. Hillman; keel Mar1/21; launch Nov 10/21, est.

No name, hull 5314, ferryboat Six Minute Ferry Co; 230 LOA; 63-6 beam over guards, 42 molded; 19-6 molded depth; TE eng, 1400 IHP; propeller drive; 3 WT boilers.

No name, hull 5315, ferryboat Six Minute Ferry Co; sister to above.

HANLON DRYDOCK & SHIPBUILDING CO., OAKLAND

Purchasing Agent: R. Barker.

Dan F. Hanlon, hull 89, steam schr. D. J. Hanlon; 2500 DWT; 1400 IHP engines; 2 B&W boilers.

LOS ANGELES SHIPBUILDING & DRYDOCK CO., SAN PEDRO

West Greylock, hull 33, steel cargo USSB; 430 LBP; 54 beam; 28-2 loaded draft; 10½ loaded speed; 11,000 DWT; TE engs, 3500 IHP; 3 Scotch single end, 15-9; keel Nov10/20; launch June/21; **deliver Aug29/21.**

West Prospect, hull 34, steel cargo USSB; sister to above; keel Dec31/20; launch July30/21; deliver Sept 30/21, est.

West Chopaka, hull 35, steel cargo USSB; sister to above; keel Feb24/21; **launch Sept19/21;** deliver Nov 25/21, est.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: W. E. Hostetter.

H. T. Harper, hull 163, tanker Standard Oil Co of California; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engs; keel Oct/20; launch June16/21; deliver Oct1/21, est.

Tamiahua, hull 165, tanker S. P.-Atlantic S S Co; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; rec engs; 3 Scotch boilers, 15-9x12; keel Feb28/21; launch July2/21; **deliver Sept23/21.**

Birkenhead, hull 166, tanker for Vacuum Oil Co; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec engs; 3 Scotch marine boilers, 15-2x12; keel Dec9/20; launch July9/21; deliver Oct1/21, est.

NAVY YARD, PUGET SOUND

Medusa, repair ship for government; 460 LBP; 70 beam; about 19 loaded draft; 17-5 loaded speed; turbine eng, 7000 IHP; 2 WT express type boilers; 10,000 tons disp; keel Jan2/20; launch and deliver dates not set.

Holland, submarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K loaded speed; turbine eng, 7000 IHP; two WT express type boilers; 10,000 tons disp; keel Apr11/21.

NAVY YARD, MARE ISLAND

Montana, battleship USN; 660 LBP; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 disp; turbo-electric engs, 60,000 SHP; 12 Bu's express boilers, 74,040 sq ft; keel Sept 1/20; work suspended.

Wasmuth, destroyer USN; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 disp; geared turbine eng, 26,000 SHP; 4 Normand boilers, 27,000 sq ft; keel Aug12/19; launch Sept15/20.

Trever, destroyer USN; sister to above; keel Aug12/19; launch Sept 15/20.

Perry, destroyer USN; sister to above; keel Sept15/20.

Decatur, destroyer USN; sister to above; keel Sept15/20.

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

La Purisima, hull 23, Isherwood tanker Union Oil Co; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engs, 2800 IHP; 3 Scotch boilers, 14x12; keel Dec22/20; **launch Sept10/21**; deliver Oct/21, est.

Semiramis, hull 26, Isherwood tanker Nederlandsch-Indische Tankstoomboot Maatschappij; 412 LBP; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engs, 2700 IHP; 3 Scotch boilers, 15-6 x 11-7; keel Nov5/20; launch Aug6/21; deliver Sept/21, est.

TODD DRYDOCK & CONSTRUCTION CORP., TACOMA

Purchasing Agent: C. L. Bankson.

Omaha, hull 100, scout cruiser USN; 555-6 LOA; 550 LBP; extreme beam 55-4; molded beam 54-9; depth molded 26; mean loaded draft 13-6; disp 7100 tons; Westinghouse Parsons turbines and reduction gear, 105,000 IHP; designated speed 34; 12 Yarrows WT boilers; keel Dec6/18; launch Dec14/20.

Milwaukee, hull 106, scout cruiser USN; sister to above; keel Dec13/18; launch Mar24/21.

Cincinnati, hull 107, scout cruiser USN; sister to above; keel May15/20; launch May23/21.

UNION CONSTRUCTION CO., OAKLAND

Purchasing Agent: A. J. Farnesworth.

Tampa, hull 16, cutter USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engs, 2600 IHP; 2 WT boilers; keel Sept27/20; launch Apr16/21; **deliver Sept15/21.**

Haida, hull 17, cutter for USCG; same as the above; keel Sept27/20; launch Apr19/21; deliver Oct15/21, est.

Mojave, hull 18, cutter USCG; same as the above; keel Apr16/21; **launch Sept7/21.**

Modoc, hull 19, cutter USCG; same as above; keel Apr19/21; launch Oct1 21, est.

Shawnee, hull 20, cutter USCG; 150 LOA; 30 beam; 13-6 loaded draft; 12½ loaded speed; 1000 DWT; rec engs, 1000 IHP; 2 WT boilers; keel June1/21.

Amalthus, hull 23, oil tanker Anglo-Saxon Pet Corp, Ltd; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec engs, 2600 IHP; 3 Scotch marine boilers, 15-6x11-7; keel Mar12/21; launch Aug11/21.

All cutters on transverse system; others on Isherwood system.

Canadian

CHOLBERG SHIPYARD, VANCOUVER, B. C.

Purchasing Agent: W. Meed.

(These vessels to be completed by Dominion government.)

Sir Henry Drayton, hull 5, 4-masted barkentine Victoria Shipowners, Ltd; 250 LOA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel; shaft logs fitted for auxiliary but no machinery installed; keel May 15/20.

No name, hull 6, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel June4/20.

No name, hull 7, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel Feb/21.

J. COUGHLAN & SONS, LTD. VANCOUVER, B. C.

Purchasing Agent: J. Joseph.

Canadian Transporter, hull 20, steel freighter Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE eng, 3000 IHP; 3 Scotch boilers, 15-6 x11-6; keel Jan6/21; **launch Aug31/21.**

Canadian Freighter, hull 21, steel freighter Canadian government; sister to above; keel Jan6/21.

PRINCE RUPERT DRYDOCK & ENGINEERING COMPANY PRINCE RUPERT

Canadian Scottish, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Sept27/19; launch May17/21; **deliver Aug/21.**

Canadian English, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Oct20/19.

These vessels are being completed by the Wallace Shipbuilding & Drydock Co, North Vancouver. The terms are time and material plus 8 per cent.

WALLACE SHIPBUILDING & DRYDOCK CO., VANCOUVER, B. C.

Princess Louise, Canadian Pacific; 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel Oct/20; **launch Aug 29/21.**

Atlantic and Gulf

AMERICAN BRIDGE COMPANY, PITTSBURGH, PENN.

Purchasing Agent: W. G. A. Millar.

Twenty-five coal barges Carnegie Steel Co; 175 LBP; 26 beam; 8 loaded draft; 19 launched.

Three car floats undisclosed interests; 285 LBP; 38 beam; 8 loaded draft; all delivered.

Two tow boat hulls Carnegie Steel Co; 149-2x34 4-5 loaded draft; launch and deliver Oct/21.

BALTIMORE DRYDOCKS & SHIPBUILDING CO., BALTIMORE

A. G. Crosby, assistant general manager in charge of purchases.

Hull 125, tanker builder's account; 340 LBP; 49 beam; 23-6 loaded draft; 10 loaded speed; 6000 DWT; rec. eng, 2000 IHP; 2 Scotch boilers, 15-3; keel Nov24/20; about 70 per cent comp Sept1/21.

Hull 126, tanker builder's account; 430 LBP; 59 beam; 25-4½ loaded draft; 10 loaded speed; 10,250DWT; turb eng, 3000 IHP; 3 Scotch boilers, 15-3; keel Sept27/20; about 85 per cent comp Sept1/21.

Hull 128, fireboat City of Baltimore; 115-6 LBP; 28 beam; 9-6 loaded draft; 12 loaded speed; rec eng, 1000 IHP; 2 B&W WT boilers; keel July15/21; about 45 per cent comp Sept1/21.

BETHLEHEM SHIPBUILDING CORP., FORE RIVER PLANT, QUINCY, MASS.

Lexington, hull 1300, battle-cruiser USN.

Raleigh, hull 1382, scout cruiser USN.

Detroit, hull 1383, scout cruiser USN.

Massachusetts, hull 1400, battleship USN.

And the following nineteen submarines USN: AA-2, hull 1270; hulls 1309 to 1320 inc, submarines S-18 to S-29 inc; hulls 1389 to 1394 inc; submarines S-42 to S-47 inc.

J. Fletcher Farrell, hull 1496, tanker Sinclair Nav Co; 430 LBP; 59 beam; 25-5 loaded draft; 11 loaded speed; 10,600 DWT; rec eng, 3200 IHP; 3 Scotch boilers, 15x11-9; launch June10/21.

William Boyce Thompson, tanker Sinclair Nav Co; sister to above; keel Nov11/21; launch July/21.

BETHLEHEM SHIPBUILDING CORP., HARLAN PLANT, WILMINGTON, DEL.

No name, hull 3477, tanker Atlantic Refining Co; 266 LBP; 39 beam; 17 loaded draft; 8½ loaded speed; 2600 DWT; turb eng, 750 IHP; B & W boilers; keel not laid.

BETHLEHEM SHIPBLDG. CORP., SPARROWS POINT PLANT, SPARROWS POINT, MD.

Pine Tree State, hull 4195, combination USSB; 518 LBP; 72 beam; 30-7 loaded draft; 16 loaded speed; turb eng, 10,000 IHP; 8 Yarrows boilers; keel Feb15/19; launch Mar 19/21.

Palmetto State, hull 4196; combination USSB; sister to above; keel Feb19/19; launch June4/21.

Nutmeg State, hull 4197, combination USSB; sister to above; keel July29/20.

G. Harrison Smith, hull 4210, ore and oil Internat'l Pet Co; 550 LBP;

72 beam; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; rec eng 4600 IHP; 3 Scotch boilers, 17-6x12; keel July22/20; launch July12/21.

Bethore, hull 4211, ore and oil Ore SS Co; sister to above; keel Feb24/21.

Marore, hull 4212, ore and oil Ore SS Co; sister to above, except turb eng; keel May2/21.

Steelore, hull 4213, ore and oil Ore SS Co; sister to above; keel not laid.

CONSOLIDATED SHIPBUILDING CORPORATION, MORRIS HEIGHTS, N. Y.

Purchasing Agent: Wm. Rayner.

Oak, hull 251, US lighthouse tender; 160 LOA; 30 beam; 9-6 loaded draft; 875 DWT; TE eng, 700 IHP; 1 Scotch boiler, 14 diam; keel Nov 22/20; launch June18/21.

Hawthorn, hull 252, US lighthouse tender; sister to above; keel Nov 22/20; launch June28/21.

No name, hull 246, US lightship; 146-3 LOA; 30 beam; 12-7 loaded draft; 825 DWT; comp eng, 400 IH P; 2 Scotch boilers, 10-6 diam; keel Mar4/21.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO., PHILADELPHIA

Purchasing Agent: Ed. C. Geehr.

Richmond, hull 448, scout cruiser USN; keel Feb16/20; launch Sept 29/21, est; 70 per cent comp Sept1.

Concord, hull 449, scout cruiser USN; keel Mar29/20; launch Nov 29/21, est; 66 per cent comp Sept1.

Trenton, hull 501, scout cruiser USN; keel Aug18/20; launch Dec 1/22, est; 50 per cent comp Sept1.

Marblehead, hull 502, scout cruiser USN; keel Aug4/20; launch Feb 1/23, est; 46 per cent comp Sept1.

Memphis, hull 503, scout cruiser USN; keel Oct14/20; launch Jan1 /23, est; 40 per cent comp Sept1.

OSCAR DANIELS COMPANY, TAMPA, FLORIDA

B. D. Benson, hull 11, Isherwood tanker Standard Oil; 466 LBP; 60 beam; 26-7 loaded draft; 10½ loaded speed; 11,900 DWT; QE eng, 2800 IHP; 3 Scotch boilers, 15x11-6; keel June29/20; launch Apr15/21.

T. J. Williams, hull 12, Isherwood tanker Standard Oil; sister to above; keel Aug11/20; launch May3/21; deliver Aug15/21 est.

DOULLUT & WILLIAMS SHIPBUILDING COMPANY, NEW ORLEANS

Purchasing Agent: Roland A. Thomas.

Six oil-carrying steel barges for builder's account; 40x175x9; 1000 DWT; two launched in July; four in August; no heating coils, piping or propelling machinery; all completed.

FEDERAL SHIPBUILDING CO., KEARNY, N. J.

Purchasing Agent: J. L. Hastings.

Steel Seafarer, hull 43, freighter US Steel Products Co; 425 LBP; 56 beam; 25-10 loaded draft; 12 loaded speed; 9400 DWT; turb engs, 3100 IHP; 3 Scotch boilers, 15 diam; keel May25/21; launch Oct15/21, est; deliver Nov5/21, est.

Steel Pathfinder, hull 44, freighter US Steel Products Co; sister to the above; keel June1/21; launch Nov 12/21, est; deliver Dec3/21, est.

Steel Pioneer, hull 45, freighter US Steel Products Co; sister to the above; keel July/21; launch Dec10/21, est; deliver Dec31/21, est.

GLOBE SHIPBUILDING & DRYDOCK CO. OF MARYLAND, BALTIMORE

Purchasing Agent: H. B. McCauley.

San Leopoldo, hull 101, oil carrier Eagle Oil Transport Co; 401 LBP; 54 beam; 25-1 loaded draft; 10½ loaded speed; 8600 DWT; TE engs, 2800 IHP; 3 Scotch boilers, 15-3x 11-6; keel Sept/20; launch June25/21.

San Leonardo, hull 102, oil carrier Eagle Oil Transport Co; sister to above; keel Sept/20; launch July8/21.

LAKE TORPEDO BOAT CO., BRIDGEPORT, CONN.

Purchasing Agent: H. A. Maxfield.

S-48, hull 48, submarine U S N; launch Feb26/21.

S-49, hull 49, submarine U S N; launch Apr23/21.

S-50, hull 50, submarine U S N; launch June18/21.

S-51, hull 51, submarine U S N; launch Aug20/21.

MERCHANT SHIPBUILDING CORPORATION, CHESTER, PENN.

Vice-President: J. L. Ackerson.

Robert E. Hopkins, hull 383, tanker Tidewater Oil Co; 424 LBP; 58 beam; 25-5 loaded draft; 10½ loaded speed; 10,000 DWT; TE engs; 3 Scotch boilers, 15-3x11-7; keel Aug 30/20; launch Aug6/21; deliver Sept 30/21, est.

Samuel Q. Brown, hull 384, tanker Tidewater Oil Co; sister to above; keel Oct1/20; launch Oct8/21, est.

No name, hull 385, freighter American-Hawaiian SS Co; 445 LBP; 59-8 beam; 28-6 loaded draft; 11½ speed; 11,000 DWT; 2 6cyl, 4-cycle Diesel engs, 4500 metric; 1 vertical donkey, 400 sq ft HS; keel Feb5/21.

No name, hull 386, freighter American-Hawaiian SS Co; sister to above; keel Feb10/21.

No name, hull 387, fireboat City of Philadelphia; 120-9 LOA; 28 beam; 12-9 deep; 9 loaded draft; comp eng, 500 IHP; 2 B&W WT boilers, oil; 4 turbine fire pumps, 1 30-foot tower, 2 15-foot towers; capacity 12,000 gals a minute; keel Sept 15/21.

NAVY YARD, BOSTON

Pecos, fuel ship No. 18, USN; 455 LBP; 56-2 beam; 26-8 normal draft; 14 loaded speed; 14,800 normal disp; rec eng, 5200 IHP; 4 Ward WT boilers; keel June2/20; launch Apr23/21; comm Aug25/21; deliver Sept15/21.

Whitney, destroyer tender No. 4 USN; 460 LBP; 60-11 beam; 21 normal draft; 16 loaded speed; 10,600 normal disp; geared Parsons turbs, 7000 SHP; 2 WT exp small tube boilers; keel Apr23/21; launching indefinite.

NAVY YARD, PHILADELPHIA

Dobbin, hull 7, destroyer tender USN; 460 LBP; 60-10 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp; Parsons geared turb single screw engs, 7000 SHP; 2 WT boilers; keel Dec23/19; launch May 5/21; deliver date not determined.

Constitution, hull 8, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive, 180,000SHP; 16 WT boilers; keel Sept 25 / 20; launch and deliver dates not determined.

United States, hull 9, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive, 180,000 SHP; 16 WT boilers; keel Sept25/20; launch and deliver dates not determined.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY, NEWPORT NEWS

Purchasing Agent: James Plummer, 233 Broadway, New York City.

West Virginia, hull 211, battleship USN; 600 LBP; 97-3½ beam; 30-6 mean draft; 32,600 normal disp; 21 speed; GE turbo-elec drive, 28,900 SHP; 8 B&W WT boilers, oil, 41,768 sq ft plus 4168 superheat; keel Apr 12/20; launch Nov/21, est; deliver Dec/22, est.

Constellation, hull 215, battle-cruiser U S N; 850 LBP; 101-8¼ beam; 31 mean draft; 43,500 normal disp; 33¼ speed, est; Westinghouse turbo-elec drive, 180,000 SHP; 16 WT boilers, oil, 198,000 sq ft plus 18,000 superheat; keel Aug18/20; launch and deliver dates not est.

Ranger, hull 215, battle-cruiser U SN; sister to above; keel June23/21; launch and deliver dates not est.

Iowa, hull 258, battleship USN; 660 LBP; 105 beam; 33 mean draft; 43,200 normal disp; 23 speed; GE turbo-elec drive, 60,000 S H P; 12 White-Forster WT boilers, oil, 82,800 sq ft plus 8940 superheat; keel May17/20; launch and deliver dates not est.

John D. Archbold, hull 261, tanker Standard Oil NJ; 555 LBP; 75 beam; 30 loaded draft; 10¾ loaded speed; 20,300 DWT; twin screw, TE eng, 3800 IHP; 3 Scotch boilers, 17x12; keel Dec15/20; launch Aug20/21; deliver Oct/21, est.

Wm. Rockefeller, hull 262, tanker Standard Oil NJ; sister to above; keel Dec15/20; launch Oct/21, est; deliver Dec/21, est.

NEW YORK SHIPBUILDING CORPORATION, CAMDEN, N. J.

Purchasing Agent: L. G. Buckwalter.

Southern Cross, hull 241, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs, 12,000 SHP; 8 WT boilers; keel Aug/18; launch July20/19; deliver fall/21, est.

Bay State, hull 251, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs, 12,000 SHP; 8 WT boilers; keel Oct15/19; launch July17/20; deliver winter/21, est.

Peninsula State, hull 252, combination USSB; sister to above; keel July20/20; launch July6/21; deliver spring/22, est.

Lone Star State, hull 255, combination USSB; sister to above; keel May 13/19; launch Oct23/20; deliver fall/21, est.

Hoosier State, hull 256, combination USSB; sister to above; keel May20/19; launch Oct23/20; deliver fall/21, est.

Yankee Arrow, hull 260, bulk oil Standard Trans Co of NY; 468 LBP; 62-6 beam, 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs, 3200 SHP; 3 SE Scotch boilers, 15-2x11-6; keel Aug17/20; launch Apr10/21; deliver Aug2/21.

Empire Arrow, hull 261, bulk oil Standard Trans of NY; sister to above; keel Sept14/20; launch May 24/21; deliver summer/21.

Levant Arrow, hull 262, bulk oil Standard Trans Co of NY; sister to above; keel Nov4/20; launch July 25/21; deliver fall/21, est.

No name, hull 263, combination Munson SS Co; 414 LBP; 57-6 beam; 23 loaded draft; 15½ loaded speed; 4950 DWT; geared turbs, 5800 SHP; 5 SE Scotch boilers, 16-4x12-3; keel Sept30/20; launch fall/21, est; deliver winter/21, est.

Eurana, hull 264, bulk oil stock; 419-3 LBP; 56-3 beam; 25-9¼ loaded draft; 10¾ loaded speed; 9870 DWT; 3 cyl TE engs, 3000 SHP; 3 SE Scotch boilers, 15-10x11-4; keel Jan17/21; launch July16/21; deliver winter/21.

No name, hull 265, bulk oil stock; sister to above.

Dixie Arrow, hull 266, bulk oil Standard Trans Co of NY; 468 LBP; 62-6 beam; 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs, 3200 SHP; 3 SE Scotch boilers, 15-3 x 11-6; keel Aug11/20; launch fall/21, est; deliver winter/21, est.

Saratoga, hull 199, battle cruiser USN; 874 LOA; 850 LBP; 105-5¼ extreme beam; 31 mean draft; 43,500 normal disp; 33¼ loaded speed; GE turbo-electric drive; 180,000 SHP; 16 WT boilers, 198,000 sq ft plus 18,000 superheat; keel Sept25/20.

Colorado, hull 200, battleship USN; 624 LOA; 600 LBP; 97-3½ beam waterline; 30-6 mean draft; 32,600 normal disp; 21 loaded speed; Westinghouse turbo-electric drive, 28,900 SHP; 8 B&W WT boilers, 41,678 sq ft plus 4169 superheat; keel Mar29/19; launch Mar22/21.

Washington, hull 201, battleship USN, sister to above; keel June30/19; launch Sept1/21.

Kamoi, hull 267, fuel ship Japanese Navy; 497-8 LOA; 67 beam; 28 designed draft; 15 loaded speed; 13,000 DWT; elec drive, 8000 SHP; 4 B&W boilers; keel Sept14/21.

STANDARD SHIPBLDG. CORP'N, SHOOTERS ISLAND, MARINERS HARBOR, N. Y.

Purchasing Agent: Jamie Cortada.

John Purroy Mitchell, hull 32, fireboat City of New York; 121 LBP; 27 beam; 14-9 deep; 12 loaded speed; comp eng, 900 IHP; 2 B&W WT boilers, oil burning; keel Mar31/21; launch Aug6/21.

STATEN ISLAND SHIPBUILDING COMPANY, STATEN ISLAND, NEW YORK

Purchasing Agent: R. C. Miller.

Dixiano, hull 726, sugar ship Am Sug Ref Co; 360 LBP; 50 beam; 23 loaded draft; 10 loaded speed; 6300 DWT; TE eng, 2000 IHP; 2 Scotch boilers, 15x11; keel Sept9/20; launch May21/21.

Hell Gate, hull 728, dredge C. R. Browning; 140 LBP; 48 beam; 15 loaded draft; keel Aug28/20; launch Feb23/21.

Socony 114, hull 734, barge Stand Oil of NY; sister to above; keel Jan 10/21.

Socony 115, hull 735, barge Stand Oil of NY; sister to above; keel Feb 26/21.

Hull 736, tugboat Staples Trans Co; 136½ LBP; 27 beam; 16½ loaded draft; 10 loaded speed; 1 TE eng 700 HP; 1 Scotch boiler, 16x11½; keel May16/21; launch July30/21, est.

President Roosevelt, hull 737, ferryboat City of New York; 247 LBP; 66 beam; 19½ loaded draft; 15 loaded speed; 1 F&A comp eng, 3500 HP; 4 B&W WT boilers, 13,000 sq ft; keel May23/21; launch July16/21.

Northwestern, tanker Am Pet Co; 242 LBP; 42 beam; 23 loaded draft; 10 loaded speed; TE eng; 2 Scotch boilers; lengthening job, additional 56 ft, making 2 new cargo tanks, 1000 DWT additional capacity. Vessel considered total loss by fire; raised; and now undergoing general repairs and at the same time lengthening. Job started May31/21; estimated time 4 months.

SUN SHIPBUILDING COMPANY, CHESTER, PENN.

Purchasing Agent: H. W. Scott.

J. N. Pew, hull 39, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs, 4300 IHP; 3 SE Scotch boilers, 15-10x 11-11¼; keel Nov5/20; launch Apr 23/21; deliver Sept/21, est.

Agwiharve, hull 40, tanker A. G. W. I. S. Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 12 loaded speed; 12,500 DWT; single screw QE engs, 4300 IHP; 4 SE Scotch boilers, 15-10 x11-11¼; keel Nov26/20; launch Apr 2/21; deliver Sept/21, est.

Agwimex, hull 41, tanker A. G. W. I. S. Co; sister to above; keel Dec8/20; launch Aug6/21; deliver Sept /21, est.

Agwiscot, hull 42, tanker A. G. W. I. S. Co; sister to above; keel Dec23/20.

Agwistates, hull 43, tanker A. G. W. I. S. Co; sister to above; keel Jan3/21.

No name, hull 46, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs, 4300 IHP; 3 SE Scotch boilers, 15x11-11¾; keel not laid.

No name, hull 47, tanker Sun Oil Co; sister to above; keel not laid.

TEXAS STEAMSHIP COMPANY, BATH, MAINE

Purchasing Agent: A. R. Weber.

No name, hull 32, tanker Texas SS Co; 415-10 LBP; 56 beam; 25-7¾ loaded draft; 11½ loaded speed; 9600 DWT; TE engs, 3000 IHP; 3 Scotch boilers, 15-3x11; keel Nov 9/20.

Canadian

CANADIAN VICKERS, LTD., MONTREAL

Topdalsfjord, hull 82, single-screw steel 2-deck cargo Norwegian-America Line; 365 LBP; 49½ beam; 29 loaded draft; 11½ loaded speed; 6400 DWT; TE engs, 2600 IHP; 3 Scotch boilers, 14-9 with superheaters; keel July29/20; launch May5/21; deliver July22/21.

DAVIE SHIPBUILDING & REPAIRING COMPANY, LTD., LAUZON LEVIS, P. Q., CANADA

Purchasing Agent: N. W. Van Wyck.

Canadian Challenger, hull 476, single-screw cargo Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE surface cond engs, 3000 IHP; 3 Scotch marine boilers, 15-6x 11-6; keel May14/20; launch July 7/21.

NOVA SCOTIA STEEL & COAL CO., TRENTON, N. S.

Purchasing Agent: A. M. Seely.

Sea King, hull 9, exploring yacht Baron Bliss, Nassau, Bahamas; 137-10 LBP; 28-6 beam; 6 loaded draft; 7 loaded speed; semi-Diesel 440 BHP, twin-screw eng; keel Aug24/20.

* * *

Eighty per cent of the Shipping Board's fleet is oil-burning, according to a recent tabulation; 41 per cent burns nothing else, and 31 per cent burns either coal or oil, leaving 28 per cent strictly coal. Figures include vessels still building.

What Repair Yards Are Doing

Repair Work Offers

Some repair and alteration jobs are in prospect. The Matson Navigation Company will withdraw the steamship Lurline from the San Francisco - Seattle - Honolulu service for extensive changes, among which will be the construction of a promenade deck, the enlarging of passenger accommodations and general overhauling. The work will cost between $200,000 and $250,000, it is estimated. The Inter-Island flagship Mauna Kea, Honolulu, will be dispatched to the Pacific Coast for repairs, the exact nature of which will not be known until she arrives about October 15. Her engines will be removed to permit examination of the bed-plate and of the tank-top.

Several small vessels are to be rebuilt for the Buxton Line for their service from Richmond to Norfolk and plans for this work are under consideration by marine engineers of Philadelphia. Two small passenger and freight vessels for coast and bay service to be inaugurated in 1922 will be built by Chapman & Fisher at their shipyard on the Great Lakes.

Todd Gets Large Job

The Tietjen & Lang repair yard, Todd Shipyards Corporation, Hoboken, has been awarded a contract for reconditioning the San Jacinto, recently chartered by the Ward Line from the Clyde, which will cost more than $1,000,000 and includes the installation of four new Scotch boilers, new reciprocating engines, renewal of the present stateroom capacity, the installation of oil fuel tanks, and the possibility of one additional deck. The same yard has also been awarded the contract for removing the main engines, rebuilding newly designed engine foundations, reinstalling the engines and the carrying out of considerable repair work on the old and the installation of new auxiliary machinery in the Mallory Line ship Henry R. Mallory. The bid for this work was $45,740.

The Standard Shipbuilding Corporation has been awarded the contract for cutting down two car floats of George B. Stearin, Inc., New York, making them into four scows. The car floats are about 300 feet long and will be made into four scows, each 150 feet long.

The Todd Drydocks, Seattle, have been awarded a contract for rebuilding the steamship Whatcom of the Puget Sound Navigation Company into a double-ended ferry having accommodations for 1500 persons and sixty automobiles. The work will cost about $100,000.

With the Drydocks

The Panama Canal has announced reductions in rates of the 1000-foot drydock at Balboa, effective August 15. On gross tonnage of merchant steamers and Army and Navy transports, colliers, hospital and supply ships, on the net tonnage of merchant sailers, on actual displacement tonnage of warships, the old charges were 25 cents a ton for docking and undocking, one charge covering both operations, and 15 cents for each lay-day. These have been reduced to 15 cents and 12 cents. Says the canal's announcement: "The establishment of the new rates indicates a change of policy, in basing the charges at the Balboa drydock on customary rates in commercial drydocks on the Atlantic, rather than on rates at Pacific docks, as heretofore."

A marine railway under construction at the yard of the Hanlon Drydock & Shipbuilding Company will be completed and ready to receive vessels about October 1.

Reports from Japan say that the Yokohama Dock Company, which has been an important building and repair yard of Tokyo Bay, will close. One vessel for the Japanese Navy remained to be completed at mid-August.

New Ventures

Rumors are current that the Chickasaw Shipbuilding & Car Company will construct wharves for handling the United States Steel Corporation's exports from the Birmingham district, and that the yard also will construct river barges. The last steel steamship building is scheduled to be completed in October.

One of the oldest shipyards in Ontario, the Port Arthur Shipbuilding Company, recently completed the last contract and is now reported to be doing repair work in their shipyard and drydock. However, the company has embarked very strongly on the manufacture of pulp and paper machinery, and by this means will be able to keep the plant running profitably till better days come. In the meantime, repair work will be carried on as usual.

The H. W. Sweet Shipyard & Machine Works, Inc., Greenport, New York, incorporated recently with a capital of $75,000 by H. W. Sweet, F. B. Corey and C. W. Thorn. The Company will operate a shipbuilding plant and general machine construction and repair works.

The Hampton Roads Ship Repair Corporation, Norfolk, has been incorporated with a capital of $50,000 to operate a local shipbuilding and repair plant. William H. Johnson is president and E. C. Davison, Richmond, secretary.

Drydocking and Repairs

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Miscellaneous repairs: Pleiades, Rose City, Ventura, Bradford, Frederick Luckenbach, Silvanus, Chancellor, Venetia, Admiral Goodrich, Harry Luckenbach, K. I. Luckenbach, Tjikembang, Oleum (also renewing H. P. cylinder). Miscellaneous repairs, drydocking, painting: Katrina Luckenbach (also installing bilge keel), Willamette, Wahkenna, Johan Poulson, Storm King, Montebello, Walkure (also electric welding on hull), Coquille River, Apus, Narbo. Installing 3rd class accommodations: Golden State. Drydocking, cleaning, removing and replacing fairwaters, incline ship: California. Repairing submarine signals: Wm. F. Herrin, New wildcat for windlass: Yorba Linda. Engine, boiler, hull repairs, drydocking, painting: West Mahwah, Cuba. Remetaling engine bearings: Matsonia. Repairing damaged propeller: D. G. Scofield. Drydocking, painting: Oleum. Renewing T. & G. decking: Coalinga.

Alameda Works

Reinforcing deck in way of fairleads: W. S. Miller. Miscellaneous repairs, drydocking, painting: Governor Irwin (also new propeller, rewooding stern bearing), Halco, Sophie Christensen, Petaluma. New propeller: Rosalie Mahoney, Vanguard. Miscellaneous repairs: Bradford, Caddo, Tovontolite, S. C. T. Dodd, Tiverton, Davenport. Repairing circulating pump: Johan Paulson.

LOS ANGELES SHIPBUILDING & DRY DOCK COMPANY, SAN PEDRO

Drydocking, painting, miscellaneous repairs: Invader, Henrietta and Springfield. Miscellaneous repairs: Anyox, West Lewark, Steel Mariner, Multnomah, Sylvanus, Providencia, Artigas, West Haven, Santiam, Trojan, Oregon. Drydocking, painting, renewing part of keel, propeller arch knee and bilge keels: Bertie M. Hanlon. Drydocking, cleaning, painting: Harvard. Boiler repairs: K. I. Luckenbach, Venetia, Santa Alicia, Edward Luckenbach. Engine and auxiliary repairs: Sierra, West Greylock, Lompoc (also hull and machinery repairs), Mullany No. 325 (also changing propeller), L-7, barge No. 30 (also changing propeller), Nicholas No. 311, Argyll (also hull and machinery repairs). High speed planet pins for turbo gears: Eagle Boat No. 11. Minor hull repairs: Invader.

MOORE SHIPBUILDING COMPANY, OAKLAND

Drydocking, cleaning, painting and miscellaneous repairs: Eastern Merchant, West Cussetta, West Camak, Los Vegas. Engine room repairs: Maui. Hull repairs: Georgina Rolph (also wheel work), Tjisondari, Golden Gate, Claremont, Pedro Costa. Engine repairs: Venezuela, Wm. F. Herrin, Miner, Santa Rita, Ventura. Deck repairs: Janelew. Drydocking, cleaning, painting, miscellaneous hull repairs: Ripley, Samar, Virgil Bogue, Wahkena, Kahola, Los Angeles. Engine and hull repairs: Creole State. Drydocking, cleaning, painting: Tampa. Miscellaneous repairs: Manukai, Western Pacific Barge No. 2, Celestial (also installation of oil-burning system). New stern frame: West Nomentum. Winch parts: Narcissus. Burner parts: Santa Monica.

NAVY YARD, PUGET SOUND

Drydocking, cleaning, painting bottom, miscellaneous repairs and alterations: Battleships New Mexico, Idaho, Mississippi; Destroyer Sinclair; Minesweeper Swallow; Rec. Ship Philadelphia; Patrol Vessel Helori; Tug Mahopac; SS. West Ivan. Drydocking, cleaning bottom, miscellaneous repairs: Coal Barges 156, 159, 171, 190, 361, 373, 390, 395, 445; Garbage Lighter 7; Pile Driver 2. Minor repairs to main engines: Amm. Ship Pyro. Miscellaneous alterations and repairs: Battleship Texas; Radio Rep. Ship Saturn; Destroyers Moody, McCawley, Doyen, Henshaw, Meyer. Miscellaneous repairs incident to operation as district craft: Patrol Boat Eagle 57; Tugs Pawtucket, Sotoyomo, Tatnuck, Iroquois. Care and preservation: Battleship Oregon; Armored Cruisers Seattle, Missoula, Charlotte; Patrol Boat S. C. 310.

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

Winches: Julia Luckenbach. Renewing wildcat on windlass, painting: Yorba Linda. Main steam pipes: La Habra. Boiler repairs: Harry Luckenbach.

TODD DRY DOCKS, INC., SEATTLE

Docking, cleaning, painting, miscellaneous repairs: Washington Barge No. 57. Renewing shoe: Warrior. Miscellaneous repairs: Eldridge (also new stern frame), Sol Duc, H. B. Lovejoy, Tyndareus. Extensive repairs and betterments: Wenatchee, Keystone State. Docking, cleaning, painting: Admiral Dewey, Victoria, Queen, Ketchikan, President, Barge Hercules, Forest Dream. Change of wheel: Westerly, Aquilo. Galley repairs: Forest King. Docked for survey: Redondo. Caulking leaky rivets: Steel Mariner. Engine repairs: Bailey Gatzert. New stern frame: West Ivan.

YARROWS, LIMITED, VICTORIA, B. C.

Docking, cleaning, painting, miscellaneous repairs: Canadian Importer, Princess Maquinna (bottom damage), Canadian Prospector (annual government inspection). Engine repairs: Estevan. Docking, cleaning, painting: Stadacona, Naden. Rudder and propeller repairs: Bonilla. Feed heater and condenser repairs: Keystone State. Electric welding: Tyee. Complete overhauling: Caddo.

Miscellaneous Construction

COLUMBIA STEEL COMPANY, PITTSBURG, CALIF.

Steel castings for many steel vessels now under construction in the Pacific Coast yards, including the dreadnought Montana and the sister ships 49, 50, 52; also for Coast Guard cutters under construction in the Union Const. Co. yard.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO., PHILADELPHIA

Twelve Parsons manganese bronze propellers for scout cruisers 4, 5 and 6 building by Todd Drydock & Const. Corp., Tacoma. Two right-hand and two left-hand propellers for each vessel. Weight of propellers 13,200 pounds each; diameter 11-3; pitch 11-10; all delivered.

ALLAN CUNNINGHAM COMPANY, SEATTLE

On order and under construction: 6 steam and electric steering gears; 13 steam and electric anchor windlasses; 18 steam and electric and hydro-electric and hand capstans; 37 steam and electric winches.

M. T. DAVIDSON COMPANY, 154 NASSAU STREET, NEW YORK CITY

Vertical beam, twin-cylinder air-pump, 9-18-18x12 and two vertical duplex boiler feed pumps 9-16x10 for New York City fireboat John Purroy Mitchell.

Vertical, twin-screw air-pump, 14-24-24x15, two vertical simplex boiler feed pumps 10-6x12, one horizontal simplex sanitary pump 5½x8 for Philadelphia fireboat Rudolph Blankenburg.

Similar equipment for second Philadelphia fireboat.

DOW PUMP & DIESEL ENGINE COMPANY, ALAMEDA

H. T. Harper, motorship Standard Oil Co; one 200 IHP, two 267 IHP Diesel auxiliary electric drive engs.

JAMES C. H. FERGUSON, SALES AGENT, MONADNOCK BLDG., SAN FRANCISCO

American Engineering Co.: Four steering engines, ferries Newark and Piedmont; electric capstans drydock Moore; hydraulic telemotor, hull 2077, Moore; 3 towing machines, 4 steering engines, Shipowners & Merchants' Tugboat Co.

Pneumercator Co.: 116 pneumercators USS California, Mare Island; 40 for 4 Coast Guard cutters, Union Construction; 8 for West Faralon; West Greylock, West Prospect, West Chopaka, Los Angeles; 60 for 12 submarines USN, Bethlehem.

Rostand Mfg. Co.: air ports and lenses complete 5 Coast Guard cutters and 4 Anglo-Saxon tankers, Union Construction Co. Rich system for detecting and extinguishing fires: SS Hawkeye State, Granite State, Empire State, Golden State, Buckeye State.

FORD & GEIRRINE, AGENTS, SAN FRANCISCO

Dean feed pumps, Dean Bros' Steam Pump Works, for 166 at Moore's; Reliance forced draft equipment, Jno Reid & Company, for hull 166 at Moore's; National stockless anchors Upson Walton Co., hull 166, Moore's; Dean feed pumps, Dean Bros' Steam Pump Works, hull 23, Southwestern; Willett Bruce whistle control, McNab Co., hulls 16, 17, 18, 19, Union Construction; McNab direction indicators, McNab Co., hulls 16, 17, 18, 19, Union Construction; Reliance forced draft equipment, John Reid & Co., hull 23, Southwestern; Anchor chain, Lebanon Chain Co., hull 23, Southwestern; windlass, gypsy and steering gear, Hyde Windlass Co., hull 20, Union Construction; Welin davits, American Balsa Co., hulls 5311-2-3, Bethlehem, hull 163, Moore; Willett-Bruce whistle control, McNab Co., hulls 5311-2-3, Bethlehem; McNab direction indicator, hulls 31-2-3-4-5, Los Angeles; Balsa wood for cold storage, American Balsa Co, hulls 5311-2-3, Bethlehem; Mills releasing gear, hulls 24-5-6, Southwestern; balsa wood cold storage, American Balsa Co, hull 23, Southwestern.

LIDGERWOOD MFG. COMPANY, NEW YORK, SAN FRANCISCO, LOS ANGELES

One 10x10 inch screw gear steering engine for USS Holland building at Puget Sound Navy Yard.

Two No. 1917 standardized ship's winches, Alaska S S Co, Seattle.

PACIFIC DIESEL ENGINE COMPANY, OAKLAND

(Formerly Skandia Pacific Oil Engine Company)

Purchasing Agent: A. Bolander.

Ten 850 BHP Werkspoor Diesel engs building for USSB; 6 cyl, 135 RPM; 8 delivered.

One 150 BHP Werkspoor Diesel marine engine.

One 100 BHP Skandia marine eng.

Several small Skandia engs from 9 to 36 BHP.

One 140 BHP Skandia marine engine.

STEWARD DAVIT & EQUIPMENT CORP., NEW YORK, SAN FRANCISCO, SEATTLE

Steward davits are being installed in the following: At Union Const Co: Coast Guard cutters, hulls 16, 17, 18, 19; Canadian Pacific lines, Wallace yard, Vancouver.

A Reply to Mr. Shoup

> You speak of the use of steel being handicapped in California because of freight rates and that California fruit cannot be moved in the opposite direction for the same reason.
>
> Steel moves from the Atlantic seacoast to the Pacific very largely by water. Canned goods and dried fruits, to a considerable extent, move in the opposite direction in the same way, yet the business of this country moved by salt-water routes is at rates so low that the Shipping Board is operating the government ships at a loss of a million dollars a day.
>
> Surely with a third of the ships of the world tied up there is something besides railroad transportation interfering with business.
>
> —From "Are Railroads Passing?" by Paul Shoup, vice-president of the Southern Pacific Company.

In this manner the vice-president of one of America's great railroad systems dismisses the recent unparalleled development of intercoastal steamship traffic and the present commanding position of the steamship in United States domestic trade; dismisses both too lightly, it would seem, and in a manner that unfortunately confuses the minds of those who read Mr. Shoup's memorandum in the San Francisco Call. The "man on the street" would assume that intercoastal steamship lines have been able to cut the ground from under the feet of the railroads only because water transportation has been at rates ruinously low, at tariffs that inevitably resulted in Shipping Board deficits, which had to be made good by the taxpayers of the country. Such an assumption would be justified by the paragraphs quoted, despite the fact that Mr. Shoup does not say explicitly that intercoastal traffic is moving at an actual loss; the added inference is drawn, also, that Shipping Board tonnage is engaged largely in the domestic trades using the Panama Canal.

What Is the Truth?

What are the facts? At the first of September approximately 500,000 deadweight tons of shipping was employed in the intercoastal trade. A more precise statement would be difficult to make because some vessels were employed in domestic transportation in one direction but not in the other. Of this aggregate what portion was owned by the Shipping Board? There were two 535's, the Hawkeye State and Buckeye State, both operated by the Matson Navigation Company, although one had been diverted temporarily to the trans-Pacific trade; there were also four freighters of 33,835 deadweight tons operated by the North Atlantic & Western. Some other vessels might appear sporadically, but the six listed were all that were regularly engaged. Five hundred thousand tons of shipping, Mr. Shoup, of which one-tenth was owned by the Shipping Board: how do these figures square with your statement that "the business of this country moved by salt-water routes is at rates so low that the Shipping Board is operating the government ships at a loss of a million dollars a day"? What about the 450,000 tons of privately-owned shipping? Are the owners of that tonnage also losing money?

Best in the World

Perhaps they are; but, if so, hundreds of shipowners in the world would wish to lose money in identically the same manner. No one even slightly in touch with shipping would deny that the American coastwise trade is the best to be found on any ocean today, that it began, or rather resumed, when the present business depression was in its infancy, and that the tonnage employed continued to increase during all of 1920, even though it is true that there is a superfluity of vessels in the business today. What the volume of traffic is may be seen by statistics of the Panama Canal for July, 1921, during which 19 vessels carrying 60,997 long tons of cargo in the coastwise trade passed from the Atlantic to the Pacific, and 15 vessels with 92,659 long tons passed in the opposite direction. The aggregate, Mr. Shoup, is 172,094 short tons of 2000 pounds, or sufficient to fill 4300 railway cars of 80,000 pounds' capacity each. Some of this traffic, perhaps a large portion, does move by rail to and from tidewater, and so is productive of railroad revenue; but the railroad receipts on a ton of steel moving from Pittsburgh to Baltimore are little enough compared with what would be had for transporting that same steel overland to Seattle.

Lost to the Railroads

By and large, this enormous intercoastal business is not something that has been developed by the steamships. It is normal domestic trade, diverted from the railroads to water because of lower rates offered by the steamships and also in part because of quicker delivery; it is business, with very few exceptions, perhaps none, that the railroads might have had but probably can never hope to get again. Barring blocking of the canal, intercoastal shipping will continue, doubtless will grow greatly, all at the expense of the railroads, which, so far as the mass of tonnage moving between the Atlantic and the Pacific coasts is concerned, are definitely eliminated from the long haul. They will handle perishable goods, they will run special silk trains; they will not, in the absence of the miraculous, restore their old transcontinental business.

Mr. Mann's Argument

When the intercoastal lines resumed operations early in 1920 they lacked precedents for many tariffs; consequently they took over those of the railroads, made sufficient reductions to attract business, and set to work. Here and there, since that beginning, rates have been made without regard to those of the railroads, especially in the event that unusually low tariffs had to be made in order to permit such commodities as dried fruits to seek a market on the Atlantic; in spite of that, intercoastal rates continue to bear a close relation to those of the railroads. Voices begin to be heard, however, demanding that water tariffs be based on costs of operation and not on those of the rail lines; Seth Mann, traffic manager of the San Francisco Chamber of Commerce, has been especially zealous in urging the doctrine, and it is probably true that the great question to be threshed out by the shipper, the steamship and the railroad is just this. But a writer named Riccardo enunciated the theory that the price of any commodity must be the necessary price of any considerable portion; that the cost of raising the last thousand bushels of wheat determines the price received for all the remainder, regardless of how cheaply produced. This holds good for transportation considered as a commodity. In other words, so long as the railroads continue to be factors in transcontinental business, whether by offering special inducements, by making low rates for attractive freight, by improving their services, by taking advantage of the errors of intercoastal lines, or by moving freight from interior cities in competition with that originating near the seaboard, just so long will steamship rates bear some relation, probably close, to those of the overland lines. But if Mr. Mann's argument should prevail, or if the intercoastal companies voluntarily should choose to ignore railroad rates, as they did a few months ago in reducing the dried-fruit tariff, then the railroads would find themselves utterly unable to compete with water transport systems for even the transcontinental business that they have now. The irreducible minimum of the railroad would be fat for the steamships. Even today, in these times of business stagnation, many of them are making exceedingly handsome profits, and not at the expense of the American taxpayer. Of how many railroads, Mr. Shoup, can that be said?

Refrigerator Outlook Unpromising

In the discussion of Mr. Shoup's analysis of the railroad-steamship situation, the statement was made that the overland lines would continue to move perishable goods. To what extent will that be true of the principal perishable product of the Pacific Coast—that is, fresh fruit? A large and growing number of steamship operators would reply that they are quite willing to concede to the railroads practically all of that business; and this despite the great deal of discussion of the last year regarding refrigerator services to the Atlantic, and more recently of extensive services to Europe. The attitude of some shipping men was outlined in these pages a few months ago, the argument being advanced that the large tonnages required for a solid refrigerator vessel, the consequently great amount of fruit suddenly cast on a limited market of the Atlantic, without opportunity being offered to divert shipments to the great territory stretching from Kansas City to Buffalo, and the lack of adequate storage facilities in New York and the difficulty and expense of reshipment to the interior would militate against any effective use of refrigerator vessels in the intercoastal trade. That this argument is not without merit is proved by the marked hesitancy of steamship lines to build refrigerator vessels.

The European Situation

Almost identically the same chain of reasoning was advanced recently by a Pacific Coast shipping man, who, it should be said, is connected with a great trans-Atlantic company that has no direct Pacific affiliations. In discussing the reported plans of Furness-Withy to place refrigerator vessels in the Pacific-European trade, he said that Western fruit exporters could not be expected to ship large quantities by one steamer. In the past they have refused generally to forward on through bills of lading, because they wished to be able to sell in the Eastern markets of the United States, if conditions were favorable; and in any case, to store fruit on this side of the Atlantic if that should be necessary in order to avoid a glut in Europe. If markets should be exceptionally favorable, he continued, they might ship solid cargoes from Halifax or Boston; in that event, however, they had made sure of their ground beforehand and were in a position to strike quickly; whereas fruit once committed to the long Pacific - Panama - Europe route was beyond hope of diversion.

Lack of Storage in U. K.

There is, however, a pronounced lack of refrigerator storage in the United Kingdom, so that whole cargoes of fruit cast on British markets would have to be disposed of, almost regardless of price. To buttress his arguments, the shipping man quoted said that an important exporter had decided to reduce the volume of his all-water shipments for 1922 considerably, despite a prior promise to dispatch several thousand boxes.

There doubtless is much to be said in reply to this brief. Adequate storage houses in Europe and a market sufficiently enlarged and stabilized to relieve the exporter of all dependence upon the United States might solve all difficulties. But it is to be doubted whether either condition is to be expected soon.

A One-Act Playlet

Civic Pride vs. A Demand for Economy might be made the title of a Little Theater play based on the recent to-do at Portland, Oregon. In compliance with what might be described as a mandate of the people of the United States, the Shipping Board decided to reduce its trans-Pacific services in order to make them conform more nearly to the requirements of trade. Believing that the Portland berth, among others, had too much tonnage, the board wished to eliminate one company. Either the Columbia-Pacific or the Pacific Steamship had to go.

But the board's decision was misunderstood by Portland, or else the city wished to retain both lines despite the demand of the people and Congress for retrenchment. Accordingly a protest against withdrawal of the Pacific Steamship Company's vessels was made. "Very well," the Shipping Board replied in substance, stroking its collective chin, "we shall take the Columbia-Pacific steamers." This it was about to do when Portland awakened to a realization of the essentially false position in which it had been placed; Commissioner Chamberlain, who in this case was spokesman for the city, fought the issue to a finish and won, with the result that the board, according to advices from Washington, decided to permit the Columbia-Pacific to retain its Portland - Oriental vessels and to make the Pacific Steamship the sole operator from Seattle, Waterhouse and Struthers & Dixon being dropped. Portland is pleased, because the Columbia-Pacific is a home company, while the Pacific Steamship is not; Portland most certainly should be pleased at having escaped the consequences of a half-cocked action. There was, of course, a struggle between the two companies, as there properly should have been, for no one would expect either to give up without an effort. No, the steamship lines are not to blame. But the Portland Chamber of Commerce is. Other seaboard cities might take the lesson to heart and decide here and now to acquiesce gracefully in the retrenchment program of the Shipping Board. Gentlemen who protest against the burdens of taxation and then work, wittingly or unwittingly, against a policy designed to save money, are exceedingly likely to be misunderstood.

Lumber and the Inevitable

In the movement of lumber from the Pacific Coast to the Far East the inevitable has occurred. Those shippers who expected the absurd rate of $12.50 to rule indefinitely were rudely awakened August 20, when the Shipping Board directed that no more booking be made. As a result, shippers found tariffs raised by $2.50 in San Francisco and Portland, and in Seattle, although rates had not been advanced beyond $12.50 on September 15, exporters were offering advances of $1, $1.50 and $2 over tariffs. The moral is this: unremunerative rates are not good for the steamship operator, and the shipper does not profit in the long run.

65,000,000 Feet to Be Shipped

But heavy cargoes will continue to move for months. At the first of September there probably was an aggregate of 65,000,000 feet awaiting shipment from the Columbia River and Puget Sound. To move this immense amount would require all available tonnage until January 1. So heavily were American steamers engaged that they found themselves unable to participate in the unexpected offerings of general merchandise, which necessarily went in large part to the foreign lines. Whether by accident or shrewd calculation, the Japanese and British decidedly got the Americans on the hip, for our friends the enemy did not go mad about lumber at $12.50.

Signs have been numerous for months that the Shipping Board was determined to reduce expenses and that the present operating system, under which the agent receives a percentage of the gross freight, probably would be superseded by a bareboat charter form. In such circumstances it would appear to be exceedingly unwise to make rates so low as this, which by the sheer volume of business produced might be profitable to the operator but which was no more than sufficient to pay the board expenses even if all went well. Nevertheless, American lines were stampeded into an indiscriminate booking of lumber by the millions of feet until the board issued its general order suspending further acceptance.

An Indirect Increase

In another direction the market moved against lumber exporters. They had persuaded steamship lines to accept logs on the Brereton scale, which means that logs moved at board measure, bark included despite the fact that the cylindrical form of a log results in waste space. Although the California Westbound Conference never acquiesced formally in this plan, the members were putting it into effect quite openly for a month or so until the conference put down its foot September 13. Thereafter the square of the mean diameter applied; or, in other words, the log was regarded as equivalent to a cube having the mean diameter as a side. Such it is to a steamship company selling space. The increase in measured content, and consequently in revenue, was 27.3 per cent. On top of all this, shippers began to offer a premium of $2 a thousand feet on logs moving from San Francisco.

On February 14 the old Pacific Westbound Conference reduced the lumber rate from $12.50 to $10 after a Shipping Board line had received permission to book cargo at Vancouver at $12.50, presumably American currency, but in reality Canadian. To help on the slash the Blue Funnel was said to have made a cut to $10, to which the Pacific Steamship retaliated by booking millions of feet at the same figure. Plans were laid a few weeks later to increase the rate to $15, but companies that were not booked heavily at $10 demanded that they have an opportunity to get business at the low tariff. Next came an announcement that the rate would go to $15 July 1, from which resulted a scramble to place business, and the Shipping Board thereby gained an opportunity to decline to accept more $10 lumber but to offer to take business at $12.50. The $15 rate did not become effective July 1, however. Finally the board tired of the whole affair and turned down all lumber offering.

The Flowers of Yedo

Lumber exporters apparently realized that they had been enjoying too low a rate and proposed to advance their prices to Japanese consumers, who probably would pay the extra freight. They probably will, for Japan is using enormous quantities of lumber; winter is approaching, moreover, and the "flowers of Yedo," the Japanese euphemism for the destructive fires that sweep Tokyo, will begin to blossom soon.

Eastern Export Rates

No great stir has been aroused on the Pacific Coast by the announced intention of Eastern railroads to make effective export rates, principally on steel, the new tariffs being 25 per cent less than domestic. Except for the interest taken in the application of the export principle to Eastern rail business the Pacific was decidedly apathetic. Pittsburgh steel will move to foreign ports for $1.90 a ton less, a reduction having been made from $7.60 to $5.70; but Pittsburgh steel long ago ceased to move overland, although a recent booking of 400 tons for Seattle transshipment did cause a mild sensation. If the export rate should be applied to Gary and Chicago, as it presumably will be, no steel could move from those centers in competition with Pittsburgh - Atlantic or even Pittsburgh - Pacific. Chicago-Atlantic steel could be landed in Kobe for $20.15, as against a new Pittsburgh-Atlantic rate of $16.40, and a Pittsburgh - Pacific cost of $19.20.

Effect on Pacific

But the Pittsburgh export rate does play hob with plans to put in a 61½ cent rail rate from Chicago to the Pacific Coast, which, it was anticipated, would result in the flow of some steel from Gary and South Chicago in competition with Pittsburgh. This proposed Chicago-Pacific rate of $12.30 a short ton, plus the $5 trans-Pacific rate, would total $17.30, or $1.90 less than the present cost. But this is precisely the amount of reduction extended to Pittsburgh, so that no change would be made in the relative positions of Atlantic and Pacific, the latter still being at a disadvantage of 90 cents.

Apparently the new Eastern export rates were inspired by no animus against the Pacific; they probably look to improving the condition of Middle Western exporters in competing with Europe. Such a motive is admirable; but some Chicago steel moving overland would have been a "grand and glorious" sight.

Rail Rates Cut

Certainly the railroads these days are sorely beset. They work with steamship lines in raising export and import rate structures and immediately turn about and fight other water transportation systems, for example, the intercoastal companies. The Southern Pacific has announced reductions of as much as 40 per cent on iron and steel moving from Trunk Line and Central Association territory to the Pacific Coast. The principal reductions will be: from $1.83½, New York, and $1.66, Pittsburgh, to $1 on bars, plates, sheets, structural iron, etc. It is hoped that the Eastern lines will concur in time to make the rates effective October 3.

Great Grain Contracts

Announcements have been made in Portland and Seattle that the Gray-Rosenbaum Grain Company, a consolidation of the J. Rosenbaum Grain Company of Chicago and P. N. Gray & Company of New York, had signed contracts for the movement of at least 5,000,000 bushels of grain through each port a year. These amounts are minima, but Portland expects a movement of 50,000,000 bushels during the year 1921-1922.

Grain will be handled at Portland in bulk, the municipal elevator at that port being equipped with fourteen spouts for simultaneous delivery. The 10 per cent differential rate from the Snake River basin, recently granted to Portland; the excellent equipment of the port; the number of steamship lines available, and the mild winter temperatures, all combined to give the city this new business. Over the protests of other shippers, the Portland commission of public docks has reduced charges for shipments in excess of 4,000,000 bushels by one shipper during the current fiscal year. The Gray-Rosenbaum company would receive a rate of 50 cents a ton as against 60 or 75 granted smaller shippers.

Bean-Cake and Politics

In the turmoil of Eastern Asia today there is much that is no more intelligible than the workings of an ant-heap. Semenoff a fugitive after the death of Kolchak; Semenoff reappearing at Vladivostok on board a Japanese vessel; Semenoff forbidden to land; Semenoff landing nevertheless; Semenoff deposed by the Cossacks; Baron Ungern appearing at Urga at the head of a sadly-mixed army; Baron Ungern making a working arrangement with the Living Buddha; much running to and fro in Tokyo and Peking over the ensuing complications in Mongolia; Kappellist coup at Vladivostok; continued Japanese occupation of that city, counterbalanced with vague promises of evacuation; reported destruction of the Far Eastern Republic, mildly denominated as "pink"; wars and rumors of wars: such is the state of that considerable portion of the earth lying west and northwest of the Sea of Japan. A disturbed ant-heap is orderly in comparison.

Freights and Frights

But now and then some keen individual believes that he can detect a slight pulling of strings. One such person is known as Orrin Keith. He has been traveling through the Far Eastern Republic, which with much tribulation succeeded to the reins of authority after Kolchak was last seen tossed aloft on the bayonets of Red troops; in his travels Mr. Keith has discovered a singular connection between freights and frights, between bean-cake and politics. Let him tell the story in his own words:

There is the railroad running through the middle of the country—its alimentary system. Vladivostok harbor is its mouth, the road from Nikolsk to Vladivostok is its throat. Here, with its clutch on mouth and throat, is the Japanese army. Slowly they are strangling the life out of the young republic. If Vladivostok were open and the Japanese clutch removed from the throat at Nikolsk, the Ussuri Railway, from Vladivostok to Habarovsk, would at once begin to pay expenses.

But Vladivostok is not open and the fingers still press deep at Nikolsk. The grip was slackened a few months ago. The Vladivostok government had recognized the Far Eastern Republic. The city was quiet. Trade was beginning again. Capital was gradually recovering from its fright. Taking advantage of this condition, the Chinese Eastern Railroad lowered the rate to Vladivostok from all points west of Harbin so that it could compete with the rate through Dairen over the South Manchuria Railway of Japan. The traffic through Dairen dropped to a fraction of its former amount. That through Vladivostok increased accordingly. From the middle of April to the latter part of May 250 carloads a day were loaded in Manchuria for the Russian ports. Part of the income from this traffic came to the Russian railways for the haul from Pogranitchnaya to the sea. At Vladivostok it was distributed to the ships of various nations, not the smallest part going to vessels flying the United States flag.

Such a condition was a great encouragement to Shatov (minister of transport of the Far Eastern Republic—Ed.) and his fellow workers. But it was not satisfactory to the Japanese. They greatly preferred to have this freight go over the Japanese line from Changchun to Dairen and from there in Japanese ships to all parts of the world. The coincidence has already been mentioned. The Kappellist uprising made Vladivostok no longer suitable for the transshipment of goods. The traffic from Manchuria again started southward, safely in Japanese hands.

A Remarkable Interest

This may explain the remarkable interest manifested in Dairen a few months ago by Japanese steamship lines. It was whispered that coal was cheaper in Dairen than in Nagasaki; perhaps it was, but even so, Dairen is a long way from the mouth of the Yangtse and the regular ports of call of trans-Pacific liners.

For what may become the greatest port of the Far East, Dairen is singularly little known in the United States. If it were called Port Arthur some of our ignorance would be dissipated, for Port Arthur was the fortification and Dalny (now Dairen) was the city about which there was a vast deal of fierce fighting in the Russo-Japanese War. In his eternal search for an ice-free port, the Bear settled himself in Dalny in 1898. He extended the Chinese Eastern Railway and built and planned on a large scale indeed; but the war came in 1904, Dalny was occupied immediately by the Japanese and Port Arthur, some forty miles distant, finally was captured by Japanese armies under command of a general named Nogi, who afterward harakiri-ed in Tokyo on the evening of the funeral of Emperor Meiji.

An Ice-Free Port

Japan succeeded to Russia's so-called "lease" of the Kuantung peninsula. The South Manchuria Railway took over the rail lines; the inner harbor of Dalny, now Dairen, was deepened to 25 feet at low tide; to one pier, 2000 feet long and 350 feet wide, built by the Russians, the Japanese added another, 2000 feet long and 570 feet wide, which had been begun by the Bear; and within a few years added a third, of the same length as the others and 400 feet wide, and like them constructed of solid masonry. Docking facilities for 34 vessels are offered, the entire length of docks being 13,000 feet, and there are some 40 warehouses on the docks, sufficient for the storage of 250,000 tons of goods.

Dairen is the sole ice-free port of Manchuria. Vladivostok, up in Siberia, is blocked much of the year, although the Russians did some remarkable work with ice-breakers during the first part of the war. But the Siberian port is under great natural disadvantages, to which, it appears, are added others designed and nurtured by man.

Where the Trade Has Gone

Trade currents are apparently returning to pre-war conditions. During the war, says the Trade Record issued by the National City Bank of New York, the dangers to navigation on the Atlantic resulted in a considerable increase of movement of certain classes of merchandise across the Pacific. In the year before the war, 55 per cent of the merchandise imported into the United States entered through the port of New York, and 72 per cent of the imports entered through the Atlantic ports as a whole. In the fiscal year 1918, with the dangers to navigation on the Atlantic, the share of the imports entering through New York had fallen to 42 per cent as against 55 per cent in 1914, and that entering through all the entire Atlantic frontage was but 58 per cent as against 72 per cent in 1914. Meantime, import trade entering Pacific ports had increased from 7 per cent in 1914 to 21 per cent in 1918.

With the termination of the war, however, imports entering New York slowly returned to normal, having increased from 42 per cent in 1918 to 53 per cent in 1921, as against 55 per cent in 1914, while the share entering by way of the Atlantic ports as a whole advanced from 58 per cent in 1918 to 69 per cent in 1921, as against 73 per cent in 1914. Meantime, the share entering by the Pacific ports fell from 21 per cent in 1918 to 7 per cent in 1921, as against 7 per cent in 1914.

On the export side, the percentage now handled by the various ports also indicates a return to pre-war conditions. Owing to the demands of Europe, the exports of New York increased from 37 per cent of the total in the fiscal year 1914 to 48 per cent in 1917, while the share of the Atlantic frontage as a whole increased from 55 per cent in 1914 to 70 per cent in 1917. The share of the Gulf ports increased from 11 per cent in 1916 and 1917 to 22½ per cent in 1921. With the reduction, however, in European demand, New York's percentage fell to 42 per cent in 1920 and 39 per cent in 1921, while that of the Atlantic ports as a whole dropped to 57 per cent.

Two Paradoxes

There are two noteworthy phenomena in American foreign trade: one, the innocent belief of some business men that they can continue to export indefinitely without importing, or, at least, without paying any attention to importing, leaving that to the other fellow; the other, the fact that we continue to sell far more than we buy, even though the aggregate of foreign trade has fallen away greatly. Says the Commerce Reports:

"The total value of the foreign trade of the United States in merchandise dropped from $13,347,000,000 in the fiscal year 1920 to $10,171,000,000 in 1921, a decrease of $3,176,000,000, or at the rate of 23.8 per cent. This loss was nearly equally divided between imports and exports. Imports dropped from $5,238,000,000 in 1920 to $3,654,000,000 in 1921, a loss of $1,584,000,000, or 30.2 per cent; while exports, amounting to $8,109,000,000 in 1920 against $6,516,000,000 in 1921, decreased $1,593,000,000 in value, but only at the rate of 19.6 per cent. . . . .

"The much earlier and proportionately greater drop in imports caused considerable surprise. In the face of depreciated exchange rates of European currencies the United States was generally considered a favorable market for selling, and it was freely predicted that this country would be overwhelmed with shipments of European goods of low production cost. As a matter of fact imports from most countries in Europe were less in 1921 than in 1920, although those from Belgium increased by $13,000,000 and from Germany by $46,000,000. At that last year's imports from Germany of $91,000,000 are less than one-half the pre-war imports from that country."

How long can these conditions continue? If the government receives any interest on its loans to Great Britain, France and the other associated nations, payments necessarily must be in goods. Then, at least, we shall be compelled to accept imports. But we talk of foreign trade today and tomorrow build a tariff wall; we talk of employing our merchant marine, only to shut out Australian wool and British manufactured goods; we have become, in short, persons who eat our cake and have it too.

Page Freight Report

San Francisco, Sept. 15, 1921.

Our last report was issued August 24. The activity in chartering has continued, although on a lower scale of rates, as both the wheat and barley markets in Europe went off somewhat in price.

From the North, Northern Grain & Warehouse Company chartered steamer Hilversun at 63/9, Ravenrock at 61/3, also steamer Terrier at 57/6, and Arnot Mendi at the same rate. Kerr-Gifford chartered steamer Ashworth at 60/— and steamer Hercules at 57/6. Balfour, Guthrie chartered steamer Norman Monarch at 57/6 and M. H. Houser steamer Havre Maru and Orient City on private terms, all to load at Portland with wheat and/or flour to U. K.-Continent, Bordeaux-Hamburg.

From San Francisco Dewar & Webb reported to have chartered steamer Hellen on private terms, Balfour, Guthrie steamer Crosshill at 66/3 for barley. Strauss & Company chartered steamer St. Dunstan at 61/3 for barley and later the Greek steamer Iolcos at the lowest rate for some time, namely 55/—. No doubt the high rate of insurance on Greek tonnage was the cause of the owner taking such a low rate. At this writing cables indicate that the barley market is very weak in England, though wheat is in good demand, and there seems inquiry for tonnage at 57/6, from Portland.

A good deal of lumber has been arranged by the regular liners on the basis of $15.50 to Australia and on the basis of $17 to $17.50 for the West Coast of South America. The schooner Vigilant has been chartered by the Robert Dollar Company for lumber from the North to Callao, at $17. J. J. Moore & Company chartered Japanese steamers, Vancouver Maru and Kaikyu Maru, for lumber and Japanese squares to Japan, at $13 and $13.75 respectively. The Munson Line are reported to have just chartered one of their steamers to bring coal from Virginia to San Diego at the low rate of $4.48 per ton, free of canal dues, and she has been chartered, we understand, probably by the Willapa Lumber Company, with a return cargo of lumber to New York at $20 per thousand.

Some low prices have been made for sailers sold at auction. You will remember the Chillicothe was bought for $25,000 by James Blaine of Seattle and the Moshulu sold at auction in San Francisco at $29,500, bought by the Charles Nelson Company. The iron sailer Phyllis, sold during the war by Comyn at $275,000, only realized $24,500 at auction in New York. The City of Portland is reported to have been sold by auction in Savannah for $10,000 and the Betsy Ross, motorboat, was reported sold up North this week for $5000, but we have just heard that the sale has not been confirmed and that someone has made a private bid for $7500. Even at these low prices it is quite likely that the above vessels will be laid up for a while until the owners can be sure of a paying freight for a round voyage, either to the Orient or the West Coast of South America or to Australia.

PAGE BROTHERS,
BROKERS.

Beyfuss Freight Report

San Francisco, September 22, 1921.

During the past four weeks there has been no decided change in the freight markets off this coast.

Barley chartering has been very light with rates about 60/— San Francisco to U. K. or Continent. Wheat fixing has been quite active, more than a dozen steamers being chartered, mostly from Columbia River to U. K. or Continent at rates of 55/— to 69/—. No American steamers are reported but three Spanish steamers are coming here for this business.

There has been no improvement in lumber rates from owners' viewpoint, although there is much inquiry for lumber from the Orient and several full cargoes are reported at about $12.50 per M feet B. M.

Lumber chartering to Australia for sailing vessels is very quiet, charterers' ideas being about $14 to Sydney, but no fixtures have been made as low as this.

West Coast of South America is also very quiet, one vessel has been reported chartered, a large sailing vessel of about 18800 M feet fixed at $17—to Callao.

Nitrate freights are still flat with no transactions reported.

C. BEYFUSS CO.,
BROKERS.

New Matson Service

The Matson Navigation Company announces a triangular freight service between San Francisco, Los Angeles and Hawaii, to begin with the sailing of the steamship Hyades in October. For many years Los Angeles has desired a direct service to Hawaii, but except for a few voyages of the Hill liner Great Northern in 1915 and 1916 its wish has been in vain. The Hyades will be operated on a 35-day schedule. Freight offerings from Los Angeles to the islands and return are quite promising, and another vessel may be placed on the run later. Calls will be made at all island ports for which sufficient business offers. No passengers will be carried.

Personals

Edward B. Germain, former general manager of the Bethlehem Shipbuilding Corporation's Harlan yard, has been made manager of sales of Bethlehem, with offices at 111 Broadway, New York City, and has been succeeded as general manager of Harlan by C. B. Weaver, former general superintendent.

Judge Walter D. Meals, former associate justice of the Appellate Court of Ohio, has been appointed by President Harding as chairman of the Shipping Board Claims Commission, which will consider claims of about $211,000,000. Other members are: Homer L. Ferguson, president of the Newport News Shipbuilding & Drydock Company; F. W. Wood, former president of the Maryland Steel Company; Captain Richard M. Watt, C. C., U. S. N., and Arthur W. Teele, of the accounting firm of Patterson, Teele & Dennis.

Captain Alexander E. S. Hambelton, recently master of the White Star liner Adriatic and formerly of the Celtic and Baltic, has been appointed master of the new 35,000-ton Homeric, ex-Columbus. He has been succeeded on the Adriatic by Captain Hugh F. David.

George Banbury has succeeded E. J. Griffith, resigned, as employment agent of the Admiral Line with headquarters at Seattle.

F. V. Archer, formerly manager of Naumburg & Company, New York, Boston and Philadelphia, has become vice-president of the Thatcher Propeller and Foundry Corporation, Albany, in charge of finance, cost, expenditures, etc., effective September 1.

Captain Edward L. Beach, U. S. N., commandant of the Mare Island Navy Yard, author of numerous novels dealing with naval life, will retire soon to become professor of naval history, Stanford University. Captain Beach will occupy what is said to be the second chair of its kind in the country, the other being at Annapolis.

Rear Admiral Josiah S. McKean has been appointed commandant of the Mare Island yard, succeeding Captain Beach.

H. S. Eaton is acting assistant manager of the Pacific Steamship Company, San Francisco, succeeding M. F. Cropley, transferred.

Dan Cook, formerly of the General Steamship Corporation and Pacific Mail, is now traffic manager on the Pacific Coast of the Compagnie Generale Transatlantique, the agency for which is held by the Trans-Oceanic Company.

H. T. Anning is general agent of the Atlantic-Gulf & Pacific at Portland, Oregon, succeeding C. R. Sheridan, transferred to the San Francisco office.

George A. Armes, president and general manager of the Moore Shipbuilding Company, Oakland, has resigned and has been succeeded by Joseph A. Moore, vice-president, who in turn is succeeded by Ira Lillick. Mr. Armes went from the Shipping Board to the Moore yard at the height of wartime construction and had a great part in Moore's successful work.

Gordon Gliddon, general sales manager of the Moore Shipbuilding Company, who had charge of solicitation of business, principally repair work, has resigned to take up similar work with Barnes & Tibbitts.

George H. Wells has been appointed by the Shipping Board to serve in the traffic department, New York. Other appointments in the same department are: F. G. Freiser, head of the department of competitive inland freight rates and competitive export and import cargoes, with headquarters in Washington; W. L. Bull, trade supervisor of the traffic department; J. P. Sutherland, head of the passenger branch of the traffic department.

Captain Y. Yabe, chief of the Yokohama harbor office and president of the Yokohama Y. M. C. A., has been sentenced to one year's imprisonment and a fine of yen 1200 following conviction in the Yokohama customs scandal. S. Hara, a director of the Toyo Kisen Kaisha, was fined yen 300. Of 88 persons tried, 83 were convicted.

John Callan O'Laughlin, special assistant to the chairman of the Shipping Board, has resigned to return to private business. He has been succeeded by Ralph Sollitt, formerly assistant to Postmaster General Hays and also a vice-president of the Munsey Trust Company of Washington. Mr. O'Laughlin intended to stay only a short time when he went to the board to assist Mr. Lasker in the reorganization.

R. L. Francis, formerly assistant freight traffic manager of the United American Lines, is now manager at Philadelphia, with E. M. Tyrrell as assistant. Wilmer M. Wood is appointed general freight agent, intercoastal service; E. W. Robinson is assistant freight traffic manager in charge of full cargo traffic, both having headquarters in New York; and Clarence F. Ray is assistant to the manager at Boston.

Deaths

Frank F. Boulton, president of the Maritime Association of the Port of New York, August 17.

Joseph C. Babcock, for 48 years assistant keeper and keeper of the Fairport, Ohio, lighthouse, July 4. He had retired in 1919.

Cristino Rios, of the Northern Shipping Corporation, 82 Beaver street, New York, at Ponce, Porto Rico, July 31.

Walter W. Ray, vice-president of Middleton & Co., export and import commission merchants, 68 Broad street, New York, August 13.

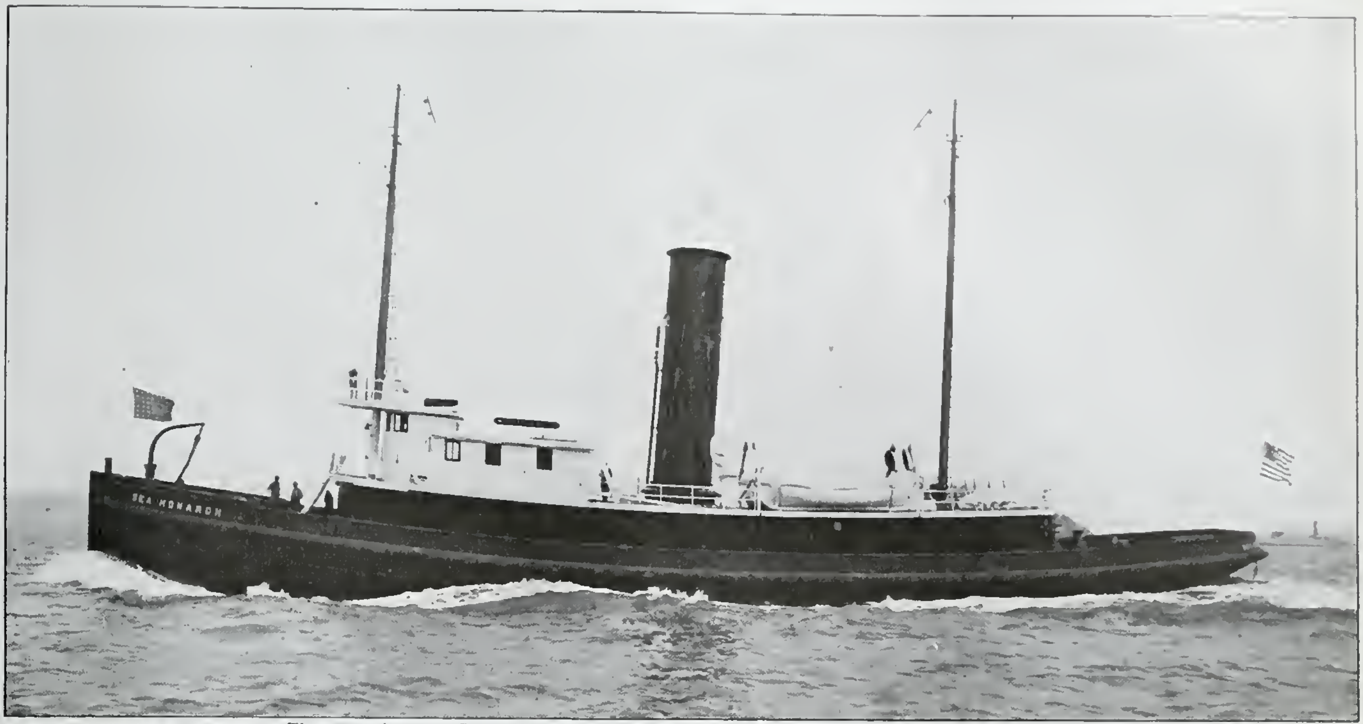
C. H. Olson, attorney of Honolulu, who had specialized in admiralty law, in an automobile accident on Maui September 5.

Philip H. Van Tassell, formerly port engineer of the Oregon Railroad and Navigation Company, in Tacoma, Washington.

Yonosuke Mitsui, president of the Mitsui Bussan Kaisha, in Oiso, Japan, August 8. Mr. Mitsui was born in Kyoto in 1856. Prior to becoming president of the M. B. K. he was head of the Kanegafuchi Spinning Company.

SAVING THE CANADIAN IMPORTER

By G. W. GORE
Master of Tug Sea Lion



The sea-going tug Sea Monarch of the Ship Owners' and Merchants' Tugboat Company

AUGUST 13, 1921, the steamer Canadian Importer, a vessel of 8800 tons, belonging to the Canadian government, left Vancouver, B. C., loaded with four million feet of lumber, bound for the various ports of Australia. Being a long-legged brute, drawing 26 feet on even keel and of narrow beam, with a high deckload, the ship was inclined to be somewhat cranky.

After rounding Cape Flattery, the course was set to the south'ard and west'ard and soon after passing out, the steamer took a decided list to starboard. As she had done the same thing on previous voyages, nothing much was thought of it at the time. The Canadian Importer was kept on her course, but the list kept on increasing, until water finally poured into the fire room from number two hold, shortly afterwards putting out the fires under the boilers and rendering the ship helpless.

In this position she lay, gradually listing over, as the water poured into the fire and engine room, until the ship had a 30 degree list to starboard and the after end of the steamer was flooded, the water finally reaching to the height of the cylinder heads on the main engine, a depth of 26 feet, leaving the ship in a most precarious condition.

On the 19th of August, the day after the steamer filled, a volunteer crew of the second and third officers and nine men set out in one of the ship's lifeboats, seeking assistance for their disabled craft.

After a harrowing experience of fifteen days in an open boat the crew were eventually picked up.

In the meantime the steamer Cordova sighted the Canadian Importer and sent in wireless calls for assistance to be sent the helpless steamer; then left in search of the missing lifeboat.

Friday, September 2 at two p. m. the tug Sea Lion loaded with fuel and an ample supply of provisions proceeded to sea in search of the Canadian Importer, then lying helpless 600 miles off shore.

Passing through the north channel at three p. m., Point Reyes was made as darkness shut in. Our course was set a little to the southward of the last position of the Canadian Importer, as received by wireless, allowing for the drift the steamer was making to the southeast.

Perhaps it was intuition, but at any rate gave the second officer on watch orders to keep a strict lookout for the missing crew in the lifeboat of the Canadian Importer.

Repeated the same orders to the chief officer who came on watch at midnight, also remarking that no doubt they would show a light, if we came anywhere near them. At 12:45 the first officer called me, stating that he thought the missing lifeboat was in sight. On looking through the darkness on the starboard hand, there appeared the red glow of a Coston signal, looking with its baleful glare, like the evil eye of some unknown denizen of the deep.

We knew at once it was the lifeboat, and immediately the wheel of the Sea Lion was ported until we were heading for them, the range lights on the tug at the same time showing those in the lifeboat that their signal had been seen.

At one a. m. we arrived alongside the lifeboat, having hauled the Sea Lion into the wind and sea in such a position as to make a lea for them on the starboard side of the tug.

Words could not express the delight of the two officers and nine men as they knew they were once more safe on board ship. As they struggled over the side of the Sea Lion, assisted by our crew, they surely presented a sorry and unkempt appearance, the result of fifteen days' exposure to the elements of sea and sky in an open boat. Weak and unshaven, but all alive, they were soon drinking copious draughts of hot coffee and eating to fullness the many sandwiches our good cook prepared for them. Drying out their clothing and making them comfortable for the rest of the night was the work of a short time.

With true maritime spirit they all decided to go back with us to their ship. Come daylight, a hearty breakfast and later hot salt water baths and a change of clothes, with judicious medical aid, soon had them all feeling better and improved in spirit one hundred per cent. There was a moderate northwest wind blowing but a large westerly swell running, when the lifeboat came alongside the tug. After three ineffectual attempts to lift the boat in the Sea Lion's davits, decided to tow her astern. Monday, September 5, at nine a. m., we arrived alongside the Canadian Importer and put the crew of the lifeboat, now greatly improved in body and spirits, aboard their ship.

The deckload of the steamer had been cast overboard and she had been partially pumped out by the use of wrecking pumps, put aboard by the British wrecking steamer Algerine, leaving the ship with only a ten degree list to starboard.

The Canadian Winner, a company ship of the same line, was towing the disabled steamer, but immediately let go on our arrival and that afternoon departed for Puget Sound.

The Sea Lion's hawser was made fast to the port cable of the Canadian Importer, and we started on our long tow from latitude 38-55 north, longitude 135-24 west for the port of Victoria, B. C., being accompanied by the steamer Canadian Observer as an escort. The weather at this time was fine, clear and smooth.

At nine p. m. on September 6 the tug Sea Monarch hove in sight and putting hawser aboard the steamer the two tugs continued on their long journey.

With the exception of two days strong northerly winds, fine weather was experienced throughout the trip, the steamer steering better with wind and sea ahead than with the wind abeam or astern.

We reached Victoria at eight a. m. September 13, just one month after the Canadian Importer had started on her illfated trip, having towed the ship a distance of 803 miles in seven days and twenty-one hours, an average of 4.24 knots per hour under all conditions of weather, wind and sea.

At eleven a. m. docked the Canadian Importer at the outer dock in Victoria harbor, being greeted with hearty cheering by the vast crowd assembled to meet the arrival of the helpless steamer.

The two tugs were objects of great interest to the many who passed along the piers where they were tied up, and many favorable comments were made on the successful feat they had just accomplished.

At three p. m., as the Sea Lion and Sea Monarch left for San Francisco, they were given three rousing cheers by the crew of the Canadian Importer and the crowd on the dock. The powerful tugs which had so ably represented the Ship Owners' and Merchants Tugboat Company took their departure from the harbor of Victoria.

BOOK REVIEWS

Zimmermann on Ocean Shipping, by Erich W. Zimmermann, Ph. D., professor of commerce, James Millikin University, Decatur, Illinois; 692 pages, with numerous tables, diagrams, and illustrations, completely indexed. Bound in blue buckram with gold stampings. Published by Prentice-Hall, Inc., New York. Price $5 net.

This book has an initial merit of being brand new, having been published in May of this year. Its treatment of this very important subject is, therefore, sufficiently modern to be tinged with the depression in business which has brought America face to face with the real problems in shipping. The prime raison d'etre is the "emphasis placed on the inter-dependence of shipping and commerce."

The book is written purely from an American standpoint and is divided into nine parts. Part I deals with the ocean, particularly in reference to trade routes. Part II treats of ports and terminals, including the idea of free zones, physical requirements, handling facilities, and everything that goes to make up an efficient modern seaport. Part III deals with the ocean carrier; Part IV with the cargo; Part V with shipping services; Part VI with marine insurance; Part VII with organization and management; Part VIII with rates and finances; and Part IX is devoted to a short history of America's merchant marine, the larger part of this last section being devoted to a chapter on the work of the United States Shipping Board, and another chapter on the Merchant Marine Act of 1920.

This book should prove very valuable both as an original text and as a handbook for business men interested in ocean shipping. If desired, orders may be placed through Pacific Marine Review.

"I'll Tell the World," the Story of the World Trade Cruise—Anderson Overseas Corporation, 165 Broadway, New York. A 16-page booklet setting forth the plan for a world trade cruise by the famous American trans-Atlantic liner St. Louis.

For the purposes of this cruise the entire main deck and portions of the promenade deck of this vessel have been set aside for exhibits. The exhibit space amounts to approximately 30,000 square feet, so that this tour would be equivalent to "taking Madison Square Garden around the world." Power is made available for the operation of any machinery exhibit, and ample space is assigned on other decks for the storage of material, literature, etc., as may be needed by exhibitors. Office accommodations are also to be provided, and banking institutions with large foreign connections will be given an opportunity to have representatives accompany the expedition.

While orders may be taken freely, no goods of any kind will be sold out of the ship. Literature should be prepared in English, French and Spanish, and possibly also in Portuguese for Brazil.

The tentative itinerary comprises a start from New York; thence down the east coast of South America, touching at various Brazilian ports, to the River Plate ports; thence across the South Atlantic to Capetown, and up East Africa to Delagoa Bay; thence to Mauritius and across the Indian Ocean to Australia, touching at Perth, Adelaide, Melbourne and Sydney in Australia and at Wellington in New Zealand; thence to Yokohama, Japan, and along the east and south coasts of Asia, touching at all important points through the Suez Canal, the Mediterranean, and along the west coast of Europe to Bergen, Norway; and thence back to New York.

Basic rates with charts of the ship will be furnished on application, and all details may be arranged by conference. Exhibits will be stored safely and free of charge until the ship is ready.

The vessel is now undergoing extensive reconditioning.

MACHINERY AND EQUIPMENT

THE MOST MODERN STEAMER

OUR marine engineering friends will be interested in some of the details of the propulsion plant and auxiliary machinery of the new Cunard liner Scythia, recently introduced into the Southampton-New York service.

The Scythia is considered by many European marine experts to be the most advanced liner afloat from a marine engineering standpoint. She is notable as being the first Class A liner to be designed and built for burning fuel oil under her boilers. Briefly her dimensions are: length 625 feet; breadth 74 feet; molded depth 45 feet; draft 30 feet; gross tonnage 20,000 tons; displacement 27,000 tons; speed average at sea 16 knots. She is fitted for 337 first-class passengers, 331 second-class, and 1538 third-class.

She was built by Vickers Limited, Barrow-in-Furness, England. The passenger accommodations are very spacious and luxurious, and she is noteworthy among European-Atlantic liners in that running water is provided in all first and second-class cabins.

Power Plant

The Scythia is the first Class A liner in which double reduction gearing is installed. The driving machinery consists of two sets of Brown-Curtis compound turbines, each set developing 6250 S. H. P., with provision of additional nozzles on the high pressure turbines so that the total S. H. P. may be increased by 1000. The H. P. and I. P. ahead turbines are arranged in tandem in the same casing, and in this casing also one astern element is assembled. The L. P. ahead turbine and the second astern element are coupled together in another casing on the opposite side of the gear case.

The speed of the H. P. turbine rotors is 3200 r. p. m., and the speed of the L. P. rotors 1816 r. p. m. These speeds are reduced through suitable double reduction gearing to 80 r. p. m. at the propeller shaft. Adjustable blocks of the Michell type are fitted to the turbines and also on the main shafts next to the gearing to take up the propeller thrust.

The condensers are underslung, being bolted through to the low pressure turbine casing, an arrangement which insures freedom from drainage water in the low pressure turbine.

The plant supplying steam for thse turbines consists of three double-ended Scotch marine boilers, each 17 feet 6 inches diameter by 22 feet 6 inches long, and three single ended ended boilers of the same type and same diameter by 11 feet 6 inches long. Morrison suspension type furnaces are used, four to the boiler end. Howden forced draft system, Schmidt's superheaters, and the Wallsend-Howden oil fuel burning apparatus are used, the boiler fronts being arranged for quick conversion from oil burning to coal, or vice versa. There are four complete sets of pumping and heating plants for insuring oil to the furnaces of these boilers.

Auxiliary Plant

Much of the auxiliary machinery and practically all of the deck equipment is driven by electricity. Two sets of turbo-driven generators, each of 375 K. W. capacity, are supplied for providing electric current for this equipment.

In connection with the electric installation there is an emergency oil engine driven motor generator installed on one of the upper decks for supplying current for lights, wireless, and steering gear in the event of the main electric generator engine room being out of action through flooding of that compartment or accident to the machinery. This precaution is in line with the traditions of the Cunard Company, who take great pride in the record of their ships for safety of passengers at sea. Such an installation should, in the judgment of the writer, be placed on every passenger ship, as it would go a long way toward eliminating many of the horrors incident to sea disaster at night and would certainly be a great aid in preserving the morale of the crew and passengers in time of danger.

Electric Deck Machinery

Another innovation for a large steam vessel is the use of electro-hydraulic winches for handling cargo and baggage, and capstans and windlass on the same system for warping ship, handling anchors, etc. This system abolishes steam and exhaust pipes for the deck machinery, saves much fuel, and makes all of this machinery immediately available, no time being lost in warming up steam pipes, etc. In the event of the main boilers being cold, the vessel may be warped and cargo worked with current derived from the emergency dynamo plant mentioned above, or if working cargo in port, the winches may be supplied with power from a cable from shore supply. The arrangement is very simple. There are no heavy reciprocating parts and conseqpently no noisy operation, and the cargo being stowed and the hatches battened down, that part of the deck becomes part of the promenade, a very desirable feature on passenger liners. The steering gear is Brown Brothers' electro-hydraulic.

The Scythia shows a reversion to an older type of ship in her slow speed propellers, moderate sea speed of ship, and one funnel arrangement of draft for boilers. This latter characteristic enables the designer of a passenger vessel to house comfortably in the same length of ship a very much larger number of passengers than is possible with multiple funnels. For this reason and on account of the high fuel economy to be expected from her well designed boiler and turbine plant, it is confidently expected by her operators that the Scythia will prove a very profitable type for the North Atlantic trade.

Four of these ships are being built and seven vessels of a similar type 520 feet in length, these smaller vessels carrying 12,000 tons of cargo and about 500 passengers.

A BLOWPIPE TEST

A very interesting paper was read before the spring meeting of the American Society of Mechanical Engineers, May 23-26, 1921, at Chicago, Illinois, reporting the results of an elaborate series of tests which were carried out in the Bureau of Standards, Washington, D. C. These tests were made for the purpose of analyzing the processes of cutting and welding by the oxy-acetylene blowpipe. The paper was read by R. S. Johnston, engineer physicist of the United States Bureau of Standards. The present article is an abstract of this paper.

THE Bureau of Standards invited the commercial manufacturers of oxy-acetylene blowpipes to submit their apparatus for the purpose of test. An elaborate equipment was prepared, consisting of—

A. Weighing system for determining the amount of gases used during tests by loss of tank weight.

B. Gage board system containing necessary pressure gages, regulators, and orifice flow meters.

C. Welding table.

D. Cutting table.

E. Flashback and safety testing apparatus.

The illustration accompanying this article shows diagrammatically the complete arrangement of this apparatus.

Extreme precautions were taken to insure accuracy of test, and it is claimed that the values obtained for gas consumption were equal to at least 0.005 pounds per hour. Practically absolute uniformity of pressure was maintained during the tests.

The welding table was carefully prepared with a firebrick top surmounted by a heavy casting which was channeled so as to permit of better heat radiation along the line of the weld, and the line of weld was directly in front of the operator and the welding performed from the back toward the operator.

The cutting table was arranged for mechanical operation so as to eliminate the personal equation, all tests being made by a mechanically controlled device under exactly the same conditions.

The summary of the conclusions drawn from these tests by the experts of the Bureau of Standards is given below. These conclusions are extremely interesting, as they indicate that there is ample room for research work in the improvement of oxy-acetylene blowpipes.

For the Cutting Blowpipes

A. That there is today no generally accepted theory for proportioning, for the cutting of metal of various thicknesses, the volume and velocity of the issuing cutting jet, with the result that none of the apparatus submitted to test proved economical for all thicknesses.

B. That there is for any thickness of metal cut a limiting velocity of exit of the cutting jet at which complete utilization of the oxygen takes place and a limiting value for the amount of oxygen required to produce a cut.

C. That an increase in acetylene consumption, of oxygen consumption, or of the velocity of exit of the cutting jet beyond the limiting values, does not produce increased efficiency in commensurate ratio.

D. That a large majority of the blowpipes tested were equipped with excessive preheating flames for the thickness of metal the tip is specified for, and that such excessive-sized flames are disadvantageous both from the standpoint of economy of operation and quality of work performed.

E. That considerable improvement in economy of operation seems possible in cutting material of two-inch thickness and that possibly this condition may be found to exist for metal of other thicknesses than those used in the tests.

F. That the maximum thickness of metal that may be economically cut with an oxy-acetylene blowpipe of standard design when neither the material nor the oxygen is preheated and the cutting is done only from one direction, is about twelve inches.

G. That cutting blowpipes due to their incorrect design are subject to the same "flashback" troubles found in the welding blowpipes.

For the Welding Blowpipes

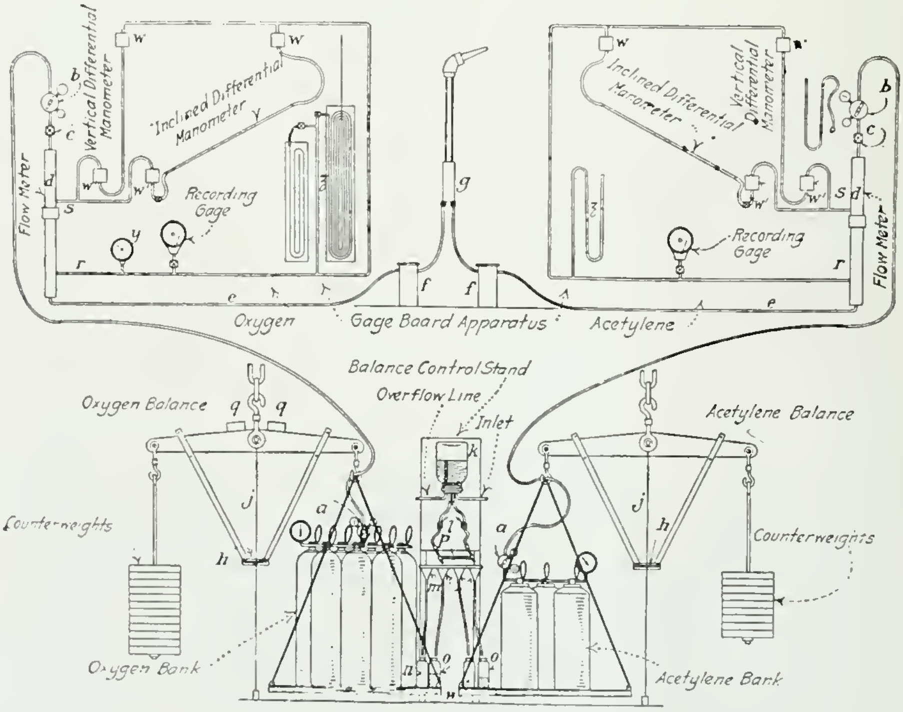
A. That the blowpipes most subject to the so-called phenomena of flashback are those in which the oxygen is delivered at a pressure in excess of that at which the acetylene is delivered.

B. That all the blowpipes tested, including those in which the acetylene is delivered at an excess pressure as well as the so-called equal or balanced-pressure blowpipes, are subject to flashback phenomena on account of the inherent defects in their design.

C. That the cause of the development of the conditions producing flashback is the setting up within the blowpipe tip and head of a back pressure which retards or chokes off the flow of one of the gases.

D. That this back pressure is the result of confining or restricting the volume flow of the issuing gases at the tip end.

E. That any cause tending to restrict the flow of the gases sets up a back pressure which immediately causes a change in the amount of each gas delivered to the mixing chamber.



Diagrammatic representation of apparatus used in blowpipe test

F. That a fluctuating gas-volume ratio, due to restriction of volume flow, from whatever cause, prevents a blowpipe from maintaining constantly and at all times during operation the desired "neutral flame."

G. That a blowpipe that cannot maintain under all operating conditions a neutral flame cannot logically be expected to produce sound welds.

H. That all the blowpipes tested during this investigation either through improper gas pressures or improper interior design, or both, are incapable of maintaining a neutral flame (constant-volume gas ratio) under all conditions of restricted gas flow and are therefore incapable of producing sound welds where there is any liability of the gaseous products of combustion being momentarily confined, such as occurs in practically all welding operations.

I. That the ability of a blowpipe to consume an equal volume ratio of gases when burning freely and undisturbed in air is no criterion that it is capable of producing sound welds, i. e., that it is not subject to detrimental fluctuations in gas ratio during a welding operation, and is therefore capable of maintaining a neutral flame under all operating conditions.

J. That whether a blowpipe of present designs will consume an equal volume ratio of gases when burning freely and undisturbed in air depends on how nearly correct the operator sets the so-called "neutral" flame, and experience indicates that the average operator checks the acetylene gas flow too much and actually develops an oxidizing rather than a neutral flame.

K. That the question of the possible limiting strength and ductility or the efficiency of welds made by the oxy-acetylene welding blowpipe must await the development of a more satisfactory instrument, and that having such an instrument there is no reason to believe that a weld of clean, sound metal cannot be made with assurance during any welding operation and that such welds will or can be made to possess the proper physical properties.

A SHIPBUILDING PLANT'S ACCIDENT RECORD

AN analysis of the number of accidents which occurred in 1920 in one shipbuilding plant located on the bay near San Francisco reveals some interesting information. This plant employed an average of 2670 men daily. It employs a safety engineer who devotes his whole time to accident prevention work, and is assisted by safety committees, composed of men employed in the various crafts about the plant. The closest co-operation obtains between the higher officials, the safety engineer and the employes.

During the year 1920, there were no fatal accidents in the plant. There were recorded fourteen cases of permanent disability, 116 compensable cases which resulted in more than seven days lost time and 78 cases with less than seven days lost time.

Objects falling from an elevation, such as bolts, nuts, liners, or tools from off a scaffolding, caused the greatest number of accidents, viz: 5 permanent, 24 compensable, and 13 non-compensable cases, a total of 42. The next highest number from any one cause is charged against the handling of material, viz: 3 permanent, 18 compensable, and 8 non-compensable, a total of 29. Hand tools caused the next largest number of accidents, viz: 2 permanent, 10 compensable, and 8 non-compensable, a total of 20. Falls of persons from elevations appear next in order, having caused 1 permanent, 13 compensable, and 5 non-compensable, a total of 19. And so down the line through some twenty classifications of causes, the three last ones being charged with one accident each.

A close study of this tabulation shows the need of the employe being educated to look out for his own and the other fellow's safety to a greater extent than he does today. The management of this plant has been preaching safety to its employes ever since the yard started and has installed safety guards on all of its machinery. The installation of these guards has substantially affected the accident record. Out of 208 accidents which resulted in a loss of time of one day or over, only 12 were caused by working machines and 4 by hoisting apparatus.

It may be seen that quite a lot may be accomplished in accident prevention work by safety committees and education of employes in safe practices. An educational propaganda composed of lectures, short talks and bulletins, and aided by continuous vigilance on part of foremen is bound to reflect a reduced number of accidents.

Safety, efficiency and production go hand in hand. The shipbuilding industry on the Pacific Coast has reached the point where the necessity for increased production must take into its reckoning time lost by reason of accidental injuries.

The employe who has his interests at heart must co-ordinate his efforts with those of the employer and he may best contribute toward the desirable end by exercising the greatest of care and religiously following the safety rules issued primarily for his benefit.

L. DEE MILLER
in California Safety News.

BOOK REVIEW

Eighth National Foreign Trade Convention Official Proceedings. Octavo; bound in buckram, with gold stamps; 600 pages, price $2.50.

The experience of American business men engaged in foreign trade in all parts of the world, the views of the leaders of American industry on the problems now confronting foreign trade, and the advice of technical experts on all phases of conducting foreign trade, are to be found in the Official Proceedings of the Eighth National Foreign Trade Convention.

This volume includes the prepared addresses and the stenographic report of informal discussion. Each delegate to the convention will receive one copy without charge. In order that delegates may obtain any additional copies desired, and that those who were not able to attend the convention, and others who are interested in promoting American foreign trade may obtain copies, a limited edition will be placed on sale.

The general theme of the Eighth National Foreign Trade Convention was, "American Foreign Trade and Its Present Problems." Five general sessions were held at which matters of general policy were considered. There were also eleven group sessions at which methods and means of meeting the immediate problems were discussed in detail.

This convention was the most practical yet held; delegates were in attendance from all over the world. From the report of this gathering can be obtained the most comprehensive and authoritative statement of the steps already taken, and of the measures and policy necessary to secure the fullest development of our foreign trade, and to enable American industry to take its proper place in the world markets.

LARGE OIL AND ORE VESSEL LAUNCHED

THE first of the combination ore and oil vessels building at Sparrow's Point plant, Sparrow's Point, Maryland, of the Bethlehem Shipbuilding Corporation, Ltd., was launched on July 12, 1921. Delivery is scheduled for about the middle of September. This vessel, the G. Harrison Smith, is being built for the International Petroleum Company and is one of four ships of this type under construction at Sparrow's Point, the other three being for the Ore Steamship Corporation.

The G. Harrison Smith is distinctive in that it is the largest vessel ever constructed at this plant, having a deadweight capacity of 20,000 tons and a length overall of 571 feet, 6 inches. It is designed for carrying a full cargo of either ore or oil in separate compartments. The ore cargo will be carried in a narrow elevated hold 30 feet wide and 360 feet long. It is divided by watertight bulkheads into three compartments, each of which is served by three large hatches extending the full width of the ore hold.

Launch of the G. Harrison Smith, 20,000-ton combination ore and oil carrier, at the Sparrow's Point plant of the Bethlehem Shipbuilding Corporation.

The oil space, alongside and below the ore space, is divided by a longitudinal bulkhead extending from the keel to the ore hold. The foremost and aftermost compartments are for fuel oil and the tanks between these are for cargo oil. There are no summer tanks.

The wing spaces, acting as expansion trunks, on account of their depth afford the greatest possible flexibility for carrying liquid cargoes of varying density and adjusting the trim under all conditions of load.

AN APPEAL TO EMPLOYES

By R. M. MacLEOD,
Safety Engineer, Los Angeles Shipbuilding and Drydock Company

"SAFETY FIRST" is not a catch word. It is a business proposition.

It is good business for the employer to cut down accidents, but it is better business for the employe. The only direct effect to the employer is the lowering of insurance costs, but the direct and indirect effects to the worker are incalculable.

The California Workmen's Compensation, Insurance and Safety Act provides for the payment by the employer to the employe of 65 per cent of his average earnings, with a maximum set at $20.83 per week, that is, no man no matter how much he receives in wages, can draw more than $20.83 per week in compensation, and the amount may be reduced 50 per cent if the accident is the result of wilful misconduct on the part of the injured employe. Under the act, no compensation is payable for the first seven days of disability. Therefore, a direct result to a man, earning 80 cents per hour, is loss of wages for the first seven days of disability, in addition to an actual monetary loss of $17.57 per week thereafter, to say nothing of the physical pain and suffering endured.

How many of you who read this can afford to lose one week's wages, and then have your wages for the balance of the time you are laid up cut one-third or more?

In case of permanent total disability, the most that can be paid is 65 per cent of the average weekly earnings for two hundred and forty weeks, and 40 per cent of such earnings for the balance of life. In the case of a man earning 80 cents per hour, this 40 per cent amounts to $14.59 per week, a rather small amount on which to support a family. The commission can legally allow a disability rating, only where the person injured is actually unable to earn a living on account of the injury.

The time which is lost by careless men, time directly and indirectly lost on account of accidents, time lost in treatment of minor injuries and redressings at the yard hospital, time lost talking over accidents, and compensation payments, necessarily must all react in some degree against the best interest of the working man.

A plant in which the accident rate is very high has the cost of its products increased so that it can not compete with other plants whose accident costs are low.

If a plant can not enter its bid for business on an equal basis with its competitor, then in the course of time operations are suspended and a number of men thrown out of work; the result is an economic loss to the community. A single great catastrophe or a series of small economic losses directly affect the cost of living—and you suffer for it.

So you can easily see where, if it is good business for the employer to cut down accidents, it is much better business for the employe. Think it over and you will come to the conclusion that "Safety First" pays dividends to you.

Most employers, and in particular those in this state, safeguard their machines, and remove, as much as is possible, every accident hazard. However, in any plant, no matter how many safeguards are applied or how much the accident hazard is reduced, accidents will happen. To only one thing can this be charged —carelessness.

With the assurance that this plant is endeavoring to do all possible toward accident prevention, we ask in your own behalf and that of your families, that you co-operate with us by way of exercising due care in performing your various daily tasks.

SERVICE BUREAU AMERICAN WOOD PRESERVERS' ASSOCIATION

THE Service Bureau has been established to promote the use of wood properly treated to resist decay, marine borers, and insect attack, thereby aiding in the conservation of the forest resources of the nation by making one stick of timber do the work of several.

The value of wood for construction purposes is fairly well understood but for permanent structures treatment with a standard preservative, such as creosote or zinc chloride, is absolutely necessary.

The policy of the Service Bureau is to give the public reliable information on the treatment of timber.

Doctoring a deck

DOZENS of time and labor saving applications have made the process of gas welding and cutting indispensable in ship yards.

Because of its uniformly high purity, exceptional portability and constant availability

Prest-O-Lite
DISSOLVED ACETYLENE

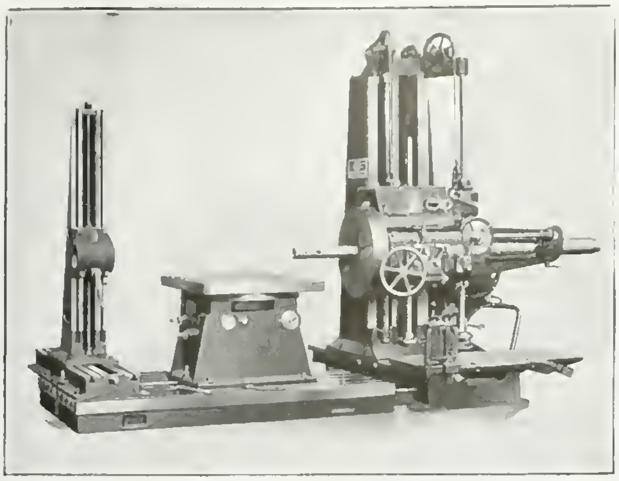
has proven the most satisfactory gas for welding and cutting in ship building and repairing.

Forty plants and warehouses insure immediate deliveries of Prest-O-Lite anywhere and in any desired quantity—a never failing service that has greatly enhanced the value of Prest-O-Lite in the hundreds of yards where it is regularly used.

THE PREST-O-LITE COMPANY, Inc.
General Offices: Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco
In Canada: Prest-O-Lite Company of Canada, Limited, Toronto

PW-506-21

BORING, DRILLING AND MILLING MACHINE


Front view of Pawling and Harnischfeger new type Horizontal Drilling and Boring Machine

OVER thirty years ago horizontal drilling and boring machines of the belt driven, double column type with rolling tables were designed by the Pawling and Harnischfeger Company, Milwaukee, and placed in local Corliss engine and steam pump plants, for which class of work these horizontal drills were particularly adapted.

Increased demand for this type of tool for varied work created a department separate from the crane department of this company, now solely engaged in the design, development and manufacture of horizontal drills for world-wide distribution.

The original double round-column type machines required overhead means of support and were belt driven, but later changed to variable speed countershaft, or variable speed motor drive.

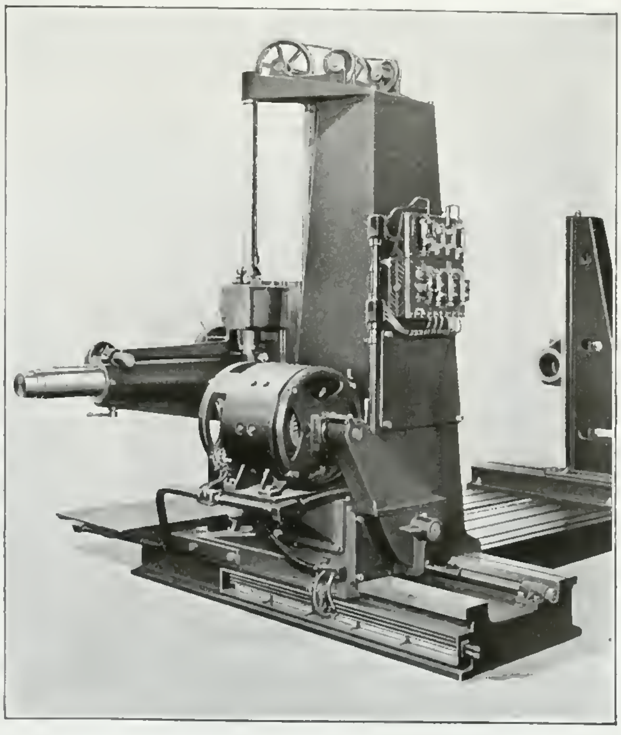
A box-section column, self-contained machine equipped with variable speed motor and rolling work table or permanent bed plate was later introduced, which proved more satisfactory owing to its greater range for variety work plants.

A new line of horizontal boring, drilling and milling machines has now been developed by the Pawling and Harnischfeger Company, of which the 4-F machine shown in the accompanying illustration is the smallest size. This machine is especially designed for very heavy milling and large boring operations and can be used either as a single purpose machine or for general machine shop work.

The machine is modern in design, is built to drive high speed tool steels to capacity limits. There are numerous noteworthy features, some of which are the narrow guiding surfaces; all feed screws in tension; all sliding parts with take-up for wear; saddle fully counterbalanced with counterweight located inside of the column; centralized control; all milling feeds actuated through quick pitch worm and bronze worm wheels, revolving on quick pitch screws in tension; externally and internally driven face plates are interchangeable; back gears close to spindle, making all drive shafts high speed; and automatic stops for saddle and column for machines electrically driven.

The runway for the column is of rigid construction, very wide, of deep box section and heavily ribbed. All guiding members for the column, saddle and runway are of the square lock type with steel taper gibs to compensate for wear.

The spindle is of high carbon hammered alloy steel forging, ground to a sliding fit in its driving sleeve. The power is applied at the front end and the feed at the rear end through a rack and pinion. This construction provides the spindle with large bearings, front and rear equally spaced at any point of its travel. The spindle is moved through its changes of feed by spur gears and positive clutches, actuated through a frictional worm wheel. The front end is bored for Morse taper and contains the necessary slots for driving milling cutters and boring bars. The drive is delivered to the spindle through a small face plate with a wide face coarse pitch gear or a larger face plate with internal gear of similar pitch and face. These face plates have slots and tapped holes for the attachment of milling cutters and facing heads.


Rear view of Pawling & Harnischfeger new type Horizontal Drilling and Boring Machine

The spindle-driving sleeve is of semi-steel and is ground to a taper fit in its bushing to compensate for wear. It contains adjustable bronze taper shoes for taking up wear due to the sliding of the spindle in the sleeve.

The drive may be either constant speed motor, variable speed motor, or by belt. The motor is mounted at base of column, 10 horsepower capacity and with direct current a 2 to 1 variation can be used. The machine is double back geared and by three levers, eighteen spindle speeds, reversible, are obtained. These spindle speeds are in geometrical progression and range from 5½ to 200 revolutions per minute. The gears are of special alloy steel, coarse pitch and wide face.

The boring and drilling feeds to spindle are eight in number, reversible and range from .0076 inch to .45 inch per revolution of spindle. The milling feeds to column and saddle are eight in number, reversible, and range from .009 inch to .45 inch per revolution of spindle. These feeds are driven direct from the spindle, back geared and in geometrical progression with no idle gears in mesh. The feed gears and shafts are of alloy steel. Rapid power traverse independent of speeds is transmitted to the saddle and column at a constant speed of 60 inches a minute.

The work bed is provided with planed T-slots running parallel to spindle travel. Three sides have a planed squaring strip for aligning work. This work bed can be made to any desired size.

The outer support, unless otherwise specified, is made with 48-inch vertical and 48-inch horizontal traverse and is adapted for supporting boring bars. Graduated steel scales for the main column and saddle, also the outer support saddle and column, are furnished, reading to 1-1000 inch by use of the Verniers.

Screw chasing attachment can be furnished to cut threads, varying from 2 to 16 threads per inch and to any length within the capacity of the machine.

Universal tilting and revolving table or a plain revolving table, with movement by hand or power, can also be furnished.

Ready for Operation in June 1921

The New Plant of The Lord Dry Dock Corporation

will offer

A Dry Dock and Ship Repair Service

SECOND TO NONE

IN THE PORT OF NEW YORK

New Plant of The Lord Dry Dock Corporation opposite 79th Street.

A MODERN ship repair plant which will embody all the advantages of existing shipyards, together with improvements and innovations in design and equipment introduced in accordance with the recommendations of our marine experts—men of wide experience in the field of ship repair work.

DRY DOCKS of from 1,000 to 10,000 tons lifting capacity; one of the largest and most completely equipped machine shops in the Port of New York; 100-ton Stiff Leg Derrick—most powerful stationary derrick in the Port—direct freight connections without lighterage; carefully planned layout which will insure uninterrupted, rapid, and economical handling of work.

LORD DRY DOCK CORPORATION

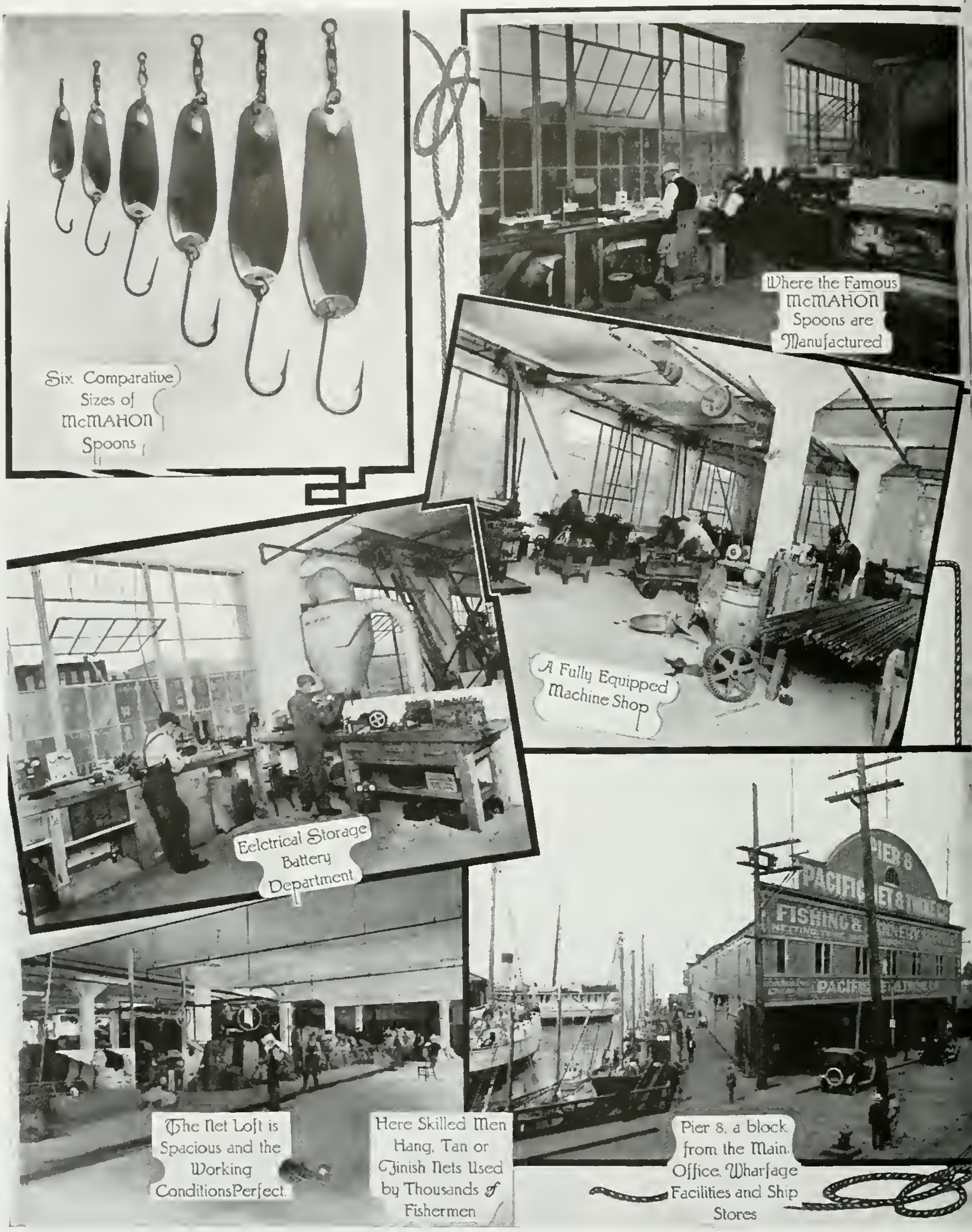
NEW YORK PROVIDENCE

LARGEST MARINE SUPPLY FIRM IN NORTHWEST

THE Pacific Net & Twine Company, Seattle, was first organized in 1897 by Mr. Edward Cunningham, who is still engaged in the active management of the business. Originally intended to handle fishing and fish cannery supplies, the firm has grown and expanded until at the present time its offices and showrooms occupy a new Class A steel and concrete six-story building with 120-foot frontage and 135-foot depth.

A new catalog just issued, which is the subject of an illustration and review in our columns for trade literature in this issue, assumes something of the proportions of an encyclopedia, contianing listings of equipment covering a range wide enough so that the Pacific Net & Twine Company is able to supply the largest of seagoing vessels with deck and engine room stores and equipment of many kinds.

The new building is located on Western Avenue running through to Railroad and but a short distance from the Seattle waterfront. The first floor of this building is occupied by showrooms, giving a display space of about 16,000 square feet. The rear portion of this floor is devoted to shipping facilities, being on a level with the floors of railway cars which are sidetracked directly to the edge of the building on Railroad Avenue. The company's trucks can back into the building on a runway so arranged that the floor of the truck is on a level with the loading floor.


Six Comparative Sizes of McMAHON Spoons

Where the Famous McMAHON Spoons are Manufactured

A Fully Equipped Machine Shop

Eelctrical Storage Battery Department

The Net Loft is Spacious and the Working ConditionsPerfect.

Here Skilled Men Hang, Tan or Finish Nets Used by Thousands of Fishermen

Pier 8, a block from the Main Office. Wharfage Facilities and Ship Stores

Views in and around the plant of the Pacific Net and Twine Company

The Pacific Net & Twine Company are distributors in the Northwest for the following firms and products: Dow Pump & Diesel Engine Company, Alameda, California, manufacturing the Dow full Diesel type marine oil engines; the Plmouth Cordage Company, North Plymouth, Massachusetts; Heath & Company, Ltd., London, England; Stamford Foundry Company, Stamford, Connecticut; A. B. Sands & Sons Company, New York City; Norwalk Lock Company, South Norwalk, Connecticut; Western Block Company, Rockport, New York; National Marine Lamp Company, Forrestville, Connecticut; A. S. Shrader & Sons Company, Brooklyn, New York, diving apparatus; Carlisle & Finch Company, searchlight projectors, Cincinnati, Ohio; D. T. Williams Valve Company, Cincinnati, Ohio; Frisbie Motor Company, Middletown, Connecticut, manufacturer of Frisbie medium and heav duty motors; the Standar Gas Engine Company, Oak land, California, manufactu ers of "Frisco Standard," en gines; Van Blerck Moto Company, Monroe, Michiga manufacturers of Van Blerc high-speed engines; an many others.

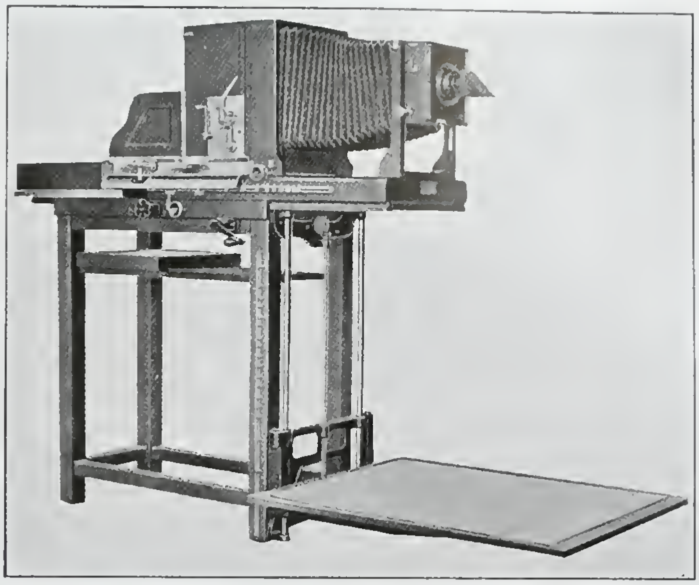
THE PHOTOSTAT

By Willard A. Brorsen

THIS is a brief story of the photostat, the remarkable photographic copying machine that has proven one of the most important and valuable labor-saving inventions of recent years. It performs its function with marvelous speed, absolute accuracy and with minimum cost.

The invention was perfected in 1910 and a contract entered into with the Eastman Kodak Company for the manufacture of the machine and its supplies of sensitized paper and chemicals. The photostat was successful from the start and today it has so broad an application that it reaches into a wide field of human activity. The photostat is now found in every civilized country. Governmental departments, railroads, industrial corporations, banks, libraries, institutions of science, art and education, lawyers, craftsmen, engineers and many others are using the photostat, to produce quickly, accurate, inexpensive copies of records, maps, drawings, blue prints, account sheets and documents of every kind, as well as pictures of machine parts, fabrics and various small objects. The application of photography to commercial and scientific uses was not new, but up to the advent of the photostat, the methods employed had always been cumbersome and expensive and not suitable for general use.

The photostat is loaded with a roll of special sensitized paper. The subject is photographed directly upon this paper, no intermediate glass or film negative being used and as the photographic copies are made they are cut from the roll, developed and fixed within the machine itself. When washed and dried the copies are ready for use. The operation is extremely simple and takes but a few minutes. There is no possibility of error as the photostat never makes a mistake and knows all languages. The copies are perfect, clean, legible, convenient in form and will never fade. Copies can be made the same size, enlarged or reduced. No tracings, cuts or stencils are needed when the photostat is used, simply the original, whatever it may be.



Photostat arranged for copying drawings

The life insurance companies were among the first to adopt this method of copying. Every policy, when issued, must be accompanied with a copy of the original application. Thousands of copies are required daily and the photostat does the work better and cheaper than by any other method. Today there is hardly a life insurance company in the United States that is not equipped with one or more photostats.

Then came the bonding and surety companies, some of the large industrial corporations, banks, public service companies, etc., with a range of copy work without limit, including letters, legal documents, sales sheets, advertisements, tabulations, etc., too numerous to mention.

In December, 1911, President Taft's commission on economy and efficiency made an investigation as to the use of the photostat by several departments of the government. The president was so favorably impressed with the report that he turned it over to the Senate and House of Representatives. On February 5, 1912, the report was ordered printed with illustrations. It is now known as the Senate document number 293. "It may be safely said" (reads the report) "that there are few bureaus or divisions of any department or other establishments of the government in which a machine of this kind cannot be profitably employed."

Today not only every department of the United States has one or more photostats, but many of the departments of the British, French and Japanese governments use the machine daily, turning out an enormous amount of copy, so varied and essential, that it would require the services of a small army of copyists to do the work by any other method.

In the offices and drafting rooms of manufacturing industries, in designing, advertising, sales, accounting, and executive departments of progressive, up-to-date concerns of all kinds, you will find the photostat hard at work. Railroads require countless copies of legal papers, tabulations, train sheets and contracts. Faraway mines use the photostat every day in duplicating drawings of new drifts, cuts and shafts, or reports to home offices. In the counting rooms of banks or the fiduciary departments of trust companies, the machine is constantly busy. Libraries serve the public by copying at a trivial cost, pictures, pages of type matter, drawings, etc., or complete their files or collections by the interchange of copies of rare documents. There is no end of work for the photostat, and no limit to its capacity for satisfactory performance of its work.

The photostat is an important part of the equipment used in the duplicating bureau of the Southern Pacific Railroad. The Bethlehem Shipbuilding Corporation have found the photostat to be of invaluable assistance to them by making it possible to reproduce from blueprints without making additional tracings. The photostat is used daily by the University of California and there are a great many others on the Pacific Coast who are cutting overhead and saving time by using the photostat.

The service extended to all photostat owners is complete in every respect. From the offices of the Photostat Corporation located in many of the important cities, representatives are looking after the interests of every photostat user, both far and near. Experts inspect the machines, instruct the operators and pass along valuable information and suggestions for new uses in each particular business. These offices are prepared to do photostat copy work at reasonable prices for anyone who may not have a machine of his own.

MOTORBOAT BEARINGS

REVERSE gear and shaft thrust bearings for marine replacements can be had without delay from the Bantam Ball Bearing Company, or their agents or branches. From New York to San Francisco branches of this company can give service on marine bearing equipment. Years of manufacturing bearings for reverse gear and other marine equipment concerns gives the Bantam Ball Bearing Company a very comprehensive knowledge of marine requirements, and this replacement service is a most important feature to boat owners forced to make quick or emergency repairs in mid-season.

Naco Anchor Chain Cable—National Malleable Castings Company, Cleveland, Ohio.

A profusely illustrated, attractive, 20-page booklet bound in pressboard with three-color cover and duotone illustrations on its exterior pages.

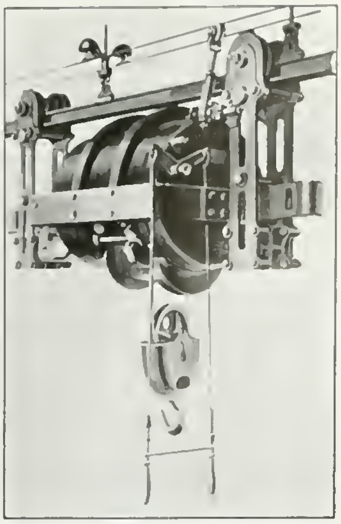
This catalog describes in a general way the specifications and advantages of cast steel anchor chain as manufactured by the National Malleable Castings Company. Included in the text are a number of very strong endorsements by shipmasters, giving their experiences in times of stress and strain with the reliability of cast steel chains.

CUTTING COSTS IN HANDLING CARGO

ONE of the very necessary steps which must be taken by the operators of America's merchant marine in reducing the costs of freight carriage is the thorough analysis of methods of handling cargoes at marine terminals, with the object of installing the best available machinery for economic movement of freight from ship to wharf and wharf to ship.

Among others the engineering force of the Cleveland Crane and Engineering Company have been very actively investigating this problem, and they have recently produced a new development in the mono-rail system of overhead hoists, which makes that system much more applicable to the ordinary problems of a marine terminal. This development has been called the Cleveland electric tramrail.

As the name would indicate, the main feature is the rail itself and the installation thereof. The rail is suspended by means of hanger rods, brackets and rail clamps. The rail may be bent cold very readily to any curve above a four-foot radius. A special bending device has been perfected for this purpose, and all of the fittings have been so standardized with ordinary structural work in view that it is claimed that any mechanic can lay out, order and install a system of tramrail as easily as he would a system of pipe line.


Cleveland electric tramrail hoist

A special type of switch has been developed with an automatic lock and an automatic safety stop, together with a trolley wire insulator, which makes it impossible for an electrically driven carrier to run at full speed against a safety stop or the open switch, thus making the safety stop entirely foolproof. This switch, while foolproof, is mechanically very efficient, practically noiseless, both the stationary and movable rail being held in firm contact.

The Cleveland tramrail motor-driven hoists are figured to take their capacity up a grade of 12½ per cent in order to make possible the working of the system for varying levels. Where this percentage of grade will not practically insure sufficient difference in level for any given installation, freight elevators are installed with the tramrail. A central control system has been worked out so that several carriers can be operated by one man from an advantageous point. With this arrangement the operator can switch the carrier to any track or location desired.

Some 1200 types and combinations of types of carrier have been worked out as standard equipment for this system, so that practically any material or diversity of local situation as regards type of construction, shape of rooms, or power supply can be handled to advantage.

Electric tramrail hoist and operator's platform

The working parts, which are few in number, are fully enclosed, and the bearings are either on ball races or of the graphite insert bronze bushing type with ample provision for self-lubrication. While fully enclosed, all of the working parts are readily accessible.

In practically every instance where installed these systems have effected large savings in operation. This system should have a very wide application for handling goods in pier warehouses and in transfer sheds.

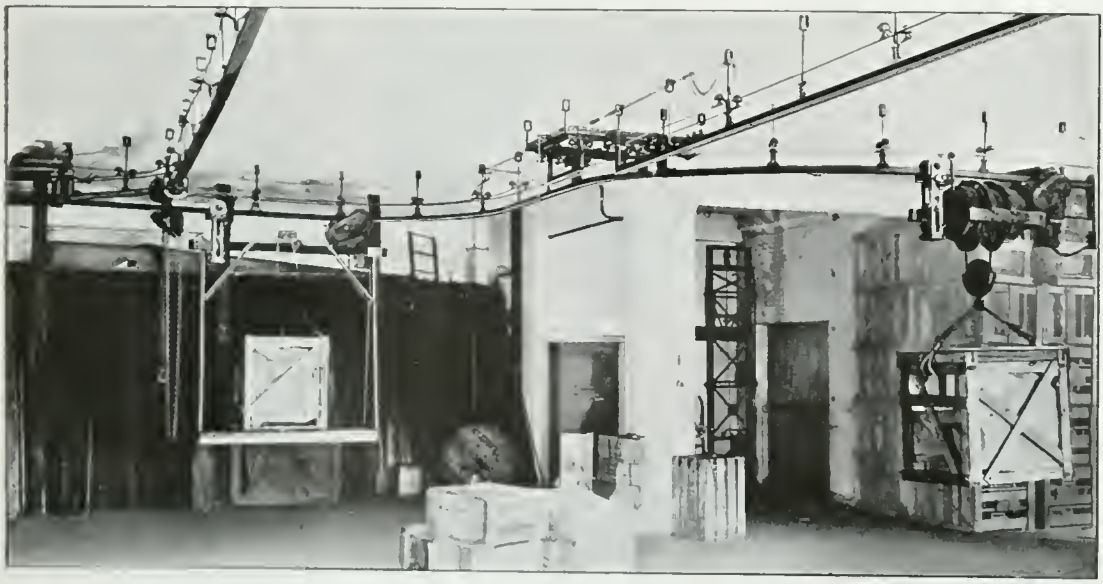
A very instructive, illustrated booklet on tramrails as an economical method of handling and conveying materials has just been published by the Cleveland electric tramrail division of the Cleveland Crane and Engineering Company, Wickliffe, Ohio. Any reader of Pacific Marine Review who is interested can obtain this book free of charge.

UNIQUE SMALL EVAPORATOR SET

THIS set consists of an evaporator containing coils of brass tubing to which steam is supplied. The vapor from this evaporator passes to a distiller and is condensed in the coils of this unit by circulating water which flows through the shell. If the distilled water is to be used as drinking water it then passes through an aerating filter, but if it is to be used in a laboratory or in a manufacturing process, the filter is omitted.

The set is very compact and is mounted complete on an angle iron frame with the piping ready for the steam and water connections to be made to it, and the dimensions of the complete set are only 7 feet high by 2 feet 4 inches wide.

It has a capacity of from fifteen to thirty gallons of distilled water per hour, depending upon the steam pressure available and is manufactured by the Griscom-Russell Company, 90 West street, New York. The evaporator and distiller units are of the well-known Reilly coil construction.


View in a warehouse equipped with Cleveland tramrail system showing various combinations.

"NACO" ANCHOR CHAIN CABLE

Is the Only Chain Made with Link and Stud One Solid Piece

It is greater in strength, more uniform in size and shape, and easier of operation than any other type of anchor chain cable.

The studs in "Naco" links being cast of the same metal and integral with the link (not inserted afterward), can never be lost or even loosened. This is the greatest safeguard against kinking, and an assurance of smooth operation in service.

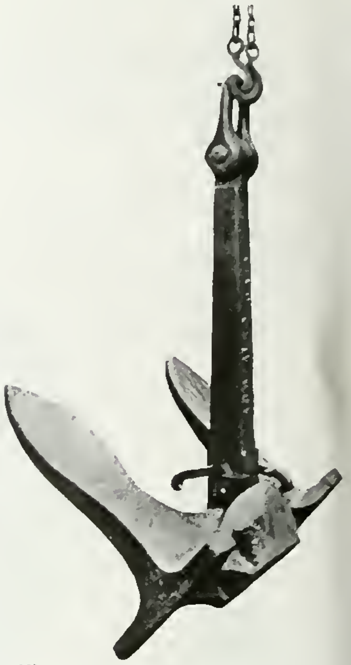
THE NATIONAL MALLEABLE CASTINGS CO.
CLEVELAND, OHIO

JONES "LOCK-GRIP" FOR STOCKLESS ANCHORS

THE stockless anchor has many undoubted advantages over the old style or stock type anchor, but to secure these advantages it sacrificed one very valuable feature possessed by the old fashioned type. In the latter the weight of the shank, stock and chain helps to hold the point of the fluke in contact with the ground. In the stockless type, on the contrary, since it is necessary to pivot the shank to the flukes, the weight of the shank and chain does not help to hold the point of the flukes in contact with the ground. As a result the stockless anchor does not take hold as quickly as the old style anchor. The purpose of the device described herein is to restore to the stockless anchor what might be termed the "hook" action possessed by the older type.

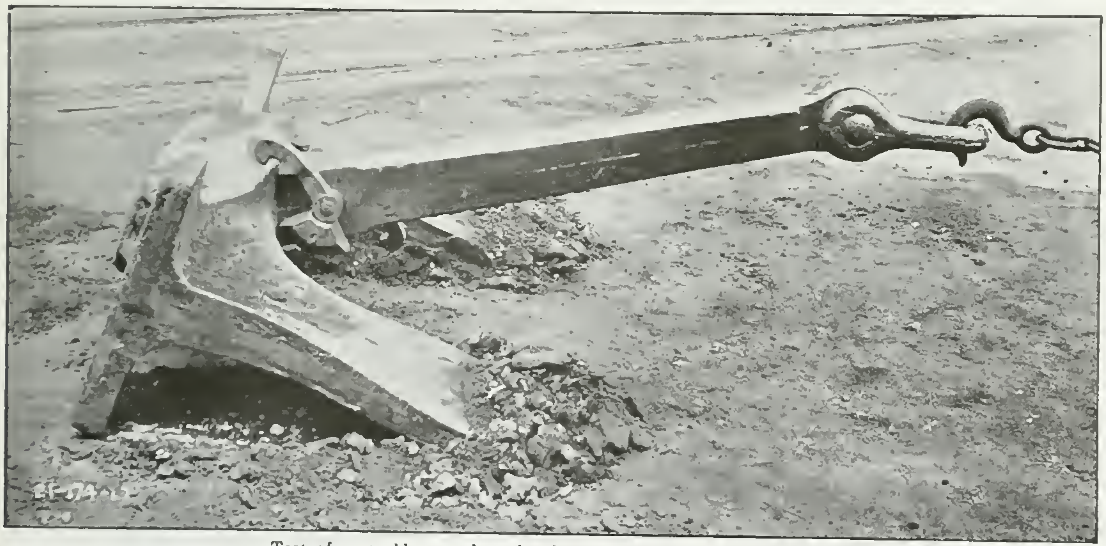
To accomplish this, the idea was conceived of a device which would automatically lock the shank of the stockless anchor to the flukes when the anchor was in holding position and automatically release the flukes when the shank was in a vertical position. Patents have been obtained on three different schemes for doing this and the claims allowed are very broad, covering "means for locking the head and shank of a stockless anchor in a given relative position for creating a gripping leverage, causing a quick gripping action of the anchor." One method, and perhaps the simplest, is shown in the accompanying photographs. The latter is covered by United States Patent No. 1,373,740. Patents Nos. 1,373,741 and 1,373,742 cover other methods for accomplishing the same end. Applications for patents are now pending in Great Britain and other foreign countries.

The accompanying photographs show a 3000-pound stockless anchor equipped with a locking device as described. In a comparatie test with a 4000-pound stockless anchor without this device, the anchor with the locking device began to bury itself before it had been dragged more than two or three feet, whereas the anchor without the device was dragged thirty-five or forty feet on this rather hard ground without showing any signs of digging in. This test seems to show conclusively that a stockless anchor equipped with this device will take hold quicker than the present stockless anchor.



View of stockless anchor in the ertical position, "Lock-Grip" swung free.

The device will not interfere with the freedom of rotation of the flukes in any position where it is desired that they should rotate. When the shank is raised to the vertical position, the head of the pawl is carried out of the depression on the anchor and the counterweight prevents it from dropping back into the depression until the anchor is again in holding position and the shank lowered to the horizontal. The flukes are therefore free to fall as at present, either way that the direction of the pull demands. When the anchor is brought up to the ship, the locking device is automatically disengaged and the flukes are free to rotate as at present. The device is designed so that the pawls will not interfere with the stowing of the anchor in the hawse-pipe.



Test of a stockless anchor showing Jones "Lock-Grip" at work

The American Bureau of Shipping and Lloyd's Register of Shipping have both approved the device. It has been shown to many shipbuilders and ship captains and is generally conceded to be a desirable and logical development in the stockless anchor. This device was originated by A. Trevor Jones, American Steel Foundries.

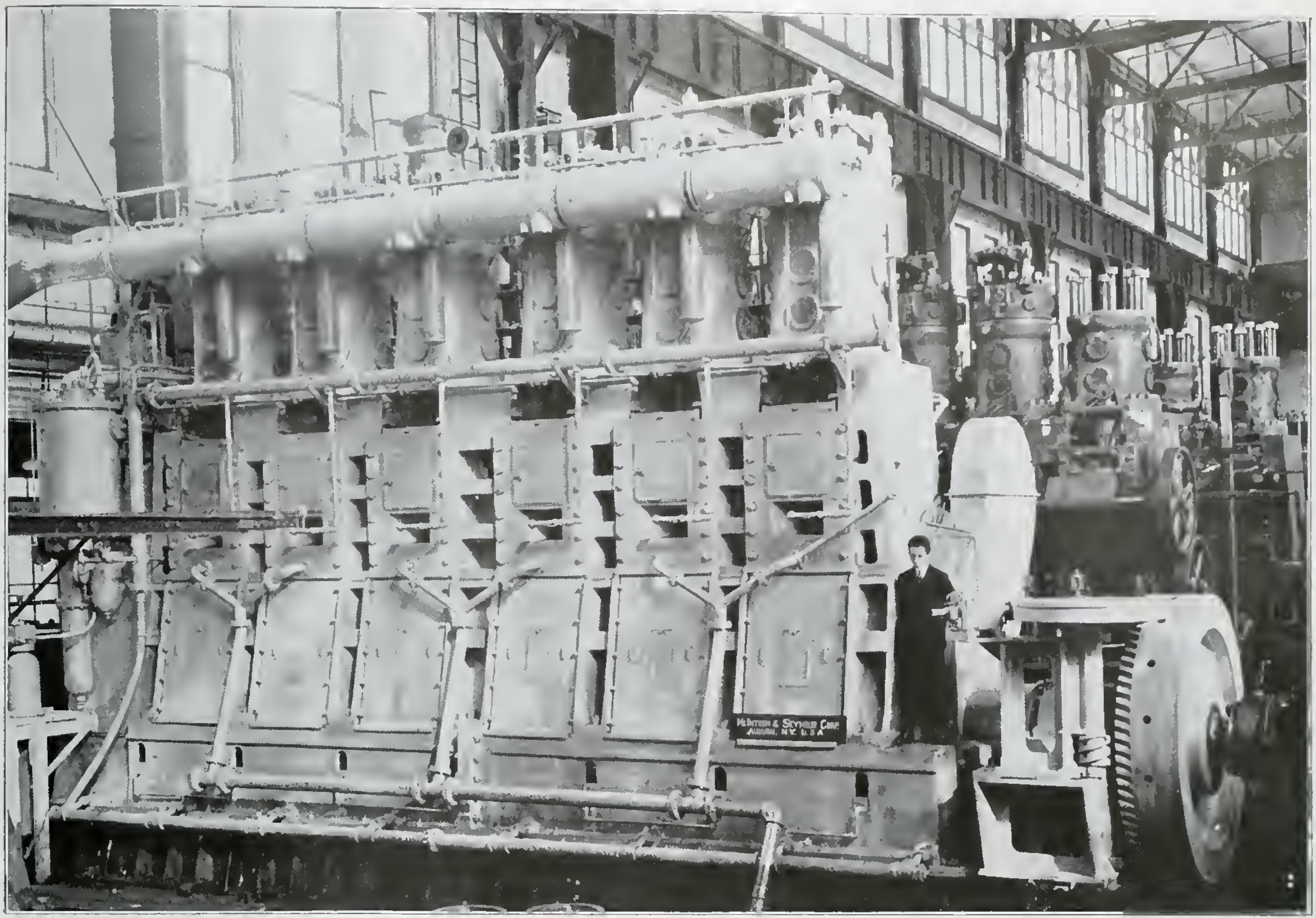
GOLF AT SEA

GOLF at sea is a reality of the sport world. Machines which enable the devotee of the ancient game to practice or engage in competitions while en voyage are being installed on Shipping Board vessels operated by American companies in trans-Pacific passenger service.

Among the first ships to offer facilities to the golf addict are the Silver State, the Keystone State and other big passenger vessels flying the flag of the Admiral Line on the new American trans-Pacific highway between Seattle and the Orient. One of the devices, which was recently patented, will be installed on the Silver State upon completion of that vessel's current voyage, during which a new ten-day record between Puget Sound and Japan was established. The Admiral Line also is planning to equip the coastwise vessels in the California service with the golf machines, the first being the President.

The machine operates with a captive ball, and in addition to affording amusement to the golfer, veteran or novice, is said to be valuable in correcting such faults as lifting the head too quickly after a stroke. The cable connecting the ball with a standard pivoted to the steamship deck operates a dial meter which accurately measures the distance the driven ball would have covered on a golf course. Slicing or topping shows at once in the actions of the ball as it whirls horizontally around the dial standard. A slice causes it to rise and dip erratically, while topping prevents the cable rising to the plane it assumes invariably when the ball is fairly struck.

Each ship is provided with balls and clubs for golfers who are not carrying their own equipment, and score cards have been developed which render it possible to approximate the features of games on regular greens.



The above picture shows one of our 1200 I. H. P. Directly Reversible Marine Engines on the test floor. A pair of these engines have been installed on the M/S "KENNECOTT."

Other sizes available for Marine work, 390, 640, 1550, 2000 and 3000 I. H. P. all four cycle and directly reversible.

DIESEL TYPE MARINE ENGINES

HEAVY DUTY

McINTOSH & SEYMOUR CORPORATION

AUBURN, NEW YORK

149 BROADWAY
NEW YORK

412 BISBEE BLDG.
JACKSONVILLE, FLA.

815 SHELDON BLDG.
SAN FRANCISCO, CAL.

NEW WESTERN ELECTRIC WAREHOUSE IN NEW YORK

THE new building of the Western Electric Company at 395 Hudson street, New York City, is not only the largest concrete edifice ever erected upon Manhattan Island, but also has been conceded to be the most up-to-date warehouse, shop, office combination in the country. It is an eleven-story building with a narrow five-story wing on Greenwich street.

The big edifice occupies the entire square block bounded by Hudson, West Houston, Greenwich and Clarkson streets, an area of 338 feet by 200 feet with a total floor space of 706,000 square feet, and will house the New York shops and the great supply divisions of the Eastern District territory, which includes New York, New Jersey, Pennsylvania, and the New England States, and the International Western Electric Company.

An entirely new system of under-floor distribution for the signaling, telephone power and lighting systems for the offices has been evolved by the company's engineers. It consists of a grid work of 4-inch fiber conduit split lengthways and reaching to every corner of the floor. It is possible to reach the lines of energy from any part of the ninth floor by simply cutting a small hole in the floor covering and providing a pipe conduit extension from and through the wall of the nearest part of the underfloor system. The cost of cutting and patching the floors is reduced to a minimum.

The warehouse sections of the building, which occupy its six lower stories, include the biggest installation of stock storing racks ever made in this country. Walter Drury, New York sales manager of the concern, takes pride in pointing out that among other things it is possible to store twenty-five carloads of conduit, a few odd score cars of household devices, and mile upon mile of wire and cable in his industrial reservoir without beginning to crowd any of the floor space to get in the other necessities of the electrical profession.

One interesting feature is the great conveyor system. Starting downward from the eighth floor and with outlets on the sixth, fifth, second and first stories is a great roller carrying device that enables the stock keepers in the standard package and other departments to route their wares directly to the wagons on the shipping floor without any outside interference.

The chute is controlled by an electric button arrangement that works automatic deflectors and permits the men at the top of the shaft to shut off a descending cargo at any desired outlet. The rollers of the conveyor are of the one-speed ball-bearing type. They keep a 400-pound case of telephone hardware from making any faster headway than a one-pound carton of electric lamps. The conveyor is a double track affair from the second floor to shipping departments. It carries the outgoing material for ordinary supply customers to shipping bays at the northeast corner of the Clarkson side of the building and that for the telephone companies to another shipping center at the northwest corner.

The first floor has every practical convenience for freight handling. There are three powerful monorail cranes which can each lift loads of at least six tons from delivering trucks and carry them forty feet into the warehouse. A special overhead conduit conveyor enables the storekeeper to stack the long pipes on their ends against the wall of the building.

At one time fourteen trucks can be loaded at the shipping platform while the receiving department is handling twelve others. If necessary ten automobile trucks could be driven into the garage which the New York Telephone Company has leased in the west wing of the building and loaded directly from the warehouse floor.

In planning the electrical system of 395 Hudson street the Western Electric engineers developed a new type of two-speed medium speed motor which has passed the most severe tests. The rotors of the new motors have an exceptionally small diameter and consume the minimum of energy, both in starting the cars and in operating them.

It was formerly considered an impossibility to get passenger cars to accelerate smoothly with the old type of AC motors. The new motors, unlike those commonly used, are almost noiseless at all speeds and during speed change. Their controllers are oil immersed, a departure which adds to the noiseless feature.

The engineers estimate that there will be used in the new building 189,700 kilowatt hours of energy a year for lighting, 229,200 kilowatt hours for its elevators and 789,300 kilowatt hours for its other activities. The primary voltage at the present time is 7800 volts. It is expected that it will be raised to 13,200 volts at an early date.

The power load of the new building will include 117 Western Electric motors in the shops averaging one horsepower capacity and ten averaging twenty-three horse power. There are two twenty-horsepower pump motors and two 100-horsepower fire pump motors.

It is interesting to note that the property for the new building was purchased from the Corporation of Trinity Church, who received it from Queen Anne in 1705 and have held it continoously since that date.

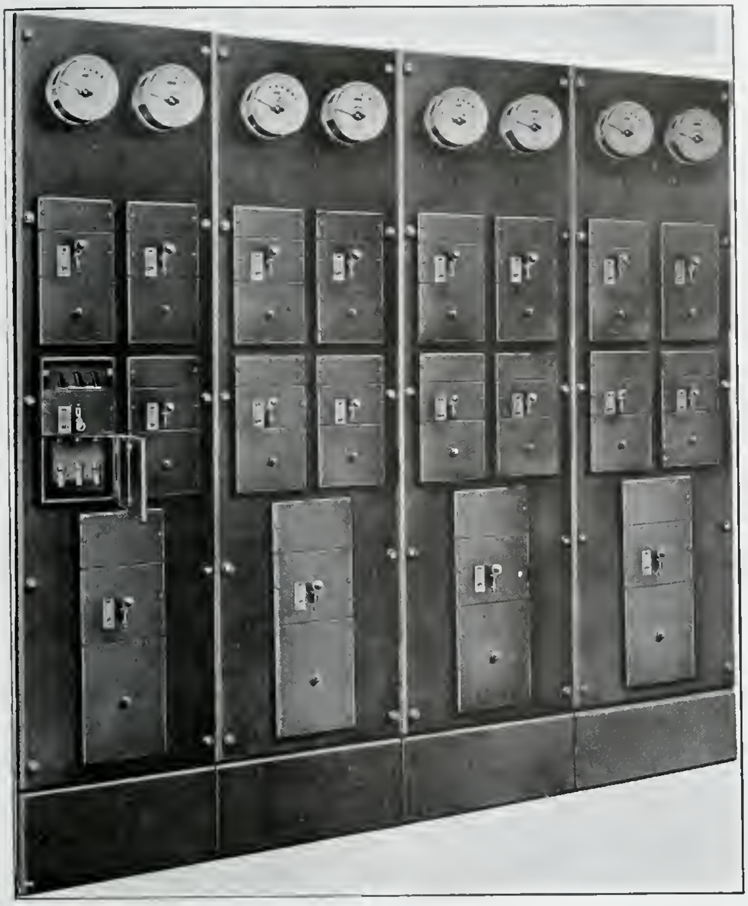
NEW TYPE LOW PRESSURE EXPANSION JOINT

A NEW expansion joint has been placed on the market and it has some very remarkable features regarding compressibility and uniform thickness of copper. This joint is known as the G-R Expansion Joint Type "C," and is manufactured by the Griscom Russell Company, 90 West street, New York. The flanges are of cast iron and expansion metal of copper. All sizes of this joint have a single corrugation. The most remarkable thing about this expansion joint is the depth of the corrugation which is used, and the fact that the sides of the corrugation are actually parallel for at least one inch of their length. These joints are manufactured on a special patented machine and this exclusive patented method of rolling insures a uniform thickness of copper after completion of the joint.

In the manufacture of expansion joints in general, the copper thickness has always been reduced materially by the rolling process and this has caused weak spots in the finished joint and has also decreased flexibility of the joint because thicker copper sheet had to be used in order to insure that dangerously "thinned spots" would not develop. This new patented process which maintains practically unchanged the original copper thickness, permits the use of thinner sheet than has previously been used, increases flexibility of the joints and eliminates dangerously thinned spots. This is a great step forward in expansion joint design, and is the result of months of experimentation and development by the manufacturers. The product is, therefore, a real engineering product. The manufacturers state that these joints are guaranteed to compress one-quarter inch axially when subjected to a compressive force of 125 pounds per inch nominal diameter, and to be capable of distortion laterally one-eighth inch with a force of 125 pounds per inch nominal diameter.

These joints are of the low pressure type and are designed particularly for use on steam lines between the turbine and the condenser. The construction and general specifications are fully described in a form sheet No. 176 published by the manufacturers.

Safety-First Marine Switchboard



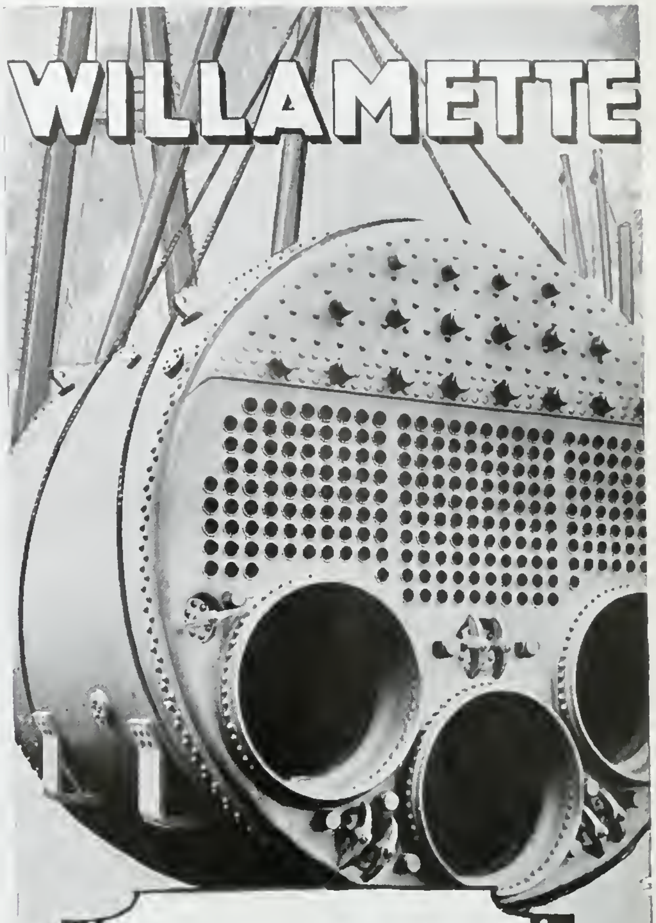
New Westinghouse electric safety switchboard panels especially adapted for marine use

A MARINE switchboard which is absolutely safe to operate and offers no danger whatever to the passerby, is one of the latest products of the Krantz Department of the Westinghouse Electric and Manufacturing Company. This board has no exposed contacts whatever. One could fall against it without the slightest danger, and in fact even were the attempt deliberately made to reach live parts, it would not be successful unless part of the board were actually dismantled. This 100 per cent safety is desirable in any kind of service, but especially so on shipboard where spaces are narrow, and the motion of the vessel often causes the loss of balance.

The construction of this board is a radical departure from the standard type. It consists of panels of heavy sheet steel which are finished to resemble slate and are mounted on angle iron supports with cross beams to insure rigidity. Openings of the proper sizes are provided in the panels and into these the switches are accurately fitted.

Each switch is contained within a separate compartment and is fully enclosed on all sides. It is operated by means of an insulated handle which projects through the cover. Below the handle is a door which gives access to the fuses and permits their renewal, but this door cannot be opened unless the switch is in the off position and all reachable parts are dead. Nor can the switch be closed when the door is opened.

These boards are supplied in any desired combination of panels, switches, meters, circuit breakers, rheostats, and other instruments, and Westinghouse Electric and amperes for 250-volt direct current, and 1000 amperes for 600-volt alternating current. They are, therefore, suitable for use for controlling both lighting and power circuits.



REINFORCED by wide experience covering many important marine operations, the Willamette plant is well prepared to undertake and complete your work with satisfaction, economy and dispatch.

MARINE MACHINERY
MARINE AND STATIONARY BOILERS
DECK MACHINERY AND AUXILIARIES
MARINE REPAIRS OF ANY CHARACTER

Willamette
IRON & STEEL WORKS
Portland, Oregon, U. S. A.

1043 Monadnock Bldg.,
San Francisco, Cal.
1920 L. C. Smith Bldg.,
Seattle, Wash.
Canadian Office
916 Rogers Bldg.,
Vancouver, B. C.

PANAMA AND THE BRITISH

Under the title of "British Shipping and the Panama Canal," the Panama Canal Record publishes the third of a series of articles on trade under different national flags. Says the Record:

In the statistics of the Panama Canal, British shipping takes second place immediately after that of the United States. By British is meant Imperial, since Australia, New Zealand and Canada all contribute materially to the tonnage under the British flag. In the fiscal year 1921 approximately one-third of the whole traffic was British, figured either by the number of vessels, net tons Panama Canal measurement, or tons of cargo. To be accurate, 33 per cent of all vessels passing through the canal was British, 34 per cent of the total net tonnage was British, and 32 per cent of all the cargo handled was carried in British bottoms. Approximately the same percentages apply for 1918, 1919 and 1920. During the first three years of canal traffic, i. e., 1915, 1916 and 1917, British shipping represented from 41 to 45 per cent of the total. The relative decline is explained by the rapid development of American shipping during and after the war in Europe. The following table shows the number of British vessels passing through the canal in either direction during the fiscal year since the opening of navigation and the relative importance of British shipping in the total traffic:

British Shipping by Fiscal Years 1915 to 1921

Year	Atlantic to Pacific	Pacific to Atlantic	Total British	Total all flags	Pctge. British
1915	226	239	465	1,088	42
1916	193	165	358	787	45
1917	371	409	780	1,876	41
1918	303	396	699	2,130	33
1919	306	296	602	2,025	30
1920	393	360	753	2,478	30
1921	500	472	972	2,892	33
Totals	2292	2337	4629	13,276	34

The development of the traffic in the early years was retarded by slides in the Gaillard cut. The war at first impeded traffic, and then stimulated it along certain routes. This latter effect is apparent in the figures for 1918, which represent a temporary peak. During the last three years there has been a gradual increase in the number and aggregate tonnage of all vessels using the canal, and a corresponding increase in tonnage under the British flag, which has maintained its relative position. Approximately the same number of British vessels pass the canal in either direction; but this applies to the aggregate trade only. Over specific trade routes, as shown in the following table, there is often a marked preponderance of traffic in one direction, but since the difference is sometimes on one side and sometimes on the other, the total approach a balance.

THE PANAMA CANAL RECORD

BRITISH SHIPPING USING THE PANAMA CANAL DURING THE FISCAL YEAR 1921; SEGREGATION BY TRADE ROUTES.

Trade routes.	Vessels.	Cargo tons
Europe to Far East	1	6,800
Atlantic and Gulf ports of United States to Far East	53	351,494
Far East to Atlantic and Gulf ports of United States	19	100,429
Mexico to Far East	2	22,432
Europe to west coast of South America	64	184,701
West coast of South America to Europe	107	562,549
Atlantic and Gulf ports of United States to west coast of South America	49	144,789
West coast of South America to Gulf ports of United States	45	137,926
Cristobal to west coast of South America	81	40,838
West coast of South America to Cristobal	80	37,117
Mexico to west coast of South America	14	95,660
West coast of South America to Mexico	16	230
East coast of Canada to west coast of South America	2	....
West coast of South America to east coast of Canada	3	8,095
East coast of South America to west coast of South America	7	3,031
West coast of South America to east coast of South America	1	347
Europe to west coast of Central America	2	2,285
West coast of Central America to Europe	3	4,203
Europe to west coast of Mexico	2	2,123
Cristobal to west coast of Central America	25	16,777
West coast of Central America to Cristobal	30	14,792
Europe to west coast of North America	33	33,564
West coast of North America to Europe	46	347,133
Mexico to west coast of United States	4	34,871
West coast of United States to Mexico	6	....
Atlantic and Gulf coast of United States to west coast of Canada	6	29,729
East coast of Canada to west coast of Canada	4	536
Cuba to west coast of Canada	1	4,800
West coast of Canada to Mexico	2	....
East coast of United States to west coast of United States	4	....
Europe to Australasia	69	385,849
Australasia to Europe	99	564,222
United States to Australasia	63	439,739
Australasia to United States	14	66,872
Canada to Australasia	9	47,513
Cuba to Australasia	4	23,040
New Orleans to Balboa	1	7,183
West coast of United States to South Africa	1	6,323
Totals	972	3,727,792

Five Principal Routes

For the period covered by this statement the most important British trade served by the Panama Canal was that between Europe and Australia and New Zealand, with an aggregate cargo tonnage for both directions of 950,000. Second place was taken by the trade between Europe and the West Coast of South America with 747,000 cargo tons.

OCEAN SHIPPING
by
ERICH W. ZIMMERMAN, Ph.D.
The latest authoritative work on this subject from
an American standpoint
$5.00 Net
Order Through Pacific Marine Review, Literary Editor

S. L. KREIDER
SHIPPING
Gen'l Agent
TOYO KISEN KAISHA
WILLIAMS S. S. CO., INC.
At Los Angeles
375 Pacific Electric Building
At San Diego
239 Spreckels Building

Then followed the trade between the United States and Australia and New Zealand with 506,000 tons; the trade between the United States and the Far East with 451,000 tons; and finally the trade between Europe and the West Coast of North America with 380,000 tons.

A few of the principal trades are well balanced, with approximately the same number of vessels and the same tonnage of cargo moving in either direction. This is true of the trade between the Atlantic and Gulf coasts of the United States and the West Coast of South America. In other cases, however, there is a marked preponderance of traffic in one direction. For example, there were 53 vessels from the East Coast of the United States to the Orient and only 19 from the Orient to the East Coast of the United States. A similar preponderance was noted in the case of Japanese vessels in the trade between the Eastern seaboard of the United States and the Orient; and it is apparently due to the fact that vessels which go to the Far East through the Panama Canal commonly return by way of Suez. The two canals thus supplement one another, and stimulate a circular around-the-world trade. In the trade between Europe and Australasia there is a similar preponderance, but in the opposite direction. There were 69 vessels outward bound against 99 homeward bound. It is known that some of the vessels returning via Panama go out via the Cape of Good Hope or the Straits of Magellan. In the trade between Europe and the West Coast of South America there were only 64 outward bound as against 107 homeward bound vessels. Outward voyages via the Straits of Magellan with return via Panama probably account in great part for the difference, although some vessels reach Chile from Australasia and then load nitrate for Europe via Panama.

Leading British Lines

The British company contributing most to Panama Canal traffic is the Pacific Steam Navigation Company, which maintains services from the United Kingdom to South America, New York to South America, Cristobal to South America and Cristobal to Central America. This company put 299 ships through the canal during the fiscal year 1921. Services between the United Kingdom, Australia and New Zealand are maintained by Shaw, Saville & Albion, the White Star Line, Commonwealth and Dominion Line, and the New Zealand Shipping Company. The Federal Steam Navigation Company operates from British ports via New York and the Panama Canal to New Zealand and Australia. The Nautilus Steam Shipping Company (F. & W. Ritson) maintains a service between the United Kingdom and the West Coast of South America. Some of their vessels go out by way of Magellan, but all return via Panama. T. & J. Harrison and Alfred Holt & Company (Blue Funnel Line) maintain services between Europe and the West Coast of North America. The Prince Line has regular sailings from United States Atlantic ports to the Far East. The following is a list of British owners who put 10 or more ships through the Panama Canal during the year: Pacific Steam Navigation Company, 299; Shaw, Saville & Albion, 44; White Star Line, 18; New Zealand Shipping Company, 43; F. & W. Ritson, 36; Commonwealth and Dominion Line, 31; Federal Steam Navigation Company, 28; C. T. Bowring & Company, 24; Edward Hain & Son, 20; T. & J. Harrison, 18; Robert Dollar Company, 16; Ellerman Lines, 16; British India Steamship Company, 15; Canadian Government, 13; Alfred Holt & Company, 13; Furness, Withy & Company (Prince Line), 12; Standard Transportation Company, 12; Blue Star Line, 10; Andrew Weir & Company, 10.

DOES YOUR BOAT LEAK?
Send for Booklets—"HOW TO MAKE YOUR BOAT LEAKPROOF," and "MARINE GLUE — WHAT TO USE AND HOW TO USE IT."—Each grade is for a different purpose. IT IS IMPORTANT THAT YOU USE THE GRADE WE RECOMMEND. Any old boat, so long as the frames are in fair condition, can be made water-tight by following the instructions in the above booklets. This applies to anything that floats, from a canoe to a yacht, wood or steel. Put your leak troubles up to us, we will help you to stop them.
JEFFERY'S MARINE GLUE IN ALL THE VARIOUS GRADES
For sale by all Yacht, Boat and Canoe Supply Houses Hardware, Paint and Oil, and Sporting Goods Dealers.
L. W. FERDINAND & CO. - - - - - - 152 Kneeland St., Boston, Mass., U. S. A.
JEFFERY'S PATENT MARINE GLUE NO 7 BLACK

CAM, CRANK STEAMSHIP SHAFTING, SHOES AND DIES, PULVERIZING BALLS
Forrest FORGINGS
OIL AND WATER WELL MACHINERY TOOLS AND SUPPLIES
OAKLAND EDWIN FORREST FORGE COMPANY SAN FRANCISCO

TIME AND TIDE WAIT FOR NO INSURANCE TO BE PLACED • DO IT NOW •
-DRIVEN ASHORE-
WHEN THIS HAPPENS, YOU WILL FEEL NO WORRY IF YOUR INSURANCE IS IN THE HANDS OF
C.H.WILLIAMSON Co
322 CALIFORNIA ST. SAN FRANCISCO.

PRATT & WHITNEY STAYBOLT TAPS

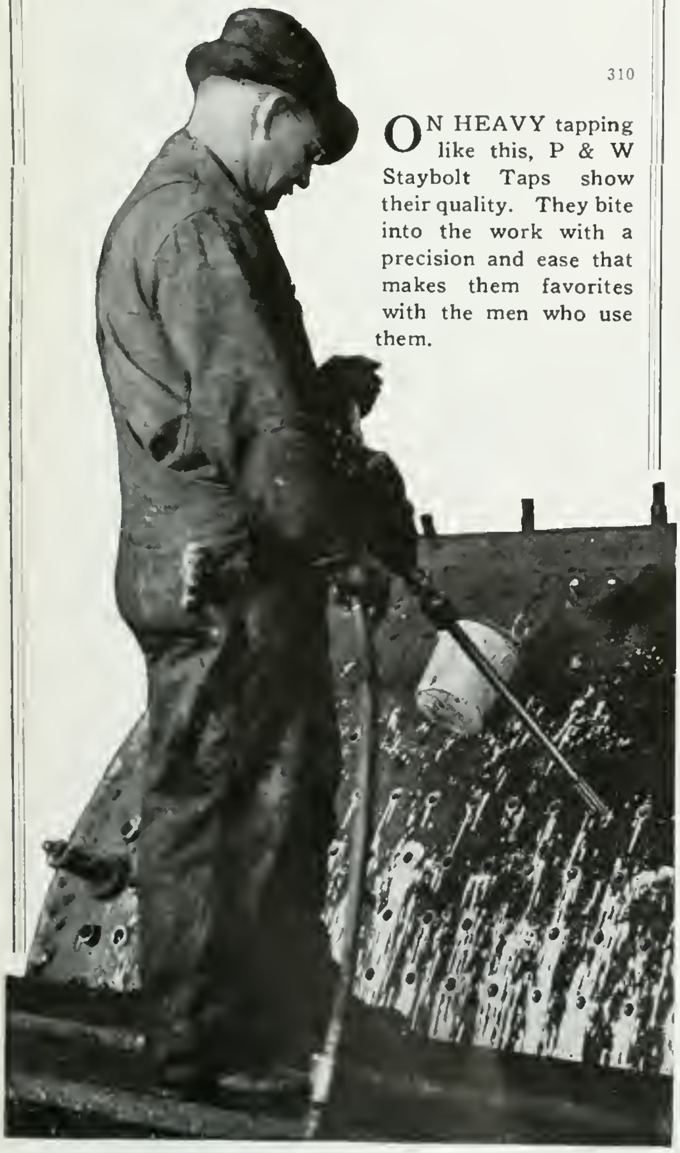
TO MEET all your boiler requirements, we build P & W Staybolt Taps in five standard styles, as well as Spindle Staybolt Taps with and without threaded end and also Combined Reamer and Tap to tap continuous hole in the reamer hole of the far boiler plate.

Our reputation for precision and high quality stands behind these tools. Buy them in any of the styles and sizes listed in our Small Tool catalogue which is yours for the asking.

These taps and our complete line of Small Tools are on sale at our offices in Boston, Philadelphia, Birmingham, Rochester, Cleveland, Detroit, St. Louis, Cincinnati, Seattle, St. Paul, New Orleans, San Francisco.

PRATT & WHITNEY CO.
111 BROADWAY NEW YORK
Works Hartford, Conn.

310



ON HEAVY tapping like this, P & W Staybolt Taps show their quality. They bite into the work with a precision and ease that makes them favorites with the men who use them.

Trade Literature

Running Light Telltale Boards, Bulletin No. 49011, General Electric Company, Schenectady, New York.

The Underwriters' Laboratories have approved and listed the running light telltale boards manufactured by the General Electric Company. These boards afford a very accurate and reliable means of indicating whether or not the running lanterns are properly lighted on vessels using electricity for lighting. Bulletin No. 49011, issued by the company to supersede Descriptive Sheet No. 69011 and Bulletin 4816, interestingly describes this safety device for navigation.

Provision is made on the board for both audible and visible warnings in case of the failure of any of the lamps. It is also possible, by means of snap switches, to throw into the circuit the second lamp with which running lights are usually provided, in order to avoid the inconvenience of replacing lamps in rough weather.

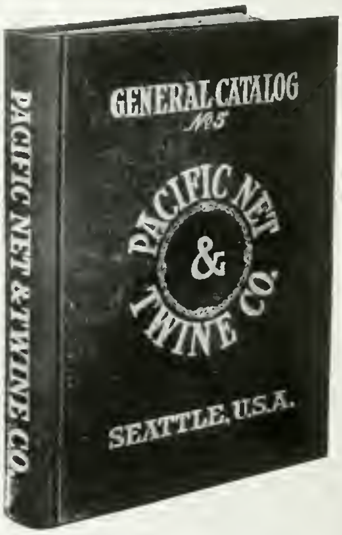
The panel method is used in the construction of these boards, and the bulletin shows by illustrations and diagrams how they are operated. The right-hand panel usually contains the buzzer signal and warning lamp receptacle and the others provide control of the lanterns located in various parts of the vessel. These boards are designed for operation on circuits of 110 volts to 125 volts, but can be adapted for use on circuits of higher or lower potential. Fuses are provided on all circuits and the sockets are made for lamps with standard Edison bases. Small nickel-plated name plates are furnished when desired for labeling each of the lantern circuits.

Universal Crane Company, Cleveland, Ohio. Bulletin No. 12.

An 8-page, profusely illustrated folder describing the Universal crane, a self-contained unit operated by a gasoline engine or electric motor, and so designed as to be adaptable for mounting on any one of the following foundations: railroad, flat car, motor truck, industrial truck, trailer, portal pier, or ground. If so desired, the crane can be arranged so as to propel its own mounting at moderate speeds, and various equipment can be furnished to suit conditions.

Among the standard outfits are ½ or ¾-yard grab bucket, an electric magnet hoist block, steam shovel attachment, post hole digging attachment, and in the way of auxiliaries the crane may be furnished with either single, double or separately driven drums with or without cabs or equipped with any form of nigerhead or capstan.

The organization back of this crane has had a long and very wide experience in industrial handling of materials, and the crane was brought out as a result of the recognition of the need for a light, portable crane of this character adaptable to a wide range of foundation.



For description of this catalogue and of the plant of the Pacific Net and Twine Company see page 46.

Quality of Steam by the Throttling Calorimeter — Bulletin No. 1 of the Tracy Engineering Company, San Francisco, California.

An attractive booklet of 27 pages bound in green presboard with gray stampings and setting forth in a technical way the advantages to be gained by the use of the throttling calorimeter in the investigation of the quality of steam.

The increased steam consumption which results from the presence of moisture in non-superheated steam and in steam at low superheats has often been demonstrated by engine and turbine tests. The calorimeter provides a simple and inexpensive method of determining exactly what the moisture content of steam is at any time, and executives of steam plants would do well to encourage its use as a check upon the waste of working capital and economy in fuel repairs and shutdowns.

The booklet also describes the Tracy steam purifier.

The Invincible Nozzle — A Catalog of Fire Department Supplies—Andrew J. Morse & Son, Inc., Boston, Massachusetts.

Andrew J. Morse & Son have been in the business of manufacturing fire-fighting apparatus since 1837, and this attractive 40-page booklet describes in considerable detail the supplies handled and manufactured by them for fire departments, with particular emphasis on their Invincible nozzle, which has been very extensively used on American fireboats. This company has been making turret nozzles for over forty years and has furnished nozzles for fireboats and other floating equipment in practically every country in the world.

The Invincible nozzle is shown to have a very low friction loss and a very high efficiency. It is made in sizes from 500 gallons per minute capacity up to 15,000 gallons per minute and is regularly mounted on a standard suitable for bolting to a deck floor or roof, as well as being fitted for direct hose connection for use on aerial ladders or with a standard coupling to be screwed onto a standpipe. There is no doubt that one or more nozzles of this character should be fitted in convenient locations on many passenger ships and ferry boats.

A Steam Trap Catechism with Specification Data—32-page booklet issued by the American Steam Gauge and Valve Manufacturing Company, Boston, Massachusetts.

This book sets forth the theory and practice of the use of steam traps for collecting the water of condensation from steam apparatus and automatically discharging same to a tank or hot well without the loss of steam. Steam traps in common use are classified as float type, simple pot type, bucket type, tilting type, and expansion type, and it is shown that in all of these types as a general rule the area of the discharge valve orifice is much too small in relation to the pipe connection.

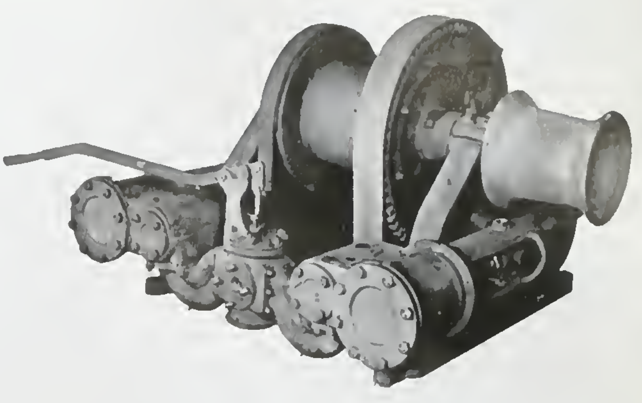
The theory of the working of steam traps is quite exhaustively treated, and the advantages of the American ideal steam trap are stressed, particularly in that the leverage provided to offset the unbalanced pressure is powerful enough to operate a valve with an orifice larger than is possible on any other make of float; consequently the claim is made that a smaller trap of the American Ideal type can be used for the same service or that the same size of American Ideal type can be run to higher continuous capacity than is possible with any other make.

Barker Wrenchless Chuck—Foster Machine Company, Elkhart, Indiana—Herberts Machinery & Supply Company, San Francisco, California.

A leaflet describing and illustrating two-jaw and three-jaw chucks automatically operated by a hand lever.

Rapid chucking is one of the most important elements in determining production cost in the modern machine shop, particularly in the case of the manufacture of multiples of small parts. The three-jaw type of chuck is made in all ordinary sizes. The jaws have a total movement in each size of 3/8-inch, one-half of which is obtained in the initial movement of the hand lever, the remaining three-sixteenth inch being a slow movement but at tremendous pressure. These chucks are mounted and dismounted as readily as a face plate. They are simple in construction, strong and substantial. Many have been running continuously for some years without any apparent deterioration.

The two-jaw chuck is a special type intended for operating with irregular shapes which require a formed false jaw especially constructed for each operation. The jaw movement on this type runs from 3/4-inch on the 8-inch size to 1-1/4-inch on the 16-inch size, and as in the 3-jaw type the final 3/16-inch of this movement is at a very high leverage and very slow speed.



FOR SALE
Specially Priced
HELSER MARINE WINCHES
Three 8¼ x 8
One 9 x 9 Standard
Two 9 x 9 Heavy Duty
1—9x9 Compound Geared Throttle Reverse Warping Winch with extended shafts
1—7x9 Enclosed Type Hesse-Martin Steam Capstan

Lifting capacity on single line, 8¼x8, 10,000 pounds; on straight line, 9x9, 12,500 pounds, on straight line. All throttle reverse. Piston valves. Gear ratio 5 to 1.

Wire or Write

Helser Machine Works, Inc.
PORTLAND :: :: OREGON

Ship Repairs by Experts

Builders of Seventeen steel vessels, including their engines, windlasses and condensers.

GENERAL MARINE REPAIR WORK
HULL AND ENGINE

Contractors for some of the largest Repair Jobs Ever Done at the Port of Portland.

Drydock Facilities Ample for Vessels up to 15,000 Tons.

Albina Engine and Machine Works
PORTLAND OREGON

SHIP DRIVES

A Discussion of Reciprocating, Turbine and Diesel Engines

By H. HAAS

IN a consideration of suitable drives for ships, i. e., of prime movers for imparting motion to the ship's propeller and through it to the ship, the selection should be governed by the needs of the propeller. A propeller is most efficient at low speed. This is one of the potent reasons why the reciprocating steam engine still finds favor for a large class of merchant ships. To this must be added the following: the reciprocating steam engine during a period of more than 100 years has been developed to a high degree of reliability and economy, and is simple to operate; it also has many inherent advantages peculiar to this type of engine that make it eminently suitable for ship propulsion.

Reciprocating Engine

A reciprocating engine's speed is readily controlled through a wide range, without seriously affecting the fuel economy. At lesser speeds and lower loads, the smaller amount of steam admitted to the cylinders proportioned to their smaller load is still economically used, and the overall economy is only lowered by the internal friction and mechanical losses of the engine and shafting, which are nearly a constant amount. But its most valuable feature is the effectiveness with which it can reverse a ship from full ahead motion and get it going in full motion astern.

Relative Advantages of Steam Engine and Turbine

While steam turbines are easier to reverse and the reversing mechanism is simpler (speaking here merely of the maneuvers the engineer has to perform), the reversing of the ship's motion is not as readily performed by turbines, unless special provision has been made. In a turbine installation an ahead and an astern turbine must be mounted on the same shaft. When steam is admitted to the astern turbine, a large amount is consumed in bringing the rapidly revolving mass of the turbine rotor (which is still going in the ahead direction), in which a large amount of live energy is stored up, to rest, before the steam can do work on the astern rotor for reversing the screw. During this entire cycle steam is consumed. There is no other means of reversing quickly than admitting immediately a large volume of steam into the astern turbine.

Steam Turbine Development

Long before the advent of the successful steam turbine, the advantages of a rotary engine were well recognized. But the great obstacle to success was a lack of means of preventing the dissipation of the steam's energy in a rapidly revolving machine whose power could not be applied usefully. Since the early 70's there were numerous turbines tried, but they all wasted steam beyond the capacity of any boiler to furnish. Even Parsons' first 10- H. P. turbine (1884) made 18,000 R. P. M. and De Laval's (1883) 40,000 R. P. M. It took Parsons eighteen years of constant effort and unusual courage and perseverance to solve the most difficult, baffling engineering problems, with facilities, tools, instruments, technical and scientific knowledge far less than what we possess today, before he produced a successful turbine. That was in 1900, but a few years later the development of the turbine had already assumed tremendous proportions, and by 1906 more than 3,000,000 H. P. had been built.

This extensive development and use of steam turbines was made possible by the modern alternating current generators, the high rotative speed of turbines greatly reducing the size and manufacturing cost of alternators.

Advantages of Steam Turbines

The advantages of steam turbines may be briefly summarized: In proportion to a given power output, they are the most compact prime mover. They occupy only one-fourth to one-eighth the space of a reciprocating steam engine of equal power and weigh much less. While there is a definite practical limit to the size of reciprocating engines, there is no such limit to the size of turbines, and units of 100,000 H. P. are now being considered.

With the elimination of tangential forces and of reciprocating masses, small foundations only are needed. Turbines require fewer operatives, use considerably less lubricating oil, and do not contaminate the condensate with oil like steam engines. They are very economical of steam, as they permit the use of high pressure and high superheat. The steam engine puts a definite limit to these. The constructor is definitely limited in the steam pressure he can safely use in a high pressure cylinder of a triple or quadruple expansion engine. The same applies to the steam temperatures. With high steam temperatures a large amount of heat is taken directly into the cylinders (and only by taking it into the cylinders is it effective), which, transmitted to the reciprocating parts of the engine, that must be kept tight and well lubricated, tends to nullify the very conditions necessary to economical operation.

In the turbine the superheat is changed into mechanical work in the simplest manner and the shortest time. It is given up in the nozzle and not beyond and into the turbine. A turbine can use effectively higher vacua than a steam engine. The internal friction of the moving parts of a steam engine is considerably more than that of a turbine; therefore, if the terminal pressure is less than the internal resistance of the engine, no power is gained. High vacuum also calls for low condenser temperatures, which bring about large heat losses in the engine cylinders. Nor are the required large cross-sectional areas of the exhaust steam ports, ducts and valves feasible for the large volumes of low pressure steam to be handled. But with these insufficient areas the effect of a high vacuum is not realizable on the piston, as only the effective decreased back pressure at the piston is beneficial.

Steam Turbines for Ships

The turbine, having all these advantages and showing considerably higher overall fuel economy than reciprocating engines, it was natural that its use as a propelling medium for ships should have been early considered. The development of the high speed express steamers of large tonnage requiring upward of 50,000 S. H. P. would indeed not have been possible without the turbine.

But an adjustment was necessary between the characteristic high rotative speed of the turbine and the low rotative speed of the propeller, if their respective efficiencies were not to be sacrificed.

Increased propeller speed introduces unavoidably greater resistance and reduced screw efficiency. Mere speeding up of a screw finally gets to a point where the water can no longer follow the screw; it moves in a vacuum and its propelling action stops completely.

Turbine Direct Drive

The necessary speed reduction affects the turbine badly. While specially designed propellers and propeller speeds of 800 to 1000 R. P. M. have been used, showing an overall economy in excess of equally powerful steam engine installations, notwithstanding the much lowered screw efficiency, such high speed installations have nothing to recommend them and are certainly not in order for merchantmen. For large installations, as express steamers, battleships and cruisers, Parsons solved it by using a large number of pressure ranges in the turbines with large wheels, and so connecting a number of turbines mounted on different shafts (usually four screws) that the steam flowed from a high pressure turbine to intermediate and low pressure turbines, by these means reducing the speed of the turbines sufficiently to secure fairly economical screw speeds.

Turbine Geared Drive

Another method extensively used is the reduction of the screw speed by the interposition of reduction gears between the shafts of the screw and turbine. Its advantages lie in the use of high speed, i. e., specially efficient turbines, and low speed propellers, speed reduction of 1:26 being not uncommon. This makes it possible to reduce going screw speeds below 80 R. P. M., a speed common with steam engines. Fuel savings of from 15 to 40 per cent resulted from the use of geared turbines compared to turbines direct connected to the propeller shaft, which plainly shows the importance of the use of the most favorable speeds for both turbine and screw.

As a further advantage of geared drives over direct turbine drives may be mentioned that such turbines are less liable to race when the screw comes out of the water, which is often the case in turbulent, heavy seas. The transmission losses of a high grade gear can be kept within 2 to 3 per cent. Reduction gears running at such high speed have to be of great precision, of high quality material and kept in perfect alignment. They must run in clean oil, the circulation of which must not stop if rapid wear and possible burning of the gears is to be avoided. As a ship is not rigid, but as its hull, members and frames pant, move and creep under the action of the seas and the pounding of the waves, such movement in time affects the perfect alignment of the gears, and their wear may be unduly increased and their life shortened.

Turbine Hydraulic Drive

Another type of speed transformer, known as the Fottinger transformer, developed in Germany, utilizes centrifugal pump and hydraulic turbine runners of different diameters and properly designed blading or buckets, and water is the transmitting medium. It works silently, smoothly, without vibration, is very readily reversed, without the use of a reversing turbine, occupies small space, and secures a fair speed reduction, and efficiencies as high as 90 per cent. It has been introduced and is used successfully on a number of ships, and will undoubtedly be widely used in the future.

Turbine Electric Drive

A later development of means to secure the necessary speed reduction is by use of slow speed electric motors for driving the screws. Current to these motors is furnished by a high speed, self-contained steam turbo-generator set. This portion of the plant would then be a self-contained electric power station unit, generating current for driving the motor or motors (depending on the number of screws used). The steam turbine and generator would have their highest economical speed, whereas the motor speed is slowed down to the needs of the screws. In such an installation, reversing is a comparatively simple matter, as it involves the changing of two out of the three phases of a three-wire system feeding the motor. While such an installation has many advantages, it has also its disadvantages, which are the high cost of such an installation, the use of high tension current on board a ship, and the combined losses in generators and motor, which is from 10 to 15 per cent.

The electric drive has been extensively adopted by the United States Navy and the latest battle-cruisers now building will have a "central power station" of 180,000 H. P., supplying current to four motors, each driving its propeller.

Diesel Engine Drive

In the foregoing, steam installations were discussed. By reason of its high fuel economy the Diesel oil engine will find increased favor as a prime mover for merchant ships. Such engines will perform the same work with one-third the oil fuel burned under the boilers of the very best steam installation.

In such installations the boiler-room is eliminated and by reason of the great fuel economy, considerable space in a ship taken up by fuel tanks or coal bunkers is made available for cargo. The saving is therefore a double one—fuel, which is the principal item, and additional cargo space.

Motorships have traveled 16,000 miles without rebunkering for fuel oil. Diesel engines are now available in units of 5000 H. P., so that the majority of merchantmen can be provided with oil engines of adequate size. In this engine the fuel oil is sprayed directly into the engine cylinder, where it is ignited by the highly heated air previously compressed by the piston.

Two general types of engines are used, one working on the four-stroke and the other on the two-stroke cycle. In the former every fourth stroke is a power stroke, the other three strokes being used for expelling the products of combustion, drawing in a charge of fresh air and compressing this charge.

In the two-stroke cycle engine the exhaustion of the burnt gases and the refilling of the cylinder with fresh air is done after the completion of the power stroke, and the second stroke then compresses a new charge of fresh air.

Before the provision of successful reversing gear for four-stroke cycle oil engines was solved (and this was no easy solution, as only every fourth stroke was a power stroke), recourse was had to the Del Proposto system of reversing, first used on the Russian ship Sarmat in 1904, and subsequently installed on many Russian river boats and ships of the Russian Navy. The engine was used for driving the ship ahead, but for reversing was coupled to a generator, and a motor reversed the screw. The engine speed could be reduced from 240 to 72 revolutions per minute. Since then very successful oil engine reversing gear of different types has been developed and has been in use on many ships for a number of years. In all, compressed air, usually furnished by a Diesel engine driven compressor, is used for bringing the engine quickly to a stop and when running in the reversed direction the compressed air, used as a fluid pressure actuating medium, is stopped and the fuel oil injections resumed.

The modern high-grade, high-powered marine engine has the low speed favorable to high screw efficiency. This low speed also facilitates the burning of heavy oils with high boiling points, which cannot be said of the high speed oil engine. Each cylinder is fitted with its own individual fuel oil pump, so that the fuel supply to each cylinder is carefully regulated, and in two-stroke cycle engines the reversing mechanism is particularly simple, so that ships can be reversed as quickly with oil engines as with reciprocating steam engines, and the maneuvering and speed control through a wide range is all that could be desired.

"Last time I went over her double bottoms with Briggs was just before the war—and that's nearly eight years ago. Since then she's been looking into every port in the far east—and her Cap'n says her lower insides are still fit as a fiddle."

—*"Bituminous Bill"*

Briggs Bituminous Composition

will do the same for any ship. For protecting inner bottoms, peaks, tanks, bulkhead or compartment doors and walls, chain lockers, etc., it is in a class by itself.

The first cost is a little greater than paint but a single application should last a life time. It forms a tough, firm, elastic coating that does not crack, flake or chip.

Send for our new booklet "The Solution of the Corrosion Problem."

Briggs Bituminous Composition Co, Inc.

17 BATTERY PLACE — NEW YORK, N. Y.

Pacific Coast Representative: Wm. C. Williamson, 373 Monadnock Building, San Francisco

Great Britain: Wm. Briggs & Son, Ltd., Dundee, Scotland

BBC-33

BITUMINOUS COATINGS

The Solution of the Corrosion Problem

Pacific Marine Review
The National Magazine of Shipping

OUR DIESEL MARINE ENGINES
MAKE SHIPS EFFICIENT

M/S KENNECOTT
THE MOST EFFICIENT SHIP
THAT SAILS THE SEAS

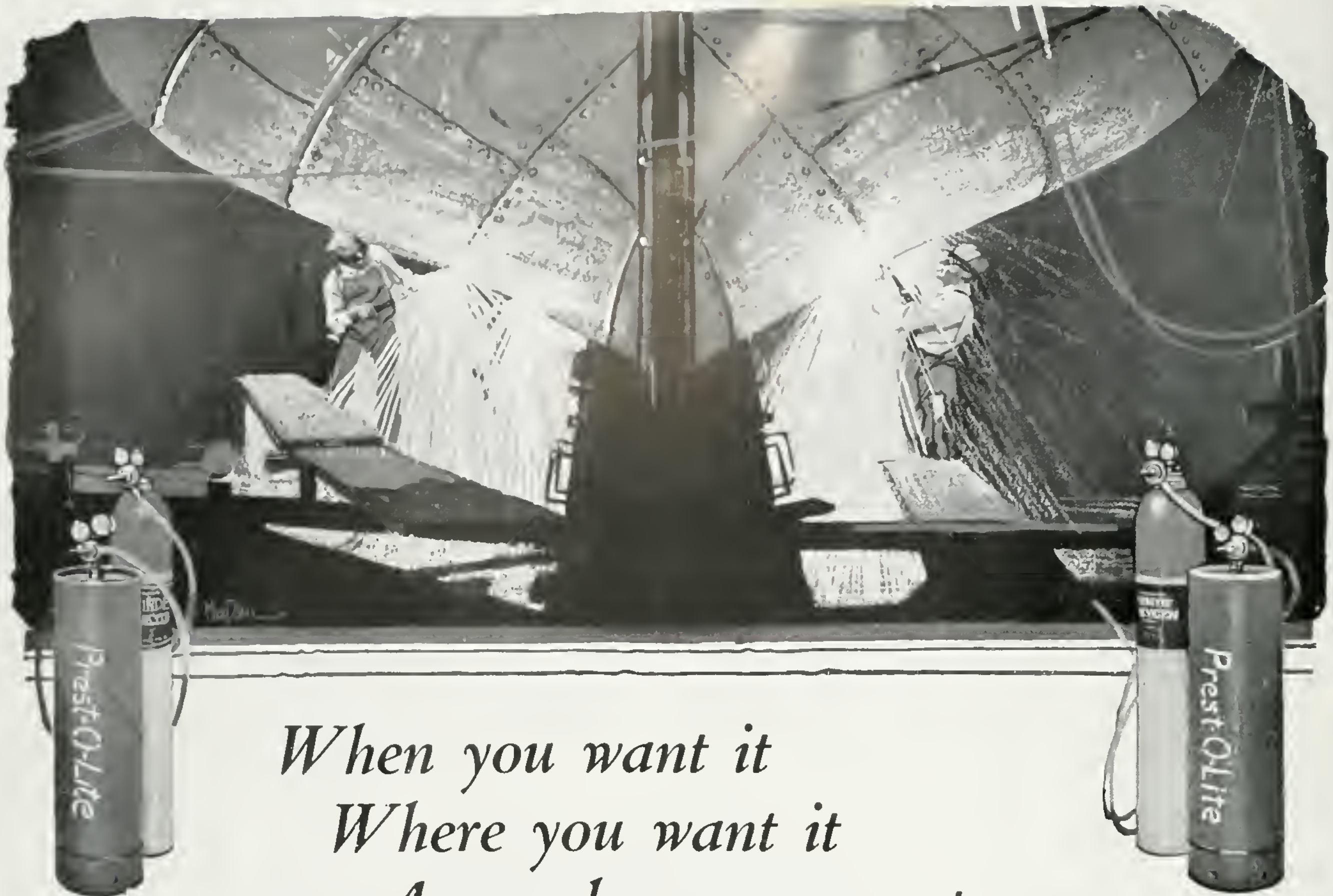
McINTOSH & SEYMOUR CORPORATION
AUBURN, NEW YORK, U. S. A.

149 BROADWAY
NEW YORK CITY

615 SHELDON BLDG.
SAN FRANCISCO

412 BISBEE BLDG.
JACKSONVILLE, FLORIDA

Pacific Marine Review, Vol. 18, No. 11. Published Monthly at San Francis[illegible] second class matter at the post office at San Francisco under the Act of March [illegible] a year.



When you want it
Where you want it
As much as you want

PREST-O-LITE Dissolved Acetylene and Prest-O-Lite Service have made the oxy-acetylene process indispensable in ship-yards.

Prest-O-Lite
DISSOLVED ACETYLENE

provides ship builders with the purest cutting and welding gas in easily portable, instantly accessible and highly convenient cylinders.

Without such a supply of uniformly high grade gas always at hand, cutters and welders would find impossible many applications of the oxy-acetylene process now in common use.

And Prest-O-Lite Service, operating through forty plants and warehouses, places Prest-O-Lite Dissolved Acetylene at the command of ship-yards anywhere, at any time and in any desired quantity.

THE PREST-O-LITE COMPANY, Inc.
General Offices: Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco
In Canada: Prest-O-Lite Co. of Canada, Limited, Toronto

PW-513-21

Pacific Marine Review

CONTENTS

NOVEMBER, 1921

The American Merchant Marine, by Albert Lasker 637

An Appeal to the American Shipper 641

Immigration on a Percentage Basis 642

Free Ports and Free Zones, by Henry M. Robinson 643

The Clipper Ship Andrew Jackson, by F. C. Matthews 646

Editorial 650

No. 1 Broadway 654

Pacific Coast Fisheries III—Washington 656

The Auxiliary Steamer Victoria, by John L. Bogert 661

Oil Engines and Motorships 663
Some Observations on the Kitchen Rudder; Diesel Electric Ferry Boat; First Burmeister and Wain Single Screw Motorship.

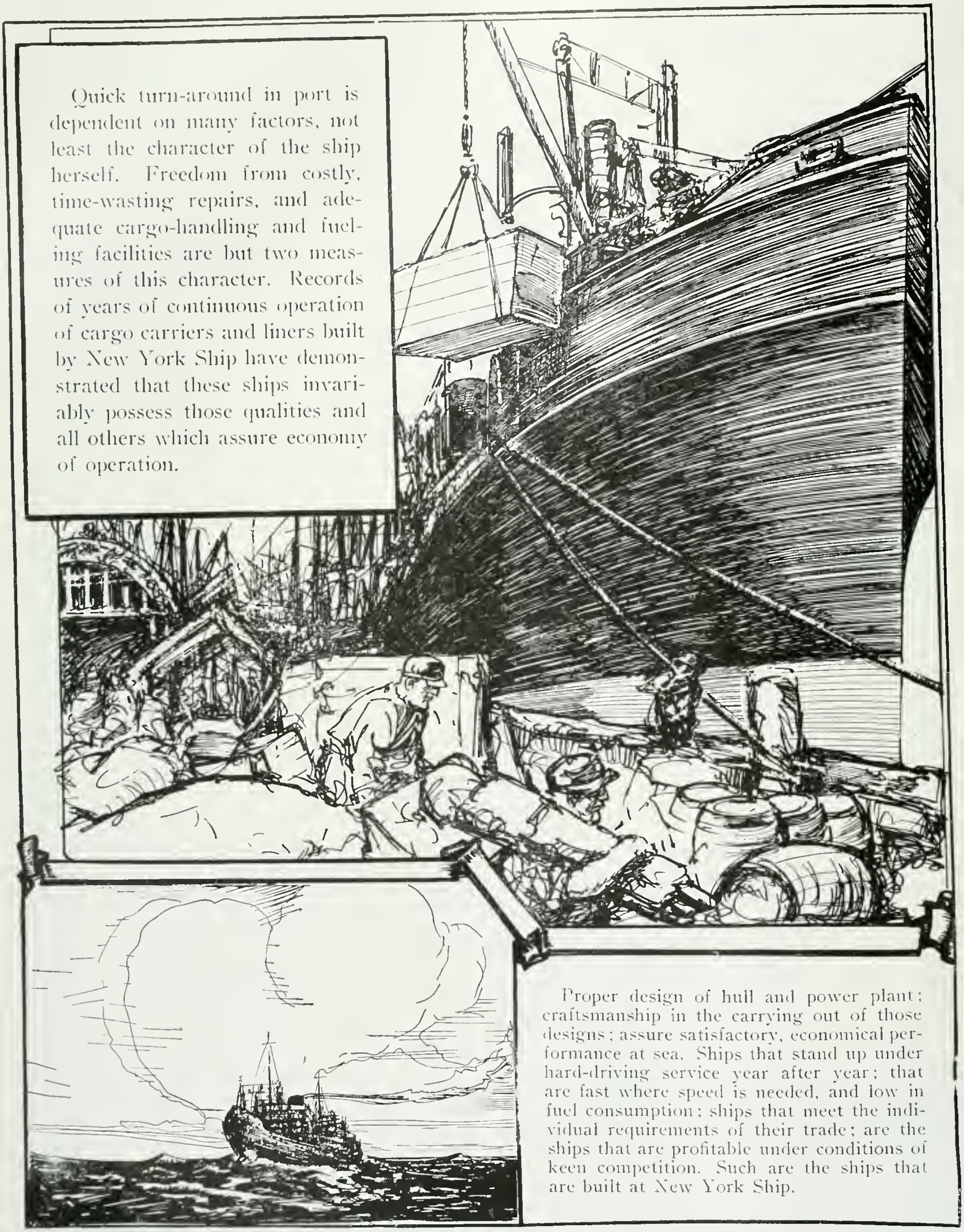
The American Ship Building Company's Annual Statement 668

Full Speed Ahead 669
Steamship Operations, 669; Marine Insurance, 678; Shipbuilding, 683; With the Exporters and Importers, 691; Personals, 696.

Marine Equipment and Machinery 697

Industrial Section 700

CHARACTER ▫ CRAFTSMANSHIP ▫ SERVICE



Quick turn-around in port is dependent on many factors, not least the character of the ship herself. Freedom from costly, time-wasting repairs, and adequate cargo-handling and fueling facilities are but two measures of this character. Records of years of continuous operation of cargo carriers and liners built by New York Ship have demonstrated that these ships invariably possess those qualities and all others which assure economy of operation.

Proper design of hull and power plant; craftsmanship in the carrying out of those designs; assure satisfactory, economical performance at sea. Ships that stand up under hard-driving service year after year; that are fast where speed is needed, and low in fuel consumption; ships that meet the individual requirements of their trade; are the ships that are profitable under conditions of keen competition. Such are the ships that are built at New York Ship.

NEW YORK SHIPBUILDING CORPORATION

PLEASE MENTION *PACIFIC MARINE REVIEW* WHEN YOU WRITE

Pacific Marine Review

The National Magazine of Shipping

November, 1921

Copyright, 1921, by J. S. Hines

THE AMERICAN MERCHANT MARINE

An Analysis of the Task Before the American People

By ALBERT D. LASKER

Chairman, United States Shipping Board*

UNTIL there is an awakened consciousness on the part of all citizens of America that economic stability is dependent on the disposal of our surplus wares and products in world markets, there can never be an American merchant marine.

Until the farmer in Kansas, the industrial worker in Indiana, the miner in Arizona, realize that the regularity and volume of their daily wage is, in a measure, as dependent on the establishment of an American merchant marine as is the continuity of employment and the wage of the dock worker in Baltimore or San Francisco, there can be no assured hope that the flag of the United States will be maintained as it should be on the seven seas. Sound economics accept as fundamental that national prosperity is based on continuity of employment at wages consonant with American standards of living.

Surplus Demands World Market

When surpluses accumulate, prices are demoralized and employment ends until the excess has been consumed.

As long as America had a virgin empire to explore and develop, the need generally for world markets to consume surpluses was not pressing. In our beginning, with thirteen states, a narrow strip along the Atlantic, we were a seafaring nation; and immediately after the war of 1812, under wise protective laws, the American flag floated proudest of all on the seas. Beginning with the period of forty-nine, the opportunity for wealth in our uncharted and undeveloped central and western empire challenged the imagination of America's youth, and the lure of salt water gave place to the call of the unclaimed riches that awaited the overland emigrant.

But, today, with forty-eight states, well populated with over 105,000,000 people; with world conditions changed by the great war; America, which, during the period of the conquering of its empire, was a self-consuming and self-sufficient nation by and large, now finds itself once more, if employment is to be general, with permanent surpluses which can only find outlet on the ocean.

Need for Merchant Marine

Generally speaking, the last ten per cent of production makes the market and it is this last ten per cent that we must insure disposal of to customers in foreign lands. Except with a merchant marine under our own control there can be no assurance of these essential markets.

When the Boer war came, Britain withdrew her ships from our trade, because she had need of them to carry her own armies and her own supplies to the scene of battle. Had we then the need of world trade which we have today, America would have suffered indeed. The lack of ships for American trade in 1915 is too fresh in our memory to need stressing.

Napoleon said, "An army travels on its belly." This, too, is true of the navy. We have today the second largest navy in the world. And who can promise that in the next war we can call on allies for the bottoms needed to transport our army and feed and supply it and our navy? So, from the standpoint of peace, or the standpoint of war, America's stability calls for the insurance of a merchant marine. Thus, an interest in the problem and a sacrifice for its successful fruition becomes as important to the inland dweller as to the coastal population..

Sixteen weeks ago today the present United States Shipping Board took the oath of office and entered upon the stupendous task assigned it. This child of war's necessity had grown to huge proportions under such conditions as to present to the new board a task so tremendous that no one not directly associated with it can have a remote comprehension of its magnitude.

Task Facing Shipping Board

These sixteen weeks of strenuous endeavor have accomplished only a mere beginning, but a real beginning, of the foundation upon which a substantial structure of accomplishment, we hope, may, in good time, be erected. In June last the overhead shore organization of the board and the Emergency Fleet Corporation consisted of some 8300 people, at an annual salary expense of nearly $16,000,000, but in spite of this huge organization it was necessary for the present board to call into being an entirely new body of executives to handle the work that it found awaiting it.

As the summer passed, it became necessary to go to Congress for more funds, no appropriation having been voted for the current fiscal year to the old board. The urgent deficiency bill carried $48,500,000, which was given to the board and the Fleet Corporation for the purpose of meeting current expenses. In addition, the board had already been voted $25,000,000 to finish the last of the ships under construction and was permitted to use $55,000,000 more for its current expenses, providing that it could find such sum or any part thereof from the liquidation of its assets. At the moment it would appear impossible, without an unconscionable sacrifice of assets, to realize any material part of this $55,000,000 within the immediate reasonable future.

No Financial Statement

The new board found no financial statements of the condition of the board, either as to capital expenditures or operating history, which any business or business man could use as a guide. The accounting system that started with the operation of ships had simply collapsed and the new board's immediate problem was to create a system of accounting that would truly mirror the business of the corporation.

---

* Address delivered at a luncheon given by the Associated Advertising Clubs of the World, New York City, October 5, 1921.

To build such an accounting and financial system on the shattered fragments that we found awaiting us was a task in itself to challenge the ingenuity of any organization. After sixteen weeks we find ourselves with the framework of our human organization (accounting, operating, financial, legal and liquidation) practically completed.

Cutting Overhead

With its new and, what is considered in some quarters, high-priced additions, the salary roll of nearly $16,000,000 of June last has decreased to approximately $12,000,000, and the number of employes represented by this pay roll to less than 6000. Financial reports are beginning to come in. On September 23 we had our cash statement as of August 31, the second cash statement that it has been possible for the new board to have since it took office.

On the same date our operating account for the month of August was presented, and three weeks ago the result of the inventory of all of the Shipping Board's materials and supplies (not including plants, ships or accounts) was available for the consideration of the board and for the adoption of a policy for liquidation. The reorganization of the various departments and offices is proceeding apace and it is hoped that results accomplished in months to come will show a satisfactory progress toward a plan of respectable operating efficiency, limited by the handicaps surrounding American shipping in general and government operation in particular.

America's Merchant Fleet

The American nation today finds itself in possession of a fleet of 1450 ocean-going steel ships of approximately 10,500,000 deadweight tons, not to mention a fleet of 10 ferro-concrete vessels of over 60,000 tons, and a wooden fleet of 285 ships of 1,000,000 deadweight tons. For practical purposes we need only consider the steel fleet, as the concrete and wooden ships will be eradicated.

Of these, nearly 1500 steel steamers, we may say, in round figures, that one-third of the number, comprising nearly one-half of the tonnage in deadweight, are excellent commercial vessels, one-third are fair commercial vessels, and the balance for all practical purposes are a total loss save for what salvage can be gotten out of them through ultimate sale or conversion, either in this country or abroad.

The reason that half the steel tonnage owned by the government rates from fair to not usable is that in the stress of war there was necessarily constructed whatever type of ship could be most expeditiously built, regardless of its ultimate commercial value in times of peace. To briefly illuminate why one-third of these ships were classed as not commercially practicable, in order to get the maximum production of war tonnage, some 300 ships were built in the yards of the Great Lakes. To bring these vessels to salt water, they must pass through the Welland Canal, the size of whose locks determine the size of these lake-built vessels. Most of these cannot be used on the Lakes, because they were built for sea service and do not meet fresh-water needs. Most of them are too uneconomical for ocean carriers to meet the competition of peace-time trade.

Cost of Construction

The cost of the construction of this fleet and its operation up to the present time is about $3,500,000,000, the total expenditure for all purposes. If the whole $3,500,000,000 were written off today and the fleet carried as a total loss, this greatest of the government's war operations would not owe the American people one penny. Unfortunately, the billion dollars or more expended on airplanes performed no service at all in the war, but who can say, of the major factors, which was the determining one in bringing the war to its successful conclusion? Certainly there were several major factors, first of which was our valiant army itself, but none of the major factors counted more than the government's fleet.

True, most of this fleet was not finished until after the war's end, but Germany, knowing that the ships were to immediately come out of the yards, realized that she was fighting a losing game. The allies and America used their ships more profligately because they knew replacement was at hand. So that, potentially, the vast share of the fleet that was not finished until after the war really played a dominating feature in hastening the final decision.

Foreign Trade Carried

Nor could our upwards of $20,000,000,000 worth of foreign trade have been carried on in the years between the armistice and the present had not this fleet been in existence. It was because of this fleet that we were able to move the enormous volume of American manufacture and raw materials at a time when there was a shortage of world tonnage. It was because of these ships that our factories, farms and mines were able to operate at top speed when the boys returning from the front were seeking employment. How serious would have been the situation had today's liquidation been in process when the country was called on to absorb into its economic life the 4,000,000 men who had so sacrificially borne arms in the world's great war.

So today we are left with this great fleet—many times the largest that has ever responded to the orders of a single owner—and the great question that confronts the Shipping Board, the problem toward which all of its organizing efforts have, so far, been directed, is the problem of the future of its vessels and of America upon the seas. For, in the successful operation of these vessels, lies the immediate hope of the establishment of an American merchant marine, and in an established American merchant marine lies our only assured hope of world trade, which means prosperity and happiness for America.

The fleet, under the control of the Shipping Board, which has been built and operated at a cost to the government's treasury of $3,500,000,000, will no longer be an irksome burden to the taxpayer. The building program is practically finished. Only such ships are being completed as are cheaper to finish than to scrap. The $25,000,000 appropriation from Congress, with possibly $5,000,000 more, will, by the end of this year, see the last of the government-owned fleet ready for operation.

Tying Up Tonnage

The Shipping Board has steadily been tying up tonnage, primarily to stop its own losses, which has incidentally resulted in permitting continued operations by private owners, who could not run in competition with the government (even were the government willing) during the present world depression. It is the board's duty to see that the utmost tonnage possible is being carried at this time under the American flag, but it is also its duty to see that private operators are fostered and that the government's loss is minimized.

We believe we have our losses checked and hope to require not more than $5,000,000 a month for operations from now until the end of the government's fiscal year, June 30 next. Five million dollars a month is a huge sum, but small compared to keeping alive an organization with $3,500,000,000 invested and operating and developing essential strategic trade routes, which must necessarily be run at a loss under the present trying conditions of world carrying trade. We cannot but believe that if we can produce a constructive policy, the taxpayer, hard pressed though he is, will not only approve of the continued operation at the present cost, but applaud same, in comparison to the previous loss entailed.

Liquidation

The liquidation of the $3,500,000,000 of the corporation's assets will, at any time, realize but a fraction of the original cost, because the fleet was built with understandable waste and high expense during war pressure. The money loss in liquidation need not be considered, since it has already been written off in the cost of the war and, as here outlined, served a function in full value.

What remains, though, are the ships—potentially one of the greatest assets America has to insure its economic future, which means to insure the pursuit of happiness by its people.

What then are the problems that must be met to permit these ships to pass into hands of private owners, to be sponsored under the initiative and energy of private ownership? What are the problems that stand in the way of the operations of American ships privately owned? What are the problems that stand in the way of an assured American merchant marine? Permit us to inventory America's future on the seas, at this time when world shipping conditions in general, and America's in particular, are at the lowest ebb, in proportion to existing tonnage, possibly ever known in the history of seafaring man under economic conditions.

World Tonnage

When the tonnage of vessels now building throughout the world is completed, there will be afloat an increase of nearly one-third, as compared to the existing pre-war tonnage. True, abroad, as well as in this country, many war-built ships are now regarded as useless. This is even true of Britain, considered the foremost of shipbuilding nations. However, the effectiveness of ships today has not yet returned to prewar standards. Disarrangement of trade routes, resulting in longer average voyages, is a factor that tends to counteract this excess, which is, however, vastly exceeded by the enormous dropping off in foreign trade.

The best estimate available today shows that in 1921, in tons of ocean freight, perhaps 60 per cent as much is moving as in 1913. Granting the premise that the last 10 or 15 per cent of trade makes or demoralizes the market, the possible 40 per cent deficit in ocean trade existing today eloquently speaks for itself.

Ocean Freight Market

As a result of this decrease in trade and the increase in ships since May, 1920, freights have fallen off and, as cargoes ceased to be available, vessel after vessel has been tied up, until now an amount of tonnage which practically represents the total visible excess of some 20,000,000 deadweight tons hangs over the ocean-carrying market, which will prevent an increase in freight to a remunerative basis for a longer time after trade improvement sets in. Half of this tonnage will never turn a wheel again, being unfit for profitable peace-time operations.

It is interesting to note that America is not alone stricken, as more than half of the laid-up tonnage fly foreign flags. Obviously, the nations who, for centuries, have been building trade routes, with generations of good will behind them, will feel the depression in much smaller measure than does our vast new American enterprise.

Ship Values

Because of the existing excess of tonnage, the values of bottoms have so dropped that time charters today are one-eighth of the going rates in the third quarter of 1919. A 10,000-ton steamer can be had under charter hire for a little over $11,000 per month, as against $100,000 when charter hire was at its height. In the face of these low rates the American owner finds himself confronted by the keenest of foreign competition, with the handicaps of higher wages, expensive victualing, and severe legislative requirements. Who will question that American living standards should be maintained on the seas as on the land, but to be maintained they must be paid for and the difference between American and foreign standards must somehow be met.

American ships cost more to build than foreign ships, because of higher American standards of living and, therefore, higher American wages. No American merchant marine can be created with ships operated under the American flag, but built in foreign yards. Domestic shipyards are as necessary to a merchant marine as the ships themselves, because, in case of need for tonnage when other nations could not or would not supply us, we might find ourselves with a woefully unbalanced fleet and, in time of war, without facilities for replacements and repairs.

American Operation

Therefore, from the standpoint of operation and original cost, with all it entails, America's new, young merchant marine is under financial handicaps of a major nature. Added to that, the sea routes of the world are controlled by other nations. Wherefore, we must spend, as every new business must spend, the moneys to get our share of the trade enjoyed by others. We are thus face to face with the question, What must be done that the American flag may not only be kept flying on the seven seas, but that America may take the place on the seas that her needs of world commerce and her position demand?

The merchant marine act of 1920, generally known as the Jones bill, has as its preamble a magna charta for America on the seas unsurpassed in the annals of our country's legislation:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That it is necessary for the national defense and for the proper growth of its foreign and domestic commerce that the United States shall have a merchant marine of the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency, ultimately to be owned and operated privately by citizens of the United States; and it is hereby declared to be the policy of the United States to do whatever may be necessary to develop and encourage the maintenance of such a merchant marine, and, in so far as may not be inconsistent with the express provisions of this act, the United States Shipping Board shall, in the disposition of vessels and shipping property as hereinafter provided, in the making of rules and regulations, and in the administration of the shipping laws, keep always in view this purpose and object as the primary end to be obtained."

Administration Attitude

The Congress that passed this legislation was thoroughly conversant with the handicaps to American ocean trade. President Harding was a member of the committee that framed it and none more inspiringly co-operated than he. And it is my privilege here to announce and confirm that the same inspiration which guided him in his work on this bill as a Senator, lives with him as President. His interest in the successful application of the Jones bill and the establishment of the American merchant marine has increased from the time of the framing of the bill until today, as his responsibilities have increased from Senator to President. No man living more whole-heartedly and determinedly calls for a permanent policy for American shipping than President Harding. No man living desires more keenly a permanent American merchant marine commensurate with American needs than President Harding. It is the inspiration and determination of President Harding that give heart to the Shipping Board to carry the great burdens it bears.

Senator Jones, whose name the merchant marine act of 1920 bears, will live immortal in our sea history.

It is unfortunate that because of intervening conditions it is only now, sixteen months after the Jones bill became law, that there exists a Shipping Board which for the first time is ready to consider the great questions of policy and the mandates contained in that legislation, in the application of which may lie the ultimate life or death of America upon the seas.

The Jones Act

The Jones act was obviously framed with the recognition that, because of conditions surrounding American sea carrying which we have covered, no American merchant marine could be established without extraneous assistance being created for its benefit. The Jones bill provides for the creation of what is hoped will be such extraneous assistance. For instance, it provides that American mail shall be carried in American ships, thereby giving American tonnage the benefit of revenues accruing from postal service originating in this country; it provides for through preferential rates on railroads, to be allowed only when property or passengers are carried in American vessels; it provides for the abrogation of treaties restricting America's right to impose discriminating custom duties and tonnage dues.

It was the thought and hope of the framers of the Jones bill that the application of these three major and several other minor provisions would render American tonnage such extraneous assistance as to increase their earning capacity, so as to enable our merchant marine to cope with foreign competition, in spite of its higher original cost and subsequent greater cost of operations. The existence of these laws and mandates in the Jones act is only the forerunner of what must be done to bring their application into being. Until this time there has not existed, as is well known, a fully constituted Shipping Board with the organization to study the applications of the provisions of the Jones act. A wrong application of these provisions, instead of building an American merchant marine, may destroy it. The right application, it is hoped, will insure the end so much to be desired.

Shipping Board Responsibilities

The present Shipping Board has three great responsibilities: first, the operation of the fleet which it inherited, pending its sale to private owners; second, the liquidation of its assets; and third, but far most important of all, the application of the Jones act.

That it might devote itself intelligently and inspiredly to the Jones act, the first sixteen weeks of the existence of the present Shipping Board have been spent in building an organization to operate the fleet and liquidate its materials. This, in itself, is a stupendous task, but is one which we feel is on the high road to ultimate accomplishment. And thus now for the first time a United States Shipping Board finds itself positioned to study and apply the great charter given it by the merchant marine act of 1920.

Next Four Months

That study and collateral work necessary to the same must perforce occupy a considerable span of time. But if in the next sixteen weeks the Shipping Board can make as much progress in this greater problem of the study and application of the Jones act as it has made in the past sixteen weeks in the operation and liquidation of its physical assets, it will have accomplished what its most ardent well-wishers dared not hope for. Seemingly insurmountable obstacles must be met.

There are those who, for myriad reasons, do not wish the status quo changed. Unfortunately, there are possibly American owners who, feeling secure in conditions as they exist and which have inured and can inure to the benefit only of a few, of whom they form part, selfishly cannot see unbiasedly the greater picture of a greater American merchant marine and are loath to aid in bringing about any greatly changed conditions.

Obviously, we cannot gain trade on the seas without displacing the existing trade enjoyed by foreign ships. And these foreigners are ever at work, silently but surely, in their own national interest, for which we cannot blame them, to undermine possibility of an American merchant marine. The Jones bill must be given life by the present board. These hostile forces from within and without, sowing seeds of discord and distrust, must be met and vanquished.

No "Magic Wand Stuff"

Such an accomplishment cannot be realized, as President Harding has said, "by the waving of a magic wand." Those who are truly interested in the winning of the seas to America, in their impatience are crying aloud for results faster than they can be brought about, and, unwittingly, are the aiders and abettors to those who would destroy the possibility of an American merchant marine.

The Shipping Board, inheritors of a war-built business with all its consequent weaknesses; the Shipping Board, with all the opportunities for statesmanship which have been put on it by the Jones act, begs the patient indulgence of the country while it does the foundation work necessary to bring the Jones act into life. And if that confidence is lacking, or, if impatience from any quarters does not give opportunity to the Shipping Board to build truly and soundly, then is America's economic life on the seas, for the next generation, dark indeed.

America Must Realize Shipmindedness

For America, self-contained and self-sufficient while it was conquering an empire of magic wealth, finds itself now approaching the time of vast surpluses which must be sent out into the lands of the worlds beyond the seas, if employment at home and maintenance and stabilization of domestic prices are to exist. We cannot rely on foreign bottoms to carry this surplus, for the foreign bottoms necessarily are owned by those nations which have the foreign trade, and when they find our competition pressing the most they will also find reasons and conditions not to give us the bottoms necessary to carry our commerce.

AN APPEAL FROM THE MIDDLE WEST

Interior Chambers of Commerce Interested in the Success of the American Merchant Marine

RESOLUTIONS constituting "The appeal of the Middle West for the establishment and maintenance of an American merchant marine" adopted at Cincinnati, Ohio, on October 7, 1921, at a meeting of the Chambers of Commerce of the Middle West held under the joint auspices of the Cincinnati Chamber of Commerce and the National Merchant Marine Association:

Whereas, the excessive ocean freight rates and the shortage of ocean transportation, caused in 1914 by the withdrawal of foreign ships, on which we have heretofore relied to get our product to foreign markets, cost our producers and shippers of the Middle West large sums of money; and

Whereas, the congestion of traffic and the consequent paralysis of our transportation and industrial systems, caused in 1919 and 1920 by our continued attempt to ship the great bulk of our exports through the "neck of the bottle" at the North Atlantic ports, cost us similarly large sums of money; and

Whereas, during the world war this dependence on foreign tonnage and this congestion at North Atlantic ports so overburdened our transportation system as to render it almost impossible to get troops and supplies to Europe, thus jeopardizing our chance of victory and our national safety; and

Whereas, these great lessons of the last decade have taught us the absolute necessity of an adequate and properly distributed American merchant marine, not only as a means of maintaining and extending our foreign market, but also as a measure of national defense; and

Whereas, the Jones Merchant Marine Act of 1920, passed almost unanimously by Congress, has certain provisions specifically intended to enable us to maintain a merchant marine in spite of foreign competition, namely, Sections 28 and 34, which provide respectively for preferential rail rates and preferential import duties on goods carried in American ships; and

Whereas, the Jones bill has also certain provisions, namely, Sections 7 and 8, specifically intended to prevent a recurrence of the congestion of 1919 and 1920 by providing for the establishment and maintenance of trade routes from the Gulf, South Atlantic and Pacific ports, as well as from the North Atlantic, to be operated by the government if necessary when at a temporary loss until the trades can be built up to such an extent that local companies can charter and subsequently buy the ships used on such routes, thus interesting a larger number of people financially in our merchant marine and thereby extending and developing the market for the ultimate sale of our government-owned tonnage; and

Whereas, it would be a very false economy, as well as a violation of the Jones bill, to attempt to save money by tying up ships to such an extent as to cripple or handicap in any way the development of these trade routes in particular, or of any adequate steamship service in general; and

Whereas, we feel that the carrying out by the government of these specific provisions of our existing Merchant Marine Act is the first necessary step for the establishment of an American merchant marine; and

Whereas, we feel that there can be no hope of a real development of an American merchant marine unless, as expressed by President Harding in his letter of September 20, 1921, to the National Merchant Marine Association, a national attitude of mind shall be developed and sustained in sympathy and understanding with the efforts of the government to establish such a merchant marine;

Therefore, we appeal to the President, to Congress and the United States Shipping Board:

First: To co-operate actively and wholeheartedly in carrying out Sections 28 and 34 of the Jones bill, so that we may no longer be subject to the danger of a repetition of the financial losses inflicted upon our producers and shippers in the Middle West, as a result of the excessive ocean freight rates caused by the withdrawal of foreign ships in 1914.

Second: To co-operate actively and wholeheartedly in carrying out Sections 7 and 8 of the Jones bill, providing for the establishment of trade routes from the Gulf, South Atlantic and Pacific ports, as well as the North Atlantic ports, so that the producers of the Middle West may no longer be forced to ship through the "neck of the bottle," at the North Atlantic, and may no longer be subject to the danger of a repetition of the financial losses inflicted upon them as a result of the congestion of 1919 and 1920.

Third: To co-operate actively and wholeheartedly in working out a plan whereby an adequate fleet of tramp steamers and an adequate number of tramp ship operators can be maintained in readiness to meet promptly the fluctuating demand for tonnage caused by the seasonal movement of many of our exports of largest volume, particularly our agricultural products, which are now in large part carried on foreign ships.

Fourth: To make an immediate and impartial study of our present laws affecting shipping and of the operation of our fleet under these laws, with a view to the repeal or amendment of any legislation that may be unduly hampering the development of our merchant marine, and with a view to the passage of such additional legislation as experience may prove to be necessary for the development of our merchant marine in competition with foreign fleets; and

Further, we appeal to our exporters and importers: To co-operate in the establishment and maintenance of an American merchant marine by specifying that their shipments should, whenever possible, be carried on American ships; and in order to make this practicable we urge the representatives of the industries controlling the largest volume of our imports and exports to confer as once with the Shipping Board and to co-operate with the board in working out ways and means wherever necessary by which they can obtain as satisfactory rates and service from American ships as they can obtain from foreign ships; and

Further, we appeal to our bankers, particularly to those who are financing foreign shipments:

To co-operate in the establishment and maintenance of an American merchant marine by using their influence, in every legitimate way, on our exporters and importers, to persuade them to ship in American rather than in foreign bottoms; and

Finally, we appeal to the rest of the nation—to the Pacific, the Gulf, the South Atlantic and the North Atlantic states—and to the National Merchant Marine Association and to all other organizations interested directly or indirectly in the development of the American merchant marine, to co-operate with us of the Middle West in the carrying out of this program.

Additional Resolutions Adopted at the Cincinnati Meeting

Whereas, we of the Middle West have today drawn up and adopted a program which, we believe, if carried out, will help in the development of an American merchant marine; and

Whereas, we believe that it is vital to the interests of the Middle West and to the entire nation that this program should be carried through to completion;

Therefore be it resolved, That a special committee shall be appointed forthwith, whose duty it shall be to follow up the various matters covered by this program with the President, with Congress, and with the United States Shipping Board; with our exporters and importers; with our bankers; with the other parts of the country, and with the National Merchant Marine Association and all other organizations interested directly or indirectly in the American merchant marine; and that said committee shall have power to increase its membership and to determine its own procedure.

IMMIGRATION ON A PERCENTAGE BASIS

New Law Makes Puzzling Situation for Steamship Lines

IN the New York Times for October 2, Mr. Joseph Mayper, formerly acting chief of the Americanization Division of the Department of the Interior, has a very informative article on the situation developed by the enforcement of the new immigration law. The quotations from traffic managers cited by Mr. Mayper showed that this law is causing a very great deal of difficulty and producing many trying situations for everybody concerned. The immigrant, the government, and the steamship lines, particularly those operating on the North Atlantic, are all suffering acutely and are all getting to the breaking point over the confusion incident to questions of international law, the distinction between nationality and nativity, the classification of exempted aliens, such as tourists and professionals, and many other points upon which the law is not clear and upon which decisions are becoming increasingly difficult.

In those cases where the maximum quotas are small, such as Albania, Bulgaria, Danzig, Fiume, Luxemburg, Palestine, all of which are entitled to less than sixty a month, these difficulties are aggravated. When foreign nationals are traveling in a stream from dozens of ports and coming in at all ports on both coasts and at all points of both the Canadian and the Mexican border, it is easy to see how embarrassing situations multiply at a port like New York and how steamship companies, acting in perfect good faith both with their government and with their immigrant passengers, may be caught by circumstances over which they themselves have absolutely no control, and forced to deport shiploads of aliens.

The law, after a very vigorous discussion for months in Congress, was signed by the President on May 19 to go into effect on June 3. Thus the world was given two weeks in which to adjust international machinery to a new American policy. When on top of this hasty action the quotas for nationalities and the departmental regulations for enforcement were not officially announced until two days before the law became operative, the resultant confusion was so great that the Secretary of Labor, acting under Section 3 of the old immigration law, authorized the landing of all aliens arriving on steamers that had sailed from Europe prior to June 8. A bill was then passed in Congress permitting these aliens so admitted to be charged against the various quotas for the following fiscal year. The Department of Labor, charged with the enforcement of the law, had no machinery for control at the sources of immigration, and the State Department refused to utilize its consular visé system for the control of immigration abroad without special Congressional authority. So that the steamship lines themselves were forced to undertake the task of regulation in Europe. The trans-Atlantic passenger conferences arranged to have European offices of the co-operative lines cable advice on steamer sailing days, giving the numbers and nationalities of embarking aliens of all classes. This information was also furnished to the immigration commissioners of the various ports. These cable reports, corrected constantly by whatever government figures are available, have been issued regularly every few days and are being sent to all lines and to government officials, and cables of warning are dispatched by the conferences here to European clearing houses whenever the arrivals and sailings for any nationality approach 50 per cent of the monthly quota.

One difficulty with the system is that the numbers charged against the monthly quotas are based on actual admissions to America instead of actual departures from the source. The Department of Labor has declined to change the ruling in this regard, although it is clearly evident that the latter criterion would be the only basis by which all the lines through their clearing houses could so regulate their embarkation as to be able to prevent any excess of quotas reaching this side. The lines co-operating in the conferences could also be more readily controlled under such method, and it would be much easier to effect a system of quota apportionments among the various carriers by governmental control at the point of embarkation.

Where the present method is used of adjudging quotas by actual arrivals and admissions in American ports, storms, fogs, and other acts of God may set at naught the best laid plans of steamship operators. For instance, the Italian steamship Calabria, due to arrive on July 27, was delayed and reached New York on August 1, thus affecting the schedules and quotas for both July and August, and the June allotment for Portugal was upset by the unexpected arrival of two tramp schooners, one at Boston and the other at Providence, with almost enough Portuguese immigrants on board to fill the full quota for the month. One of these schooners had been at sea thirty-seven days and the other forty-three days.

Some of the non-conference lines have formed the habit of anchoring outside the three-mile limit and racing into quarantine a few minutes after midnight on the last day of the month. Any one of the ships thus handled might have the full quota of any one nationality for the full month and those on board the other vessels would have to be deported. Making the count solely with reference to the admissions on the American side creates complications resulting from competition between slow and fast liners, short and long routes, etc., and adds endlessly to the confusion of the whole matter. Such situations could certainly be prevented by charging the aliens embarking against the quota for the month in which they embark.

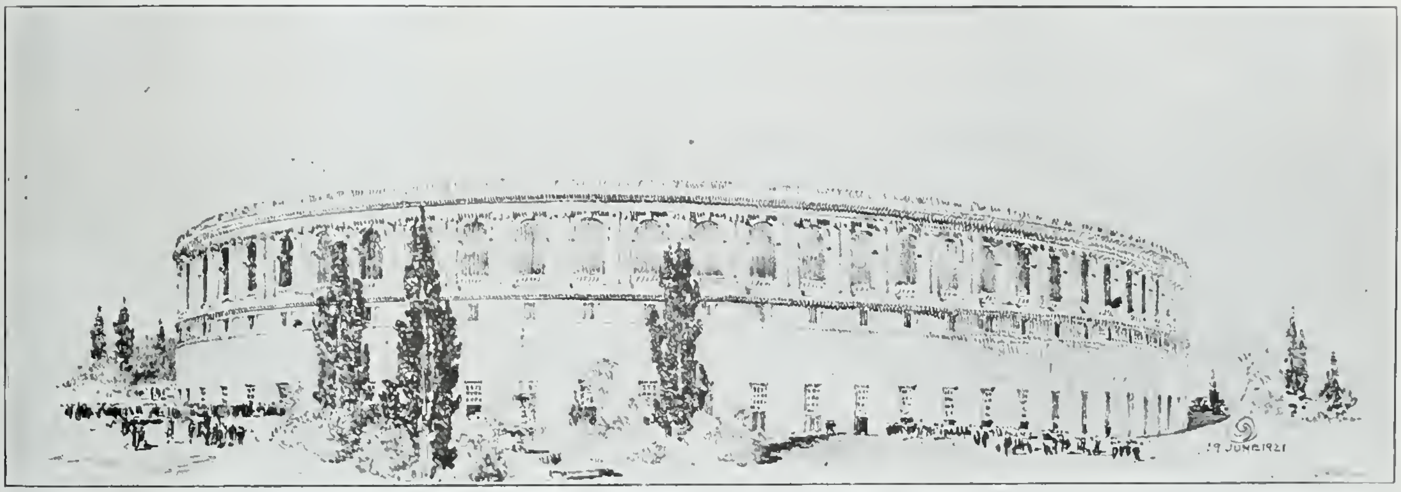
In June the quotas for twenty-three out of thirty-seven nationality groups were exceeded by 11,741, while for the remaining fourteen groups the quotas were not reached by nearly an equal number. In July the efforts of the lines to create order in the business were commencing to tell, and the monthly quotas were exceeded for only eleven nationalities and for a total of only 623, while for the other twenty-six nationality groups the number brought in did not reach their quotas by 43,290, or nearly two-thirds of the entire quotas for the month. In August a still better showing was made when only seven nationalities exceeded their monthly quotas for a total of 3490, while the remaining thirty groups were 41,197 short.

These figures were given out by the manager of the Lloyd Sabaudo Line. If they are correct, they indicate that the steamship companies are making a very determined and earnest effort under great difficulties to clear up this extremely confusing situation, and they also indicate that there is very little need for the expressed impatience of Federal officials and the recent characterization by them of "dishonest steamship agents" and their impositions on government agents.

It seems to us largely a matter of that well known and very lamentable lack of co-operation between government departments. The State Department should be designated as the administrator of the immigration law and the count of quota should be at the source. The present method of administering this law is very much like locking the barn door after the horse has been stolen.

THE FLAGSHIP OF AMERICAN FOOTBALL

Great Memorial Structure at the University of California



Artist's drawing of memorial football stadium for the University of California at Berkeley

OVER at the University of California, greatest institution of its kind in the world, the Associated Students are building an immense ferro-concrete vessel. This structure is to serve both as a very fitting memorial to the university men lost during the war, and also as a training ship or carrier for the athletic activities of the university student body.

The plan is being financed by subscriptions mainly among the alumni and student body. These subscriptions are in units of $100 on various terms, and each subscription entitles the subscriber to seats at games to the value of $10 per year for ten years. The alumni and general subscribers are raising $1,000,000, and the student body $500,000. As we go to press these sums are practically guaranteed.

The specifications are: length over-all 728 feet, beam molded 528 feet, depth molded 90 feet. She is built on the two-deck principle of reinforced concrete and has a capacity for 60,000 rooters comfortably stowed on the steps of her ample sloping decks.

The berth for this immense barge has been acquired through purchase of four blocks adjacent to the university property. This site is on the first slope of the Berkeley foothills, and the great seaward wall of the stadium, 728 feet long and 90 feet high, will be the most prominent landmark to greet the eye of the mariner coming in at the Golden Gate.

Dedicated to California's heroes who laid down their lives in the service of their country, housing the supreme efforts of friendly rivalry in America's great intercollegiate sport, facing the great gateway to the commerce of the Pacific—who shall measure the influences that this building on this site shall have in shaping the future of the American merchant marine?

Here every Saturday afternoon in the football season thousands of students, exultant in victory or sobered by defeat, shall turn to the west and behold the celestial artist paint a broad path of gold across the deep blue waters of the Pacific Ocean, an added laurel to the victor's crown, an emblem of hope for the morrow, and a constant enticement to entrance into the struggle for supremacy in that greater arena of commerce which lies beyond the Golden Gate.

FREE PORTS AND FREE ZONES FOR THE UNITED STATES

By HENRY M. ROBINSON,
President the First National Bank of Los Angeles and the Los Angeles Trust & Savings Bank

In this paper Henry M. Robinson, former member of the United States Shipping Board, develops a very interesting argument in favor of the present bill before Congress for the establishment of free zone districts in the principal ports of the United States.

The principle of free ports or free zones would seem to be almost axiomatic in the case of any nation following a protective tariff policy. It has been practiced in Europe for centuries and has come to be recognized as a necessity for that freedom in turn-around and trans-shipment which alone can build up the foreign shipping of any nation.

We have now in the United States recognition of the necessity for such districts in our laws governing the trans-shipment of goods in bond and the storage of such goods, duty free, in bonded warehouses. The free zone idea would, if adopted, extend the principle of the bonded warehouse, free from red tape restrictions, to certain districts in our ports and would make possible in those districts the ready re-distribution and manipulation of ships' cargoes for trans-shipment without hindrance by Custom officials.

THE surge of the trading nations of the world to re-establish their foreign commerce brings again to the fore a proposal which has frequently been discussed in this country—a proposal for the establishment of so-called "free ports" or "free zones in ports" in the United States.

Bearing on Foreign Trade

At the present, the subject is of much greater importance to this country than at any time in the ten years that the project has been under consideration—first, because of the bearing which the inauguration of such a policy must have on the maintenance of the foreign trade which the United States built up during the war; secondly, because of the fact that the United States now has a large merchant marine whose profitable operation, if not actual existence, is dependent on making the best use of our ports and trading facilities. Many proposals of tremendous beneficial potentialities are lost because not made at the proper juncture. Let us hope that this time the proposal is better synchronized.

There are, unfortunately, many misconceptions concerning free ports and the advantages of their establishment which have developed during discussions in recent years. **What is really meant by a free port is a free zone within a port of entry—a segregated district where imported merchandise can be unloaded from ships, either stored, exhibited, broken up, repacked, assembled, distributed, sorted, refined, and graded, or cleaned and mixed with foreign or domestic merchandise and otherwise manipulated, which may be exported in its changed or new form without interference or charge made by the Customs authorities of the United States. However, if any part of such merchandise before or after being manipulated should move from the free zone into a domestic market, the customs duty must be paid.**

Foreign Trade Zones Defined

Senator Jones, in his bill, has adopted the expression "foreign trade zones," which term much better describes the purposes and uses, and much better defines the proposal. These zones, as proposed, would be of limited area ranging from a few acres to possibly several hundred acres. They would have their own waterfront, wharves and warehouses. **The goods entering these zones would be unloaded without the regulations or delays of Custom House inspection;** in fact, our Customs officials need have no knowledge or concern that the merchandise exists; and it could be kept within the foreign trade zone indefinitely since, within the meaning of the tariff law, technically it would not be within the Customs boundaries of the United States.

Heretofore, opposition to the establishment of foreign trade zones has seemed to center under two heads: first, that it meant some attack on the principles involved in a protective tariff policy, and, secondly, that some few ports, where foreign trade zones were to be established, would thereby acquire an advantage over other ports and also over the interior.

Tariff Policy Not Affected

It would appear that the fear of the protectionists that the establishment of foreign trade zones would negative to some degree a protective tariff policy cannot fairly be sustained because, in practice, all merchandise coming through a foreign trade zone into the Customs territory of this country will pay the customs duty as at present; and only such merchandise imported into a foreign trade zone as is trans-shipped will escape the customs duty.

As a matter of fact, the principle that imported merchandise retained for trans-shipment and actually trans-shipped should not pay the customs duty is already recognized by law in the United States. Under certain provisions of our statutes, merchandise falling under this classification may be impounded in bonded warehouses, shipped in bond across the country for trans-shipment by water, or even trans-shipped in bond abroad. Furthermore, merchandise on which the customs duty has been paid may be manufactured in connection with domestic products, and when shipped abroad become entitled to a refund of the duties paid, provided the imported merchandise so attached or worked into the domestic commodity is, at time of shipment abroad, susceptible of identification.

While the principle is identical with the proper use of a foreign zone, the carrying on of foreign trade under these statutes has in a large way been a failure, owing to the cost in carrying charges and financing, and loss of time and inconvenience in the way of meeting the technical regulatory provisions.

We have acknowledged the underlying principle, but

have burdened the operation of trans-shipment so greatly that, broadly speaking, it is ineffective, and relatively inoperative. The foreign trade zone is the practical and economic basis for operation under the principle now on our statute books and already accepted.

Relation to Merchant Marine

It must be recognized that if we are to engage in foreign trade, if we are to maintain a merchant fleet and are to continue our protective tariff, the foreign trade zone is a necessity, and the higher the protective tariff, the greater need for a foreign trade zone.

Another widespread misconception has been that those ports where free zones were to be established would have some advantage over the rest of the country, especially the interior. This is not the case under the present proposal. Originally, the propaganda for foreign trade zones contemplated their establishment in about three ports on the Atlantic Coast, and one or two on the Pacific. The present discussion, however, provides for the establishment of foreign trade zones in each of our important ports of entry. This is a great stride in the right direction, for if all of the foreign trans-shipment were to be done in the ports of New York, Philadelphia and New Orleans on the East Coast, and in only one or two ports on the Pacific, the congestion of traffic to and from these ports would place an additional burden on rail terminals already overloaded, and would result in an uneconomic transportation into the back country of merchandise intended for domestic consumption.

Free Ports and Zones Differ

As regards the people of the interior who have felt that the plan would place the interior at a disadvantage compared with the rest of the country, it is only necessary to repeat that there is no such thing as "free ports" in the sense of competition with domestic production. In no country where a protective tariff exists are there any free ports, although in such countries there are free zones within ports, and there is a vast difference between these two things.

Of course London has the greatest consignment trans-shipment market in the world; but England needs neither free zones nor foreign trade zones, as she is a free trade nation and her regular ports have had all the privileges that would be imparted by the setting up of foreign trade zones. Germany, with a protective tariff before the war, developed several ports where the principle of foreign trade zones was extensively carried on. From 1882 Hamburg has maintained a district where merchandise from abroad could come in and be handled and manipulated, and even manufactured, without the payment of customs duty. This resulted in the creation of world trade with Hamburg as the center. One or two other German ports also maintained foreign trade zones.

Port of London Operations Detailed

Although the port of London does not maintain a foreign trade zone, as such, a tremendous foreign trade trans-shipment business has been built up owing to the fact that all merchandise has moved in and out free from customs duties and regulations, and still does, except for war measures. At London, as a result, a tremendous market has developed under which shipments of commodities from all over the world may be made on consignment. These commodities are held in London, financed to a large percentage of their value, and then marketed throughout the world in an orderly manner.

The general merchants receive consignments of rubber, American and Egyptian cotton, South American, Australian and American wool, hemp, sugar, coffee and a hundred other commodities, and for nearly all of these commodities London's prices govern world prices and affect the sale value of the product of the smaller producer in other countries. In practice, the shipper is credited with, say 80 per cent of the present value, and merchandise held and marketed as possible, and the balance accounted for when sale is completed. This creates a center where prices are determined and stabilized. This, of course, is advantageous not only to the British trade, but to British industries as well.

There is every reason why the United States should put itself in a position to obtain the marked advantages that would come from such a consignment market, in the interest of industry, in the interest of trade, and last, but not least, in the interest of maintaining a merchant fleet.

Provisions of Jones Bill

The so-called Jones Bill (Senate Bill No. 2391), introduced by Senator Jones of Washington, and shortly to come up for open discussion, provides for the establishment, operation and maintenance of "foreign trade zones" in ports of entry in the United States. But one zone is authorized in any port of entry, except when the port of entry is located within the confines of more than one state, when a zone may be authorized in each state in the territory comprised in such port of entry. The Secretary of Commerce is authorized, in his discretion, to grant to public corporations the privilege of establishing such zones. ("Public corporations" are defined as a state, a legal subdivision thereof, or a municipality, or a lawfully authorized public agency of a state or municipality.)

When such privilege is granted and the zone set up, foreign and domestic merchandise of every description —except such as is prohibited by law—may be brought into this zone and there stored, exhibited, repacked, assembled, distributed, sorted, refined and otherwise manipulated without being subject to the Customs laws of the United States, except as otherwise provided in the Act; and such foreign merchandise may pass the boundary of such zone into the Customs territory in the original package, or after manipulation, only upon payment of the customs duty.

Under the terms of this Act, no duty is to be applied to merchandise delivered from ship to wharf within a foreign trade zone until some part or all of it moves out of such zone for domestic consumption, at which time it will pass through the Custom House and be subject to the regular duty.

Free Zones and World Trade

The maintenance of a merchant fleet is obviously predicated on world trade. It is therefore evident that a high protective tariff and world trade and the maintenance of a merchant fleet with the commercial accompaniments of such operations are inconsistent.

The experience of European nations shows conclusively that a modification of this inconsistency can be brought about without definite injury to the principle involved in a protective tariff if foreign trade zones, free from customs duties and regulations, are established.

In fact, if the feeling continues to grow that we should engage in world trade and maintain a merchant fleet as a necessary corollary, the high protective tariffs must, of necessity, be greatly modified, unless some method is devised that will permit a world trade in merchandise in and out of our important ports of entry, without the delays and expense attendant under our present methods for trans-shipment.

Would Limit Serious Delays

If it be true that the cost of operation of our merchant ships is to be greater than that of the important competing nations, because of higher wages and higher living standard for the men who go to sea, some method must be devised to balance that loss. The two great economic wastes in the shipping business are, voyage without adequate cargoes and loss of time in ports, and especially that loss due to delays resulting from the administration of complex laws and regulations—regulations which unfortunately lie within the province of many different governmental departments. It is recognized that the elimination of port delays would be of great economic advantage and that successful ship operation depends on keeping the ship at sea at the work for which it was built, and filled adequately with cargo.

A foreign trade zone, limiting, as it does, serious delays would permit the prompt unloading of the ship within the boundaries of the zone and later such part of the cargo that was intended for domestic consumption could move through the Custom House to its destination, as well as furnish additional cargo.

While it is to be recognized that ships other than those under our flag will have the same advantage in our ports, it is fair to assume that ships under our flag touch more often at our ports, in a given period of time, than the ships under other flags; and to that extent, at least, there would be a factor for improvement in the cost of the operation of American ships.

Another great advantage in the operation of our merchant marine ships would be that we would be in the same position as our competitors in the making of the so-called triangular voyages, and in the movement of cargoes to our ports where only a part of such cargo would be intended for consumption in our country.

Effects of Jones Bill

The problem of the American ships has been that while we have merchandise for export shipment, only too often it is necessary for the ships to return in ballast. On the other hand, the English, a Free Trade people, have been until recently able to fill their unoccupied space in their ships outward bound with coal for foreign countries and for bunkering (and this condition is again returning), returning with cargoes of commodities from foreign countries, partly for home consumption and partly for trans-shipment, and very often all under consignment for trans-shipment only, and trans-shipment made without any regulatory practices that result in delays and without our customs expense. This, too, was true in Germany because of the free port zones long since established.

Should the Jones bill become a law, our protection principles will be conserved; because, otherwise, if we engage in foreign trade in any large way, pressure will, in the course of time, result in a marked modification of the present protective tariff laws, all of which might be unnecessary or even obviated, if we could maintain our foreign trade and our merchant fleet through the medium of foreign trade zones.

Without Injury to Established Principles

It is to be recognized that the two groups who should be most interested in the establishment of foreign trade zones free from customs duties and regulations are the high protectionists and those engaged in foreign trade, including the ship owners and operators. It is to be recognized, too, that generally the views of these two groups are widely divergent. Nevertheless, the whole country and its domestic trade and industry and the financial element in each community have an indirect interest in the establishment of such machinery, without injury to any of our established principles, and actually for the benefit of all.

A GOOD USE FOR WOODEN STEAMERS

THE first of October has come and gone, and the wooden ship fleet of the United States Shipping Board is still afloat and unsold. We assume, therefore, that the United States Shipping Board will welcome suggestions for the use of these vessels.

We note with pleasure a suggestion made by our friend and correspondent, John L. Bogert, in the New York Tribune for October 5, that these ships be used for school purposes. Quoting Mr. Bogert's article:

"Not to mention their conversion into hospitals and homes, they certainly are worth the substantial part of their cost as schools. Equipped as they are with engines, boilers and propellers, they can be used to help every public school boy in our sea and river ports to understand the fundamentals of marine engineering, and equipped as they might be with machine tools, they would fill a long-felt want in supplying technical shop instruction to these same boys."

This use certainly, if applied very widely on the waterfronts of most of our seaports, would engage the services of the majority, if not all, of the wooden steamers and surely open up a very attractive perspective along educational lines for the adventure-loving youth of our coast states. In practically every American city every fall season there is a more or less acute shortage of schoolroom space, and by co-operation with the school boards the Emergency Fleet Corporation no doubt could salvage a very large proportion of the cost of their wooden steamships. There is, as Mr. Bogert points out, plenty of precedent for the use of ships for school purposes and plenty of warrant for the assumption that such a use would take very well with the majority of the boys in our public schools.

It is futile and worse than useless to keep on hoping that these wooden steamers may be sold to advantage as commercial ships. They simply cannot compete with a steel steamer, much less with a motorship.

They can, however, be distributed among the ports of the United States and at the rate of from one to five in a port serve many useful purposes when moored along our waterfronts.

The Shipping Board, the Emergency Fleet Corporation, or whoever owns and cares for them, can easily afford to give them away to any municipality for public work service rather than keep them at a constant expense with no return.

HISTORY OF THE ANDREW JACKSON, MEDIUM CLIPPER SHIP

By F. C. MATTHEWS

High o'er the knight-heads flies the spray,
  As we meet the shock of the plunging sea,
And my shoulder stiff to the wheel I lay,
  As I answer "Aye, aye, sir, hard a lee!"

With the swerving leap of a startled steed,
  The ship flies fast in the eye of the wind,
The dangerous shoals on the lee recede,
  And the headland white we have left behind.

The topsails flutter, the jibs collapse,
  And belly and tug at the groaning cleats;
The spanker slaps, and the mainsail flaps,
  And thunders the order, "Tacks and sheets!"

'Mid the rattle of blocks and the tramp of the crew,
  Hisses the rain of the rushing squall.
The sails are aback from clew to clew,
  And now is the moment for "Mainsail haul!"

Aand the heavy yards, like a baby's toy,
  By fifty strong arms are swiftly swung;
She holds her way, and I look with joy
  For the first white spray o'er the bulwarks flung.

"Let go and haul!" 'tis the last command,
  And the head-sails fill to the blast once more,
Astern and to leeward lies the land,
  With its breakers white on the shingly shore.

From "Tacking Off Shore" by Walter Mitchell

SECOND of our series of articles on celebrated members of the world-famed California clipper fleet, this paper deals with the ship whose passages were more generally heralded and exploited as being "phenomenal" and "record-breaking" than were those of vessels honestly and actually entitled to such distinction.

The captain of the Andrew Jackson consistently refused press agents and others interested access to his log books, giving out for publication only broad and general statements, some of which were subsequently disproved by friends of rival ships. It may also be here stated that the name of the Jackson does not appear at all in Lieutenant Maury's "Sailing Directions," because, contrary to the custom of practically all other clipper captains, her master did not furnish data from his logs for incorporation in the lieutenant's book. The "Directions" contains log-book details of several thousand voyages over the various world-wide trade routes, made prior to 1859, and is authoritative and official.

Our present article will not attempt to detract from the merits of the Jackson, but will give her full credit for a series of exceedingly fast passages, fast even for a "McKay eighteen-knotter." Hard facts and figures obtained from unquestioned authorities will be found to refute the claim that she broke a record in any instance.

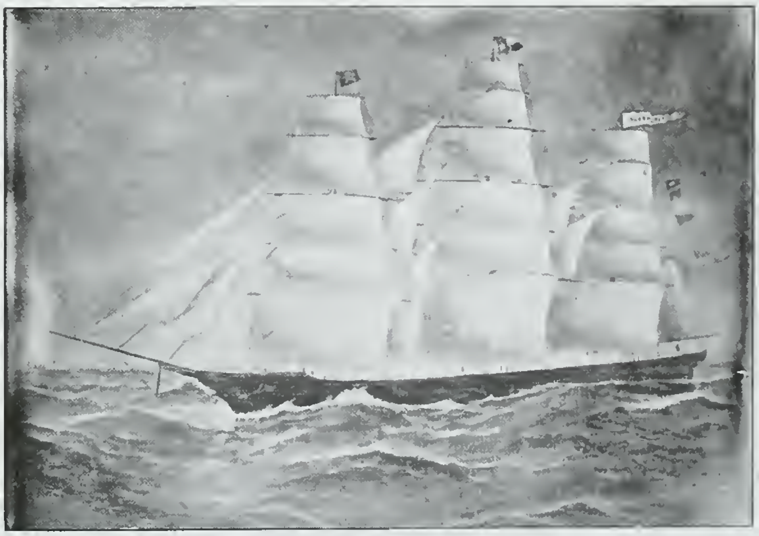


Photo by P. F. Watts from a painting at Sailors Snug Harbor
American medium clipper ship Andrew Jackson

The Andrew Jackson made seven passages to San Francisco, Captain John E. Williams being in command for the first five. Captain Johnson took the ship toward the end of 1860, remaining in charge until she went under British ownership in 1863. The following is an epitome of these voyages, details being given later:

San Francisco Passages

First voyage: Arrived at San Francisco November 20, 1855, 128 days from New York. Had a good run of 10 days hence to Mazatlan in December; thence proceeded to the port of Altata, where loaded logwood; had a fair passage thence to New York; reported, about 92 days.

Second voyage: Arrived at San Francisco February 28, 1857; had sailed from New York November 15, 1856; passage 105 days. Sailed hence June 26, 1857, with a cargo of California produce—barley, hides, wool, tallow, shells, etc., and "1 bbl. wheat." Arrived at New York September 22, 88 days passage.

Third voyage: Arrived at San Francisco April 27, 1858; had left New York January 16; passage 101 days. Sailed hence July 1; arrived at New York October 10; 101 days passage. Had the customary cargo of California produce, including "1388 blocks of California marble."

Fourth voyage: Arrived at San Francisco April 5, 1859; had sailed from New York December 23, 1858; passage 103 days. Sailed hence May 27 and arrived at New York August 22; 87 days passage.

Fifth voyage: Arrived at San Francisco March 24, 1860; had left New York December 25, 1859; passage 90 days 12 hours, anchor to anchor; 89 days 20 hours, pilot to pilot. Sailed hence April 26, 1860, in ballast for Callao; arrived out June 8; 43 days passage. Sailed from Callao in ballast June 20; arrived at New York August 22; 63 days passage.

Sixth voyage: Arrived at San Francisco May 4, 1861; had sailed from New York January 21; passage 103 days. Sailed hence July 31; arrived at New York November 9; 101 days passage.

Seventh voyage: Arrived at San Francisco May 21, 1862; had sailed from New York January 27; passage 114 days. Sailed hence July 10; loaded a cargo of spars at Puget Sound and sailed from Port Townsend about October 6. Arrived at Ferrol, Spain, January 12, 1863, claiming to have made the passage from Cape Flattery in 95 days. From Spain she crossed to New York, arriving April 11, 1863, after a boisterous passage of 25 days; had encountered thick weather with much ice and many icebergs on March 31 and been obliged to steer to southeast for twenty-four hours to get clear.

Sold to British

This voyage ended the career of the Andrew Jackson as an American ship, for on September 30, 1863, she left New York under the British flag bound for St. Johns. On March 2, 1865, she was reported as arriving off Dover from Soerabaya, Java, December 3, 1864, bound to Amsterdam.

Between her fifth and sixth Cape Horn voyages she is said to have made a round between New York and Liverpool, which would necessarily have been in the fall of 1860, and her last voyage under Captain Williams. Particulars of days and dates are not now available, but it has appeared in print that on her homeward passage she was 15 days from Rock Light to Sandy Hook.

Following are some details of her different voyages which are of interest:

Outward bound on her first voyage she lost a portion of her cutwater, had bulwarks stove, and sprung jibboom off the Horn. From 50 degrees south in the Pacific to within 700 miles of San Francisco her time was reported as having been 36 days; very good, but not a record.

On her second voyage it was claimed that she covered practically the whole distance from the equator to San Francisco in 16 days. While discharging cargo at Jackson street wharf she was fouled by the steamer Columbia, berthing on her arrival from Oregon, lost her jibboom, and had her bowsprit split. Her homeward run on this voyage was given as 85 days, but dates of sailing and arrival out show 88 days, as previously stated.

The outward bound time on the third voyage was the cause of considerable controversy and resultant newspaper correspondence. As originally claimed, the time was 99 days, or considerably under the run of the Twilight, Mystic-built medium clipper, of 101 days made about that time. However, when all necessary particulars had been obtained, it was found that the Jackson's passage was 100 days, 16½ hours, and the Twilight's 100 days, 20 hours, the time in both instances being computed from dropping New York pilot to passing Fort Point, San Francisco harbor. It developed, however, that Twilight was but 74 days from New York to the Pacific equator and was within 900 miles of San Francisco on her 88th day out, while Jackson had 81 days to the Line and exceptionally favorable winds thence, which retrieved her passage. Homeward bound this voyage the Jackson claimed to have crossed the Atlantic equator 70 days out and to have had 32 days thence to port.

Outward bound on her fourth voyage it was claimed that she was up with the Horn in 49 days and crossed the line 82 days out. Her homeward passage was represented as being 83 days only, but there is no question about the correctness of the dates previously quoted, and they show 87 days for the run.

Record Controversy

The outward passage, voyage five, was the cause of much controversy. The time as first reported, 89 days, 7 hours, from New York, would have been a record and that made by a ship not of the clipper class, so that much interest was aroused. The Evening Bulletin of Saturday, March 24, 1860, had the following: "The Andrew Jackson—By the Eternal, she has made one of the quickest passages on record. At the moment of writing the time reported is equal to the best of the Flying Cloud's. When the days and hours are counted, we shall be happy to award the palm to one or the other. As the news reaches us at the moment of going to press, the Cloud must look to her long-worn laurels. (Then following in italics.) The ship Andrew Jackson to the consignment of DeWitt, Kittle and Company is telegraphed off the Heads, 89 days from New York."

The Daily Alta California of March 29 published the following letter:

"Editor Alta: I notice an article in your paper of the 25th inst. stating that the ship Andrew Jackson had arrived the day previous in 89 days 7 hours from New York, making the best passage on record and beating the quickest voyage of the Flying Cloud. I have waited patiently to the present time, hoping to see in your columns a detailed statement of this unprecedented voyage. Thus far I have been disappointed in my expectations and am still at a loss to know whether the reported time has been reckoned from anchorage to anchorage, pilot to pilot, or from the last sight of Sandy Hook to the first view of the Farallones.

"In the absence of such statement I now beg leave to claim for Captain J. P. Cressy and the ship Flying Cloud the credit for having made the best passage on record from New York to this port in the year 1854 in 89 days 8 hours, her anchor having been weighed at the foot of Maiden Lane at 12 m. January 21 and dropped in San Francisco harbor at 8 p. m. April 20, making the actual time, from anchorage to anchorage, 89 days 8 hours.

"In the absence of any proof to the contrary, I further claim that the passage of the ship Flying Cloud, Captain Cressy, from New York to this port in the year 1851 (her first voyage) in 89 days, 21 hours, is the second best passage on record.

"I have made no request to be permitted to look at the log of the Andrew Jackson, as I understand such favor has been refused to others. I have no personal acquaintance with Captain Williams, but judging from what I hear of that gentleman, I cannot believe that he would wish to appropriate to himself the honor awarded to him by your article, without having fairly earned it.

"Sorry as I should be to see my favorite beaten, still whenever it can be shown that it has been done, none will more readily extend congratulations to the victor than your obedient servant, E. F. S."

(Captain Josiah Perkins Cressy's name was pronounced Creasy, and he was familiarly known as Captain "Perk.")

Record Investigation

This letter caused investigation, with the result that the Alta of April 6, 1860, contained an elaborate half-column article giving the following details as furnished by Captain Williams:

Up anchor New York, 6 a. m. December 25, 1859; discharged pilot at noon. Received San Francisco pilot March 24, 1860, 8 a. m.; anchored in San Francisco Bay 6 p. m. Passage 90 days 12 hours, anchor to anchor; 89 days 20 hours, pilot to pilot. As the

Alta stated, "these figures and dates are facts and are unquestionably correct."

Spurious Claims

The writer of this present article has confirmed them from official sources, including the Board of Commissioners of Pilots of New York, and why in the face of this evidence the Jackson is still being given credit for not only equaling but even surpassing the record actually earned and held by the Flying Cloud is a matter of mystery. A recent elaborate publication, which shows considerable research into historical New England maritime matters, attempts to perpetuate the Jackson myth, in which case the compiler relies entirely upon unproven statements, while in the instance of the Dreadnought's 9 day 17 hour passage Sandy Hook to Cape Clear he decries as not authoritative the very methods he uses himself. There has appeared another version of this "record," wherein the time is given as 89 days 4 hours. This legend appears under the original of the picture we present, besides being the heading of a lengthy article appearing a short time since in a New York paper.

Another claim to "record time" on this particular passage of the Jackson was her 53 days from equator to equator, but this had been equalled in 1858 by her rival Twilight and beaten by the Young America in 1853 and probably by other clippers.

Completing her momentous fifth voyage, the Jackson was 43 days hence to Callao in ballast; sailed thence also in ballast June 20, 1860, and arrived at New York August 22, 63 days.

On her sixth voyage, the first under Captain Johnson, she had some fine runs—18½ days to the Line from Sandy Hook; 43 days to Straits of Le Maire; 52 days to 50 degrees south in Pacific; 78 days to the equator; thence light and variable winds and poor trades with much northing in them forced the ship greatly to westward. In 29 degrees north she was in 137 west; was within 3 days' sail of San Francisco for 8 days, the whole passage occupying 103 days.

Tremendous Gale

When four days out from New York on her seventh voyage on the southern edge of the Gulf Stream, she experienced a severe northwesterly gale with a tremendous cross sea. While running before it shipped some very heavy seas which stove the wheelhouse, binnacle, main-hatch house, skylights, cabin doors, etc., and started water tanks, spars, and everything movable about decks. Was hove to for 15 hours. Was 52 days to the Horn; was 20 days making the 20 degrees between 40 degrees and 20 south in the Pacific. From the Line to port had a good run of 16 days. The memorandum says that 20 miles outside the Farallones the ship passed through a large school of whales, the sea for miles around being alive with their spoutings.

As before stated, she completed this voyage by taking a cargo of spars from Puget Sound to Spain; thence went to New York, where she was sold, and as a British ship, under command of Captain McCallum, she went into the East India trade. She was lost December 4, 1868, in Gaspar Straits. At that time she hailed from Glasgow, her managing owner being H. L. Seligman. Had been opened and surveyed at Cardiff in 1867 and classed A-1½ for three years.

Specifications

The Andrew Jackson was built in 1855 at Mystic, Connecticut, by Irons & Grinnell; tonnage 1679, old measurement. She was 220 feet by 41-1/6 by 22-1/4; draft 21 feet. Her owners were John H. Brower & Company, New York, for whom the same builders had constructed the previous year the Harvey Birch and who put the Racer on the stocks the following year, 1856.

These three vessels are the only ones listed among the California fleet of the '50's as being from the yard of Irons & Grinnell. All were described in "American Lloyd's Universal Register," the standard of classification of that period, as being of "medium" model as distinctive from the "full" carrier type, the "sharp" model and the "clipper" model.

Production of the extreme clipper type practically ceased in 1853, as the year 1854 showed less than half a dozen such models launched. We have nowhere seen a statement of the deadweight carrying capacity of the Andrew Jackson, but the Racer (which, by the way, was on the stocks four years, not being launched until 1860) was described as a miniature Jackson; was 833 tons register, old measurement, and carried 1600 tons California cargo. The Jackson is said to have had lines somewhat similar to those of the later well known Seminole, also from a Mystic yard.

The Andrew Jackson was a very strong and particularly well built ship, always delivering her cargo in first-class condition and being a favorite with shippers. Our picture, which is from an oil painting by Blacklow furnished through the courtesy of Governor Beckwith of Sailors Snug Harbor, shows a finely designed and well sparred vessel, not so lofty as the clippers and not carrying three skysails and royal-stun'sails, as has been variously stated. The figure-head of the ship was a full length statue of the soldier-statesman for whom she was named.

The seven passages of the Jackson from New York to San Francisco total 744.5 days, an average of 106⅓ days. The extreme clipper ship Flying Fish had an average of 105-6/7 days for her seven passages, while the Flying Cloud averaged 101 days 1 hour for her five direct passages. On her last passage here she was forced to put into Rio for repairs. Her net sailing time on the whole voyage being 113 days, gave her an average for six passages of 103 days.

It is noted that the "Clipper Ship Era" does not list the Andrew Jackson among the names of vessels making fast runs over any of the sections of the route under consideration, i. e., port to equator in Atlantic; St. Roque to 50 degrees south; 50 degrees to 50 degrees; 50 degrees south in Pacific; to the Line; Line to port. We have been unable to trace any record of the best hourly, daily or several-consecutive-days run of the Jackson, and it would appear that her rapid voyages were in at least some instances due to a continued succession of winds favorable to running near to direct course, rather than the ability to move through the water quickly. This is shown by the fact that the distance she covered in 90 days 12 hours was given as 13,700 miles, while the log of the Flying Cloud shows 15,091 miles made in 89 days 8 hours. Both Captain Cressy and Captain Williams had reputations for "carrying on," neither being more quick-witted than the other in this respect.

In conclusion it may be well to give here the four fastest passages from any Eastern port (and they happen to be all from New York) to San Francisco. They are:

Flying Cloud, Captain Josiah P. Cressy, 1854, 89 days 8 hours.

Flying Cloud, Captain Josiah P. Cressy, 1851, 89 days 21 hours.

Andrew Jackson, Captain John E. Williams, 1860, 90 days 12 hours.

Swordfish, Captain David S. Babcock, 1852, 90 days 16 hours.

Pacific Marine Review
The National Magazine of Shipping

576 Sacramento Street
SAN FRANCISCO, CALIFORNIA U. S. A.

Official Organ of the Pacific American Steamship Association

Subscription Price, per year (Domestic) $2.00
(Foreign) $3.00
Single Copies . . . . 25 cts

J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor

NEW YORK OFFICE
339 at 30 Church Street
M. B. STEWART, Manager

Pacific Marine Review is sold at all leading News Stands
Entered as second class mail matter at Postoffice
San Francisco, California

Published on the First of Each Month.
Copyright
1921 in the United States by J. S. HINES

THE SHIPPING BOARD TASK

EVER since the armistice many of our esteemed contemporaries and we ourselves have been stressing the idea that in order to firmly establish the American merchant marine in foreign trade, **shipmindedness** was necessary for the American people. Now comes Albert Lasker, chairman of the Shipping Board, in an address delivered before the Advertising Clubs of America in convention assembled, which address is published in full as the leading article of this issue of Pacific Marine Review, and declares that it is necessary for "the miner in Arizona, the industrial worker in Indiana, and the farmer in Kansas to realize that the regularity and volume of their daily wage is in a measure as dependent on the establishment of an American merchant marine as is the continuity of employment and the wage of the dock worker in Baltimore or San Francisco" before there can be any "assured hope that the flag of the United States will be maintained as it should be on the seven seas."

Notwithstanding our former and present attitude on the necessity for shipmindedness among all classes of the American people, we cannot wholly agree with this statement of the chairman of the Shipping Board. In the article in this issue immediately following that of Mr. Lasker, an appeal is made by the Chambers of Commerce of the Middle West to the Shipping Board and the administration, which plainly shows that the business men, at any rate, of our great interior cities are alive to the necessity for an American merchant marine and to the reasons for that necessity. In fact, if anyone will read very carefully these two articles and will interpolate between the lines with understanding, he must be forced to the conclusion that it is very possible that the workers of our great industrial centers will eventually have to pay quite a considerable bill for keeping the American merchant marine on the seven seas until such time as it shall be established in a normal, profitable way in the commercial trade routes of the world.

Going still further and reading the third article in this month's issue, we are face to face with the relationship between the establishment of America's merchant marine and the protective tariff policy which is now engaging so much of the attention of our lawmakers.

We have American industries and American agriculture largely protected by a tariff wall. We have American coastwise shipping protected by exclusive legislation. We need foreign markets for our surplus products. In order to get these foreign markets we must trade in the products of the foreigner. Our products must be taken to him and his brought to us on ships. The American problem with regard to the merchant marine consists simply in finding out what is necessary to be done in order that a respectable proportion of this carrying trade shall be done in American bottoms.

Undoubtedly the appeal from the Chambers of Commerce of the interior states, as cited above, sets forth several methods which will help to make this much to be desired object an accomplished fact. If any very large proportion of American shippers will in their placing of business give preference to American ships, it will help a very great deal. On the other hand, we cannot expect over any very long period of time that any American shipper is going to give preference to an American ship unless that ship can show equality in service and equality in rates with her foreign rival, and we know that under present conditions it is practically impossible for an American ship engaged in foreign trade to do this.

From the standpoint of cold-blooded business economics there may be room for a difference of opinion as to the advisability of American business paying the cost of maintenance of an American merchant marine. From the standpoint of naval and military strategy there can be no difference of opinion as to the advisability of the maintenance of an American merchant marine as an auxiliary to the army and navy. Therefore, it would seem to be logical that the Federal government—or, in other words, the people of the United States—should pay the difference in operating cost between American operation and foreign operation, operating cost as here used comprising all that is included in that term as computed on the books of the old established steamship companies.

If our memory serves us correctly, the original Shipping Board was created for the purpose of carrying out an investigation to determine just what was involved in such Federal government assistance to the American merchant marine. Our part in the great war intervened and postponed this original program for the Shipping Board, but now the war is over, and the Shipping Board has given into the care of the Emergency Fleet Corporation (from which it has divorced itself) the management of the great war-created fleet and the liquidation of the physical assets amassed by the expenditure of war funds, so that the Shipping Board should now be free to go on with the original program outlined for it by the act through which it was created. That should be the task to which Chairman Lasker and the other commissioners of the Shipping Board should be addressing themselves during the months that are to come, and the American people should accede to the request of the chairman of the Shipping Board, giving him every co-operation and waiting with patience the results of his investigation of that problem.

It should be a comparatively easy matter and one involving a by no means prohibitive expense for the Shipping Board to audit the books of several of the more prominent American companies in the various trade routes of the world and of several of the foreign lines operating on the same trade routes and then, by a comparison between these audits and the books of the Shipping Board itself, come to a very definite conclusion as to the actual difference in operating expense.

It should also be a comparatively simple proposition for the Shipping Board to determine by a careful check of their own records and the records of other operating companies just what effect American rules, regulations and legislation affecting ships in foreign commerce have upon American operation as compared with the effect of, say, British or Japanese rules and regulations upon the operation of their respective ships in the same trade routes. Having made these audits and checks, it would again be a comparatively simple proposition to state the results in such a way that the remedies would become obvious.

That, it seems to us, is the duty and the whole duty of the Shipping Board.

To do that, no Congressional investigation committee is necessary, nor is it necessary to call busy men away from their ordinary tasks for long personal investigations at Washington. It is only necessary to get perfectly reliable auditors and responsible and efficient checkers. When this task is done and presented to Congress, the Shipping Board's preliminary task is finished and it is up to Congress and the people of the United States to apply the suggested remedy.

Let us hope that Chairman Lasker and his associates will be courageous enough to put over some such program quietly, in their own way without bombast, and that when their preliminary task is furnished and the results presented to Congress, that body will be wise enough to act upon those results without delay.

TRANSPORTATION PROBLEMS

THE great need in the world's commerce at the present time is adequate inland transportation. The supply of steamships is far more than ample to take care of all the freight offering, but in many of the world's greatest producing areas the railroad transportation is lamentably weak.

This is shown by a broad general survey of the great land areas of the world. There are in round numbers approximately three-quarters of a million miles of railway in the world. Over one-third of this length of railway is in the United States alone and a little less than one-third in Europe. On the great continent of Asia there are only 70,000 miles; in South America only 60,000; in Africa 30,000; and in Australia 26,000.

In the United States there are 89 miles of railroad for each 1000 miles of area; in Asia there are 4 miles for each 1000 miles of area; and in Africa 2½ miles. South America has but one transcontinental railway line, which is frequently blocked for several weeks at a time by winter storms. A second transcontinental line is now being constructed at a point very much nearer the equator.

Africa has no distinct transcontinental line, although a roundabout connection is possible for rail transportation across the southern part of that continent. The long-talked-of Cape to Cairo line now operates about 4000 miles of railroad and 2000 miles of steamship line and requires about 650 miles of railroad to link up the two systems.

Eurasia, the great continent composed of Europe and Asia, has but one ocean-to-ocean line, the trans-Siberia, and that is largely inoperative through political disturbances. A second system now nearing completion would utilize the great European lines from points in Europe to Constantinople, thence by the Bagdad Railway to the mouth of the Euphrates, thence by steamer to Karachi for connection with the Indian railroad systems to Kumlong on the China frontier, from which point a line about 750 miles in length would connect that system with the head of navigation on the Yangtse-kiang. About 150 miles of line are necessary to complete the Constantinople to Bagdad railway.

In the meantime word comes from Australia that a transcontinental line from east to west has practically been completed, and a north to south transcontinental line connecting Darwin with Port Adelaide has been begun.

This railroad activity is all good business building for future expansion, and when the world settles down in dead earnest to the raising of its own bread and butter, there need be no fear but what with the assistance of these many rail feeders the ports of the world will be offering attractive freights for filling the capacious holds of the great merchant marine fleets, so much of which is now idle.

BUSINESS IS BUSINESS

"BUSINESS is Business," the Little Man said,
"A battle where 'everything goes,'
Where the only gospel is 'get ahead,'
And never spare friends or foes;
'Slay or be slain,' is the slogan cold,
You must struggle and slash and tear,
For Business is Business, a fight for gold,
Where all that you do is fair!"

"BUSINESS is Business," the Big Man said,
"A battle to make of earth,
A place to yield us more wine and bread,
More pleasure and joy and mirth;
There are still some bandits and buccaneers
Who are jungle-bred beasts of trade,
But their number dwindles with passing years
And dead is the code they made!"

"BUSINESS is Business," the Big Man said,
"But it's something more, far more;
For it makes sweet gardens of deserts dead,
And cities it built now roar.
Where once the deer and the grey wolf ran
From the pioneer's swift advance;
Business is Magic that toils for man;
Business is True Romance.

"And those who make it a ruthless fight
Have only themselves to blame
If they feel no whit of the keen delight
In playing the Bigger Game,
The game that calls on the heart and head,
The best of man's strength and nerve;
"Business is Business," the Big Man said,
"And that Business is to serve!"

Berton Braley in The Nation's Business

NEW RECORD FOR SAN FRANCISCO MINT

CONSIDERABLE attention is being directed in recent months to the record coinage of silver dollars in the United States mint in San Francisco. Under the provisions of the Pittman Act an attempt was made to speed up silver dollar manufacture in all of the mints of the United States with the object of redeeming the interest-bearing treasury certificates and thus saving a considerable amount of monthly interest to the Federal government.

M. J. Kelly, superintendent of the San Francisco mint, and Samuel J. Ward, for years foreman of coiners in that institution, went very heartily at this task with the result that the production of the mint was speeded up to a point where it is turning out 260,000 silver dollars every twenty-four hours, an average of 1000 dollars per employe, which is much higher than that of any other coining plant in the country.

Since its establishment the United States mint in San Francisco has coined very close to $3,000,000,000 in domestic and foreign coins. Its employes are known as the most skillful craftsmen of their kind in the country, and the majority of them have seen years of service.

A high tribute was recently paid to the mint here by Director Raymond D. Baker, who requisitioned the services of Samuel J. Ward to go to the parent mint at Philadelphia in order that he might "speed up things there in the San Francisco way."

PUBLIC BUILDINGS OR PUBLIC BREAD LINES?

"HARD times" is largely a state of mind. Therefore the statement recently issued by the U. S. Department of Labor to the effect that more than 5,000,000 men are now out of work in the United States need not of itself alarm. Rather it should spur us to immediate action in discovering the cause for this situation and in applying the remedy.

For five years or more the construction industry, recognized because of its far reaching ramifications as an index of prosperity or the reverse, has been confronted with repeated handicaps. This season has witnessed considerable private enterprise as recorded in the volume of business in dollars that has engaged the attention of the construction industry, but with the possible exception of highway work, public works have been notoriously inactive—this in the face of the oft repeated statement that there is a shortage of schools, hospitals, various municipal structures and buildings in general of a public and semi-public nature.

All of us can recall that months or years ago we voted a bond issue, or in other ways provided for the raising of funds to further some needed public improvement—a park development with its adjunct of recreation features, including perhaps a swimming and wading pool, a new city hall, new quarters for the fire department, a new hospital, new schools, or what not? The money for these is waiting somewhere to be spent. Often the spending has been held up by the misguided notions of our public officials that some time other than now would be more propitious for commencing the work. In the meantime the public—you and I—languish for the civic improvements which we thought had been provided for and were to proceed.

There has been a tedious period of readjustment, and latest indications point to an upward trend of prices. Some permanent new levels seem to have been reached. This only reminds us again that delay profits nothing and is likely to be more costly if long continued.

One thing in particular makes the present unemployment situation somewhat alarming. The more or less confirmed habit of suspending construction activities with the approach of winter is certain to add to the ranks of unemployed. Even in the "normal times" of which we have been so wont to speak in recent months, suffering is with us in winter.

Bread lines are not in harmony with the present commanding status of America. We have more than half the gold in the world, a natural wealth untold, abundant harvests, banks bursting with money, inestimable resources undeveloped. If weather sharps are weather wise, a severe winter is approaching—cold supplemented by shortage of fuel and the inability of millions of unemployed to get the warmth of necessary food and other sustenance.

This isn't a cry of wolf, but a warning that human suffering and hardships may be inflicted upon the present unemployed as well as those who are about to join these ranks unless work and wages are obtainable. It is difficult to predict what may be the outcome of a situation such as that threatening.

Public work can be done more cheaply now than at any time in recent years, and the grave responsibility rests upon the shoulders of public officials to inaugurate and continue through the winter months every form of public work for which funds may be available as a means of preventing a social crisis which they may otherwise be required to meet. Action must be immediate. Politicians operating for political gain must forego that vocation and become plain public citizens and taxpayers, fostering only that individual interest which is the best interest of the community.

Let Chambers of Commerce, Rotary Clubs, Civic Organizations and all other similar public bodies resolve themselves into a citizenship committee of the whole, kick politics out of every open door and window and begin letting contracts for work at living wages. Competition of private enterprise is out of the way. There are men everywhere who want work, men everywhere who are willing to give a full day's labor for a full day's pay.

Let's all go to work building public buildings for public welfare! If we do, we'll not have to make bread for public bread lines.—Reprint from Engineering World.

FIFTEEN YEARS AGO

IN November, 1906, Pacific Marine Review, then three years old, recorded the results of the official standardization trials of the United States armored cruiser California, built in the Union Iron Works, San Francisco, which trials took place on October 5 in the Santa Barbara channel. The trials were highly satisfactory, the maximum speed attained being 22.75 knots, the maximum horsepower developed being about 30,000 indicated horsepower.

On November 12, in a four-hour endurance run held off San Francisco, the California maintained an average speed of 22.2 knots, steaming straight out to sea for two hours from a point just outside the San Francisco lightship, then turning at full speed and running back to the starting point.

Today we have afloat a larger, better, more modern California, also built on the shores of San Francisco Bay, and we have a greater, nobler and more mature state to stand sponsor for the ship.

UNEMPLOYMENT

THE above editorial from our esteemed contemporary emphasizes what we ourselves had to say in the October issue of Pacific Marine Review concerning the much discussed problem of what is to be done for the unemployed. Since writing the editorial for October on unemployment, the conference called by President Harding under the leadership of Herbert Hoover has been held, and its results have fully justified our forecast as then stated.

A committee of the conference nominated to look into the question of unemployment statistics reported back to the conference that it "deplored and was much impressed by the absence of adequate opportunity to obtain the essential facts concerning the matter of unemployment. Those departments of the government in Washington which deal with statistics in this connection are performing a most valuable work in that field but are handicapped by their inability to obtain comprehensive and well authenticated information from industry and commerce and by the lack of instrumentalities in many of the states and municipalities to gather and report such facts to a central governmental agency which could tabulate and present the actual status of employment and unemployment throughout the entire country."

This committee is of the opinion that the number of unemployed as of September 29, 1921, measured in terms of the reduction since January 20 in the number of workers on payrolls, exclusive of agricultural, is not less than 3,700,000 nor more than 4,000,000. We have no means of knowing whether this estimate is correct or not, but we must assume that the figures are fairly accurate since the extreme variation is less than seven per cent.

One interesting fact brought out by the conference is that during 1921 up to September 1 there have been sold $700,000,000 worth of municipal bonds, this eight months' balance exceeding the sum total of the twelve months of the preceding year, and that the sale of municipal bonds is increasing is evidenced by the fact that during August 333 municipalities had sold $106,000,000 worth of municipal bonds. These figures indicate that municipalities are becoming increasingly active on the public works which have been delayed lue to war conditions.

The reports brought in to the conference from the majority of industrial centers throughout the country show that in many lines of industry employing very large numbers of skilled and unskilled labor conditions of employment are slightly on the mend. This is particularly so in the case of the majority of the skilled trades, and it is for that reason that road work and other public improvements employing a large proportion of unskilled labor is being stressed and the municipal and state governments are being looked to for relief.

With just a little co-operation and intelligent effort directed to the immediate turning loose of municipal funds in construction work, America should be able to tide over the coming winter with no more than the usual amount of bread line experience.

THE ST. LOUIS WORLD TRADE CRUISE

The Past and Present of America's Foreign Trade

By J. HERBERT ANDERSON
President of the Anderson Overseas Corporation

IT is patent to any student of American business today that a large export trade is essential to the economic prosperity and social stability of the country, as our greatly increased resources of capital and labor can no longer look to domestic markets for full employment, but must reach out into the markets of the world. While there are thirty thousand manufacturing exporters in the United States, according to official statistics, not over one hundred and fifty manufacturers can rightly claim adequate representation in even all the major markets of the world.

This certainly is not because of the absence of American initiative; nor because American products are not equal in quality to any in the world; nor because of the inability of American manufacturers to visualize the need for foreign trade that the country may prosper and maintain its leadership among the nations of the world—a position it now temporarily holds; nor because of the unbelief in the minds of American manufacturers that the absence of foreign trade will result in unemployment in our industries, losses through great plants being shut down and general social unrest—the latter dangerous to the internal peace of the United States.

Export planning is based on the same hard common sense used in selling within the United States—no more and no less. It is a process easily understood, and in results profitable to the exporter and an aid to the commercial supremacy of the United States. It appeals to the cold blooded for its profit making possibilities, to the technician for its thoroughness, and to the man of vision because it brings into play all his business acumen.

Exporting to be beneficial to the individual or corporation, and to the United States, is selling the whole world, not one market at a time, which is a hit or miss method, mostly, and robs the exporter of the larger profits to be obtained by a world plan, which plan should be based on a knowledge of the world and its markets and a vision of a decade in advance.

Countless American manufacturers have ignored this basic foundation, resulting in many cases in disaster, and leaving very profitable fields open to European manufacturers.

What method, therefore, should be adopted by American manufacturers which will tend to re-establish, within the next two years, not only the export trade America had preceding the war, but make her present leadership a permanent one with balanced export sales?

The first step should be advanced planning for an ultimate world-wide and balanced trade, sufficiently complete so that no important market is overstocked and no minor market entirely neglected. To make such planning possible three necessary qualifications are: first, the visualizing of the product by the foreign buyer; second, the salesman who can sell; and third, an export manager who knows how to chart his territories and who will not make exclusive arrangements with agents except where agency representation is the logical sales treatment. Whether there is available for export a thousand dollars or a million dollars worth of merchandise, the rules mentioned above should govern.

These rules govern the plans we hope will be carried out in the World Trade Cruise of the St. Louis.

NUMBER ONE BROADWAY

The Home Port of the International Mercantile Marine Company

View of No. 1 Broadway from the Battery Park side

The International Mercantile Marine Company is an American holding corporation.

Its stock ownership is 94 per cent American.

It holds complete ownership of the entire stock issue of the following lines and companies:

- **American Line.**
- **Atlantic Transport Line.**
- **George Thompson and Company, Ltd.**
- **Leyland Line.**
- **Panama-Pacific Line.**
- **Red Star Line.**
- **White Star Line.**
- **White Star--Dominion Line.**

And a minority interest in:

- **Shaw, Savill and Albion Company, Ltd.**
- **Holland-America Line.**
- **New York Shipbuilding Corporation.**

Its fleets comprise 120 ocean-going ships, including the Majestic, the largest liner in the world, and aggregating not less than 1,300,000 gross tons.

THE site of No. 1 Broadway is historically one of the most interesting in New York. It overlooks on the Broadway side the old market place and bowling green of the early settlers, and to the south the site of the first fort in New Amsterdam and the Battery. High lights in the chronology of this neighborhood are as follows:

1626—Peter Minuit, director general of the Nieuw Amsterdam settlement, bargained with the Indian owners of Manhattan in the clearing that is now Bowling Green, and bought the island for $24.

1640—Peter Koeck, a sergeant in the Dutch garrison, built a tavern facing the bowling green, on the corner of Heere street, the site now covered by No. 1 Broadway.

1756—The site of No. 1 Broadway, having been owned successively by Frederick Phillipse and Abraham De Peyster, merchants and men of substance in New York, was purchased by Archibald Kennedy, a captain in the Royal Navy, who built thereon a spacious mansion.

1776—Captain Kennedy, who upheld the king, withdrew from New York and his home was occupied by General Israel Putnam of the American Army. Here for some weeks General George Washington came frequently from his headquarters at Richmond Hill to confer with his officers. Later the house was occupied in turn by Sir William Howe and Sir Henry Clinton, British commanders. It was from this house that Major Andre wrote the letters to Benedict Arnold which preceded the American officer's betrayal of his trust and Andre's capture and execution.

1783—The Kennedy mansion was restored to its owner, who later sold it to Nathaniel Prime, one of New York's leading merchants and financiers.

1794—The Kennedy mansion became a house of public entertainment known as the Washington Hotel. As such at one time it housed Talleyrand, Napoleon's exiled minister.

1882—Cyrus W. Field, famous for laying the Atlantic cable, bought No. 1 Broadway and erected on the site a 12-story office structure, then the tallest in lower New York, known as the Washington building.

1919—No. 1 Broadway was bought by the International Mercantile Marine Company, and work of rebuilding the structure began.

1921—The rebuilding of the structure was completed, five floors being reserved for occupation by the American Line, the Atlantic Transport Line, the Leyland Line, the Panama-Pacific Line, the Red Star Line, the White Star Line and the White Star-Dominion Line, the constituent lines of the International Mercantile Marine Company, whose fleets, aggregating 120 vessels of 1,300,000 tons, ply to all parts of the world.

Reconstruction Problems

Technically the work of making over the building has presented a strong testimonial to the genius of American engineering and architectural deftness. The problem presented to the architect, Mr. Walter B.

Chambers, F. A. I. A., was no ordinary one. He was under the necessity of rebuilding the structure, outside and in, without dispossessing the tenants on seven floors. The company will occupy the first five floors of the completed building.

The task involved by sweeping structural alterations in the building called for many niceties of calculation and execution. The work included extensive strengthening of foundations in some places; the entire elimination of the heavy interior frame structure of the first floor, and the incorporation of the space in that floor into the upper portion of a lofty booking office; removal of roof and tower, and the construction of two new stories, in a different place; the relocating of staircases; change in the location for the main entrances to the building, and the introduction of entirely new ventilating, heating and electrical systems.

Decorative Motif

The finished product reveals a highly successful accomplishment, as the building presents today both in its exterior, now virtually completed, and in the work nearing completion within, a character and tone completely at variance with the old-fashioned red brick structure from which it has emerged. Heraldic shields of the world's chief ports let into the outer walls in Venetian mosaic of varied colors and gold are the principal decorative motif of the building's exterior. From the stone carvings around the shields spring bronze sockets, in which will be placed staffs for flags, with the Stars and Stripes over the main entrance and the distinguishing colors of the various lines of the company in minor positions.

Carvings, cunningly worked into the stone, suggest the uses to which the building is put. In the spandrels and pediment are shown Neptune, god of the ocean, and Mercury, god of trade.

Booking Hall and Offices

The distinguishing feature of the interior is the great booking office, extending the entire length of the Battery Park front of the building from Broadway to Greenwich street with a length of 160 feet, a breadth of 40 feet and ceiling 25 feet high.

This office is designed to represent the latest ideas in practical utility, with extensive counter space, a waiting room for customers, a department devoted to the issuing of traveler's checks, and a section for the distribution of travel information.

View of No. 1 Broadway looking across Bowling Green

One strikingly modern feature of the booking office will be a small motion picture theater for the projection of films portraying life on the company's ships when on the Atlantic passage or tropical cruises.

Four floors above the booking office will be occupied by executive offices of the company and its constituent lines, including a floor devoted to the accounting department, another to freight, another to operating, and the fifth to the general officers of the company and their clerical staffs, and the board room. On the Greenwich street level will be the third-class department, with extensive counter space, offices, waiting rooms, etc.

MAJESTIC

Owners—I. M. M. Company.

Builders—Blohm and Voss.

Gross tonnage—56,000.

Length O. A.—955 feet 9 inches.

Breadth molded—100 feet.

Depth molded—70 feet 4½ inches.

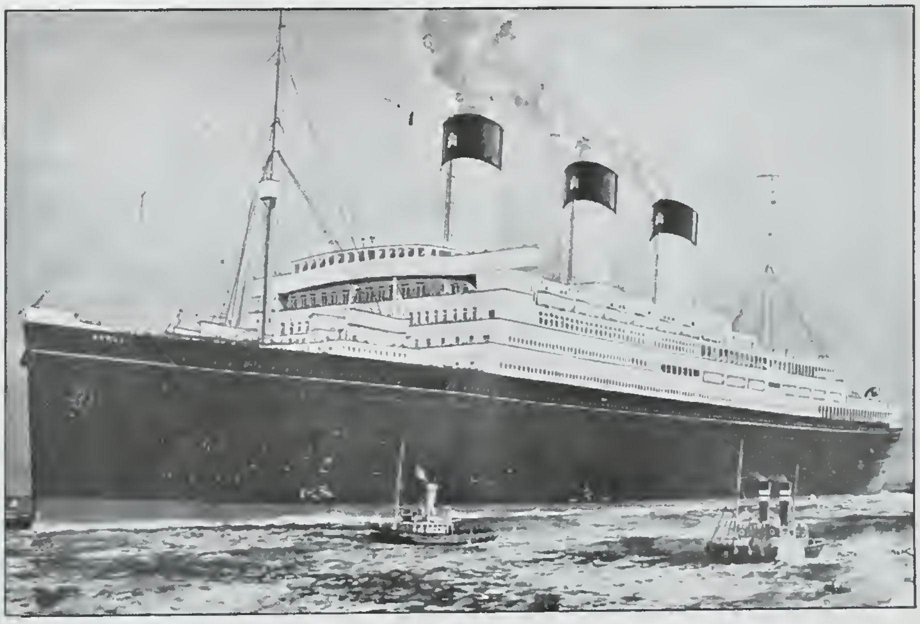
Loaded draft—38 feet 6 inches.

Normal shaft h. p.—62,000.

Average sea speed—23 knots.

Maximum shaft h. p.—91,000.

Maximum speed—26 knots.



PACIFIC COAST FISHERIES

Washington—III

TOTALING a money value of more than $10,000,000 in 1920, the state of Washington stands well toward the head of the list in the fishing industry of the nation. The most valuable Washington fishery is of course the salmon, but other fishery resources are enormous. The sturgeon, smelt, black, ling, rock and other varieties of cod, halibut, flounder, herring, mackerel, salt water perch, redsnapper, sand dab, shad, sole and many others are all found in commercial quantities, while oysters, crabs, clams and shrimps abound. The state is divided into four fishing districts, Puget Sound, Grays Harbor, Willapa Harbor and the Columbia River. With the first of these interesting international questions arise in competition with Canadian fisheries, while on the Columbia river controversies have arisen with the fisheries of the State of Oregon.

The most valuable salmon run that ever entered Puget Sound is the sockeye. In quality it is on a parity with the chinook, but in numbers it tremendously exceeded that famous species. The sockeye is the cause of most of the disputes with the fisheries of the Canadian Pacific Coast. These disputes remain to this day very live issues, for there has been pending before the United States for the last three years a treaty executed by the plenipotentiaries of Great Britain, acting for Canada, and the United States, which seeks to provide a program for the rehabilitation and perpetuation of this run, which has almost been exterminated by fishing. It may be pointed out that in 1913 on Puget Sound alone over 1,600,000 forty-eight-pound cases of this variety of fish were canned, while in 1921 it is questionable if the pack will be more than 75,000 cases.

The sockeye salmon are principally natives of a Canadian stream, the Fraser river. It is in the spawning grounds of the Fraser and its great tributaries that they are hatched and spend the first year of their existence. They then make their way down stream to the ocean to return at the end of the fourth year to the Fraser. On their return they first pass through American waters, and American fishermen catch as a rule from three to four times as much as are secured by the fishermen on the Canadian side. Naturally this angers the Canadian fishermen, who feel that inasmuch as the fish are mostly produced by their stream they should be protected in the opportunity to secure a larger number. Americans, knowing they have the advantage, have been unwilling to concede any of it to the Canadians. The result has been that as negotiations, looking to a more equal distribution of the supply, have failed to be successful, on both sides of the line the efforts to capture the fish have multiplied, and the species is threatened with extinction.

On the Columbia river fishermen of Washington and Oregon have equal rights and a group of representative men from the two states hold regular meetings to make such rules and regulations as are deemed necessary for the industry.

Create Fisheries Board

The Washington state legislature at its last session created a state fisheries board, clothed with absolute power to say when, where and how fishing operations may be carried on in the state. L. H. Darwin, for many years state fish commissioner, becomes secretary of the board, and the other members include E. A. Sims, chairman, Captain Harry Ramwell and E. P. Blake. E. A. Seaborg is director of fish and game; J. W. Kinney, supervisor of game and game fish; and George A. Harris, chief deputy game warden.

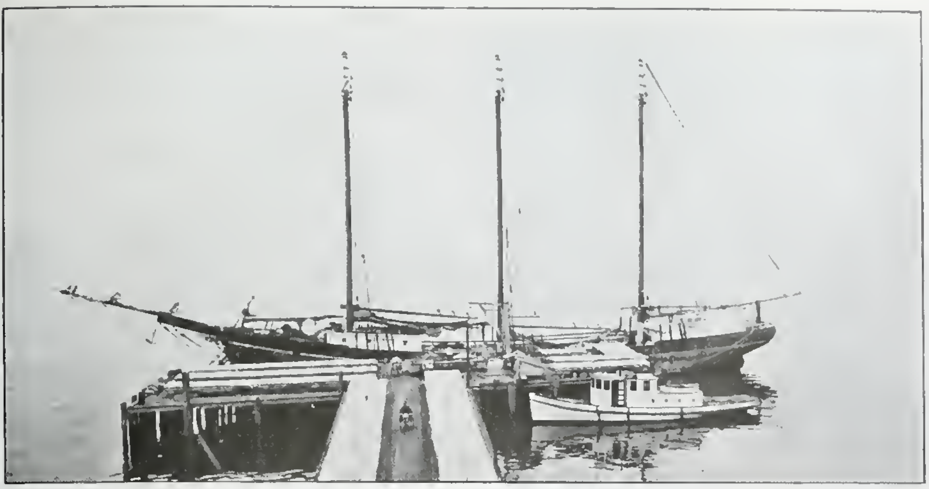
Fishing Methods Numerous

The fishing industry in the state of Washington is carried on by practically every known method. This is shown very clearly by the variety of licenses issued annually. In 1920 the number of licenses issued for the use of pound nets totaled 626; fish wheels, 27; set nets, 1024; gill nets, 929; drag seine, 184; purse seine, 345; reef net, 10; hook and line, 922; bag net, 126; drag bag net (smelt), 56; brush weir (herring), 5; beam trawl (shrimp), 14; clam digging, 774; clam digging for bait, 27; and crabs, 193. That the pound net and the purse seine are about equal in results obtained is shown by the fact that with 626 licenses issued for pound nets, a total of 1,444,601 pounds of salmon were obtained by this method of fishing; and with licenses given out for 345 purse seines, a total of 941,096 pounds of salmon were caught by this means. Although licenses were issued for 1024 set nets, the records show that only 101,536 pounds of salmon were taken.

In 1903 the first gasoline-powered purse seine boat appeared on the Pacific Coast salmon fishing grounds

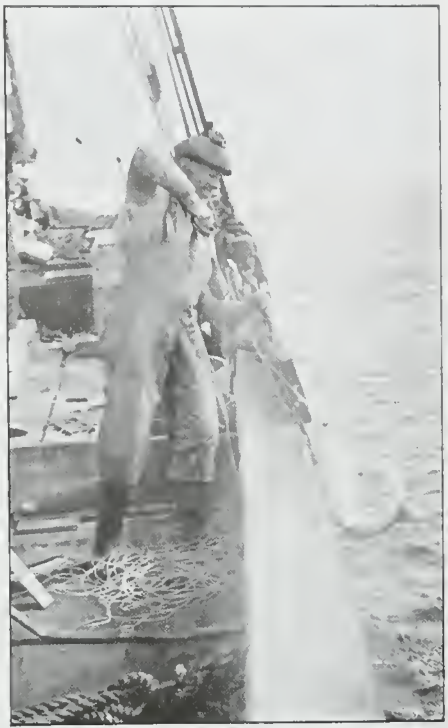
Typical Puget Sound cannery tender
Photo by Cobb

Part of the purse seine fleet of Puget Sound at anchor Photo by Cobb



Fishing schooner Wawona of the Robinson Fisheries Company at Anacortes dock. Note codfish flakes drying on racks on dock Photo by Cobb

in Puget Sound. The vessel was the Pioneer and was equipped with a 5-horsepower engine. The first season she easily demonstrated her vast superiority over the other purse seiners in the quickness with which, after a school of fish was sighted, she could reach it and surround it with her seine. The next year there were a few more power boats built or equipped, and the number has steadily increased until at the present time practically all seine boats are equipped with motor engines. The first power seine boats were only about 30 feet in length and had small power. As they were few in numbers, there was virtually no competition and high power and speed were not a necessity. As the boats increased in numbers, however, competition became keener and the first types of boats with their small power were quickly thrown into the discard by the newer types, which average between 45 and 55 feet in length, with 45 to 75 horsepower engines.



Pulling in cod with a handline over the rail Photo by Cobb

The Puget Sound purse seiners meet the salmon off the entrance to the Strait of San Juan de Fuca and follow the sockeye until they have passed out of American waters, what are known as the Salmon Banks, off the lower end of San Juan Island, being the principal rendezvous of the sockeye run. After this run is over they go up the Sound and fish for chums and cohos, and later go to the head of the Sound and fish for chums, cohos, chinooks and steelhead trout.

Each year the catching of salmon by trolling and trawling becomes of increasing importance commercially. These methods of operation were explained in the September issue of Pacific Marine Review in the article on California Fisheries, and for that reason will not be dwelt on here.

Salmon First Importance

As stated before, the most valuable fishery resource of Washington is the salmon. As on other bodies of water on the Pacific Coast frequented by salmon, the Indians were fishing for them when the first whites visited the country. The natives at this time and for many years after used reef nets and hooks and lines in the salt water, and spears, dip nets and weirs in the rivers. For many years this region was comparatively isolated from the rest of the world, and the completion of transcontinental railroads has not completely changed this, owing to distance from large consuming centers. As a result of this isolation, it was necessary for many years to resort to methods of preparation which would insure the preservation of the product for indefinite periods. Salting naturally came first, followed by canning, while the shipping of fresh salmon has been steadily growing in importance as transportation facilities increased. During recent years the canning of salmon eggs for use as bait has come to be a side-line industry of considerable proportions.

The first salmon cannery on Puget Sound was erected by Jackson, Myers & Company, in 1877, at Mukilteo, in Snohomish county. The members of this firm had all been engaged previously in salmon canning on the Columbia river. The first pack was of 5000 cases, composed wholly of silver, or coho, salmon. Later at this plant were put up the first humpbacks ever canned. In order to divert the minds of purchasers from the fact that the meat of the humpback was much lighter in color than the grades then known to the

Dressing gang on a halibut schooner Photo by Cobb consuming public, the company printed on its label the legend, "Warranted not to turn red in the can." Even with this shrewd slogan, the demand for humpback, or pink, salmon developed very slowly and it was some years before it became a factor in the markets.

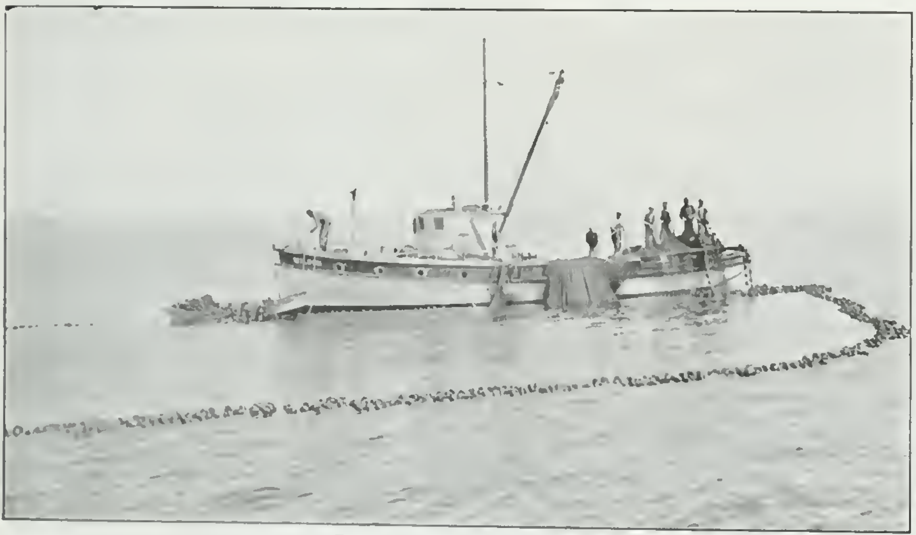
The Quinault river, which enters the ocean in the northwestern part of Grays Harbor county, has a length from the ocean to Lake Quinault of about 40 miles, wholly within the boundaries of the Quinault Indian reservation. This stream is especially noted for its long continued annual run of Quinault salmon. These fish, which are noted for their especially red colored flesh, make an appearance early in December, when the Indians generally catch them for their own use, as they fear that if the whites got hold of the fish they might throw away the hearts. Should a heart be eaten at this time by a dog or chicken, the Indians believe the run would not come. In January, when the fish begin to be abundant, all danger of this seems to have passed, for the Indians then usually have a considerable number for sale and these are shipped to distant markets in a fresh condition or are sold to the canneries. The big year of the Quinaults, in 1915, saw 350,000 of these famous salmon canned. Like the sockeye, however, the run is now much reduced. The silver salmon, the chum, the chinooks and the steelhead trout appear in the Quinault river during the fall and winter months.

During the Quinault season stake nets are used, while the rest of the time, as a result of the freshets, drift gill nets are used in the eddies. The stake nets are arranged in a rather peculiar manner. A line of stakes is run out for about one-third the width at right angles to the shore, and to these are attached a net by short ropes. From each stake a section of net is run out and downstream, curving inward like a hook at the end, the latter part being held in place by three stakes. The stake nets are 40 to 60 meshes deep, with 5¼-inch stretch mesh and are set 85 yards apart. A set of these forms one fishing location.

Humpback salmon jumping falls
Photo by Cobb

In 1883 B. A. Seaborg, father of E. A. Seaborg, present director of fish and game, established the first cannery on Grays Harbor. His plant was on the waterfront of what is now Aberdeen, although at that time it was practically a wilderness. In fact, it was from this cannery that Aberdeen received its name.

Washington has thirty-one state salmon hatcheries and eight trout hatcheries. The federal government has seven hatcheries in the state and there are several county hatcheries, aside from ten privately owned and operated game fish hatcheries. To the increased efforts in propagation is due the increased taking of chinooks, silversides and chums. These runs have been but little diminished, while in some cases it is claimed by the state fisheries board that they have been actually increased. Transplanting salmon runs from one stream to another had never been attempted, at least on a large scale, until the state fish commissioner began it eight years ago. It was demonstrated by actual experience that eyed salmon eggs can be taken from one stream, conveyed to another stream, hatched out and liberated and the mature salmon will return to the stream where hatched out and liberated rather than to the stream where the eggs were taken.



Purse seining on Puget Sound
Photo by Cobb

Handle 16,000,000 Pounds Halibut

The Puget Sound halibut fleet during 1920 handled through Seattle a total of 16,174,199 pounds of fish which brought an average price of .172 cents per pound, making the total commercial value of the catch $2,781,962.23. While this is an increase over 1919 and 1918, the condition is not as healthy as the figures indicate. The catch is far from proportionate to the increase in the fleets operating, and it has been necessary to widely extend the range covered and to increase the amount of gear used.

Today the sailing vessel is unknown in the halibut fishery, having been superseded by vessels with twice the carrying capacity of those formerly engaged, the increase in size permitting them to carry double the number of fishermen and dories. These vessels are all powered with gas engines. Instead of getting its catch within easy radius of Seattle, the fleet now fishes mainly on the Alaska off-shore banks, ranging from 800 to 2000 nautical miles from Seattle. A large number of small vessels, mostly of the purse-seine type, have been fitted up for long lining and operate with the fleet principally on the nearer banks.

The present extensive halibut fisheries of the Pacific owe their inception to the publication in 1886 of a series of very optimistic letters in the Cape Ann Advertiser, of Gloucester, Massachusetts. The enterprising spirit of the New England fishermen prompted them to consider the matter favorably, particularly as they knew from reliable sources that halibut were abundant off Cape Flattery at certain seasons. The native fishermen had fished here for their own use for many years, the surplus being sold to the whites living on the shores of Puget Sound.

The pelagic fur-seal fishery, which was then lawful and quite profitable, was another strong inducement for the Eastern fishermen to make the venture of sailing "around the Horn," for some believed that this offered unusual opportunities for financial success, while they thought the period between sealing seasons might be profitably utilized by engaging in halibut fishing. The men who entered upon this experiment were among the most skillful, daring and adventurous of their class.

The Point Roberts cannery of the Alaska Packers' Association Photo by Cobb

Eastern Schooners in 1887

In the fall and early winter of 1887, three schooners sailed from Massachusetts for Puget Sound. These were the Mollie Adams and the Edward E. Webster of Gloucester and the Oscar and Hattie of Swampscott. The two former were owned by Captain Sol Jacobs, who had achieved fame as a mackerel fisherman and who after dispatching his vessels crossed the continent in time to make the necessary business arrangements, pending their arrival. The Mollie Adams made a good passage and reached her destination without mishap, but the Webster met with an accident to her spars before rounding the Horn, put into Montevideo for repairs, was delayed and finally arrived on the west coast late in the season.

The Oscar and Hattie reached Puget Sound later than the Adams, but in time to engage in the halibut fishery, carrying six dories and a crew of fourteen men. About two-thirds of its catch was sold fresh and the remainder was fletched. The result of the season's work was 240,000 pounds of fresh and fletched fish, with a value at the prices paid the fishermen of $7600. The fish shipped east by the Oscar and Hattie was the first shipment so made and it went forward by the Northern Pacific Railroad. The ice used cost $22.50 per ton and the high freight rates took all the profit.

When the Mollie Adams returned to Puget Sound at the close of the fishing season she brought with her 150,000 pounds of halibut. In the meantime after a lot of trouble her owner, Captain Jacobs, had arranged for a rate of $1.25 per hundred pounds for transportation of the fish across the continent to Gloucester. After deducting expenses the members of the crew received $175 each, or at the rate of $9 a day for 19 days' fishing.

Cod Fishery Large

Codfish handled by the Puget Sound fleet last year, fresh, cured and tongues, had an aggregate commercial value of $359,061.93. Unlike the vessels used in the New England fisheries, there is no distinctive type employed in the Pacific cod fishery. Many of them were at one time brigs, barks, barkentines and schooners employed in the carrying trade of the Pacific and purchased for use in the cod fishery after they had attained varying ages. As the schooner rig has proven the most economical, many of the vessels have been altered to this type. They vary in length from 102 feet 6 inches to 156 feet, and the net tonnage ranges from 138 to 413.

All Pacific codfishing is done in the daytime. Early in the morning the dories are put over the sides of the vessel which has been anchored in a favored spot. Each dory is equipped with the necessary fishing lines, a small sail, a water beaker, a windlass for hauling in the anchor, a 10 or 14 pound anchor, a small keg buoy, a knife for cutting bait and bleeding the fish, a gaff for handling the large fish and with which most of the fishermen stun or kill the fish by striking it on the head with the handle. But one man goes in a dory and each rows away in search of a good place to fish. The direction in which they row from the vessel is to a great extent governed by the tide and force of the wind, the idea being to utilize the wind and tide to help in getting back to the ship when the dory, being full, would make rowing laborious.

Captain Matthew Turner, master of the brig Timandra, 120 tons, sailing from San Francisco in 1857, seems to have been the pioneer in the discovery of the commercial possibilities of the great cod banks of the Pacific Ocean. While his vessel lay anchored in northern waters waiting for the ice to break to make a river trip with an assorted cargo, the crew began fishing over the rail with hand lines simply as a pastime. They were surprised to find plenty of cod, averaging about two feet in length. Captain Turner had not previously seen codfish, but some of the crew were familiar with the species, and he, knowing their market value,

A Puget Sound cannery tender caught in the ice on Bering Sea

appreciated the importance of the discovery and became interested in the fishing. For several years he had no competition in this new line of commercial cod fishing, but in 1865 six vessels sailed from San Francisco to the Okhotsk Sea in pursuit of cod. These were the first American vessels to visit that region on cod fishing trips and their sailing evidenced a resolution to begin the business upon a broad commercial basis.

Shell Fish Industry

Clams, mussels and crabs off the coast of Washington and on Puget Sound furnish a big industry in themselves. During the year 1920 nearly four and a half million clams and mussels were taken and more than a million crabs were caught. Of the clams the razor variety taken on Grays Harbor is probably the best known and the 1920 yield from this district alone totaled 3,040,758, for which the diggers received $76,018.95. During the 1920 season ten canneries were operated on the Washington coast and the clam pack had a total commercial value of $394,688.90. In addition to this 1082 cases of clam nectar were obtained with a value of $2164. Handled fresh the clams for the season amounted to 666,920 pounds with a commercial value of $23,951.53. The season's catch of crabs resulted in 1,656,933 being shipped fresh and twelve cases of crab meat were canned with a total value of $432.

Aquatic Animals Taken

Grays Harbor has the only whaling station on the Washington coast, and from it three vessels are operated, the Westport, Moran and Aberdeen. During 1920 a total of 187 whales were captured, from which 251,733 gallons of whale oil were obtained, 49,493 gallons of sperm oil, 330 tons of fertilizer and 221 tons of whalebone. The year 1921 has been a quiet one in the whaling industry of Washington. When the season opened in April the market for oil was poor, and when relief in this line was obtained the shipping strike was called and all plans for operations had to be cancelled. Consequently the fleet of whalers has been tied up all summer.

The Universal By-Products Company, which established a tannery to handle skins of aquatic animals at Edmonds, Washington, has tanned more than 16,000 shark skins of various sizes and several tons of whale stomach and intestines.

A COLLEGE OF FISHERIES

The University of Washington Operates a Unique Department for the Study of Commercial Fishing

A College of Fisheries was established two years ago at the University of Washington, Seattle. It is the only institution of its kind in the United States and is one of two in the world, Japan being the only other country to have taken this step in advanced education. The American school has enrolled pupils from practically every nation, both European and Asiatic. Many graduates from the Japanese college have sought admission, feeling that the methods taught in their country might well be supplemented by the modern four-year course of the College of Fisheries at Seattle.

John N. Cobb, professor of fisheries, is director of the college, and many of the textbooks used are from his pen. His many years of earnest study and practical experience make him one of the best informed men in the United States on the commercial fisheries of the nation. The college now occupies buildings vacated by the Naval Training Station at the close of the war, but the university plans a permanent group of buildings as soon as necessary funds are available.

The College of Fisheries has a two-fold purpose: first, to afford instruction in the principles and practices of commercial fishing; second, to promote the interest of fisheries in the state of Washington and in the United States by encouraging the right use of fishery resources.

Professor John N. Cobb, director College of Fisheries, University of Washington, Seattle
Photo by Hamilton, Seattle

The location of the college on the shores of Lake Washington and Lake Union, which bodies of water are connected by canals with each other and with Puget Sound, presents unrivaled opportunities for the study of aquatic life and fish culture and for experiments in the practice of fishing.

The ichthyological laboratory contains an extensive collection of fishes and is particularly rich in species from Puget Sound and Alaska. The laboratory for fish diseases is equipped for the study of life histories of the various fish parasites. It includes aquaria for live subjects and a dark room for studying the effect of various colored lights.

A laboratory devoted to the study of apparatus is equipped with working models of the larger forms and fully rigged types of the smaller forms of fishery equipment. Practical instruction is given on the manufacture, use, care and repair of all classes of fishing gear. The canning laboratory contains all the machinery and appliances necessary for canning any fish product, and much experimental and research work is done. The curing laboratory is equipped for the pickling, dry-salting, mild curing and smoking processes.

About 700 square feet in Fisheries Hall No. 2 is occupied by a fish hatchery, which is furnished with troughs, baskets and other essentials for the care of 500,000 salmon or trout eggs. A complete set of batteries of open and closed-top jars is provided for the care of several million semi-buoyant eggs. Cement lined ponds are available in the college grounds for the rearing of various species of aquatic animals. Trap-netting, purse and haul seining, gill netting, trolling, hand and long line fishing, oyster gathering, clam digging, kelp harvesting, and other forms of commercial fishing are every-day work for the students.

THE AUXILIARY STEAMER VICTORIA

An Account of a Successful Combination Steam and Sail Ship

By JOHN L. BOGERT

THE Victoria was built in 1852 for the England-Australia trade. She was a combined sailing and steaming ship, what we call today an auxiliary. Taking into consideration the limitations that at that time surrounded steam engineering, she was a great success. She was given a fine model (that was the day of the clipper ship) because she was expected to maintain a sea speed of 10 knots under steam alone and without steam to keep up with the fast sailing ships of that time. Through a combination of circumstances connected with the discovery of gold, the price of coal had risen to £5 per ton, and it is not at all impossible that the day may again dawn when fuel will be expensive and man will once more turn to the winds for help.

The Australian authorities had offered a prize for the most rapid passage under steam from England to Australia, and this prize was carried off by this little "auxiliary" when she left Gravesend on the 18th of one June and reached Adelaide on the 19th of the following August. On one trip the Victoria ran this same distance in 59 days, 22½ hours, including two days' stoppage at St. Vincents, the fuel consumption for the voyage being 1200 tons.

Oscillating Engine

Her engine would have given the modern sea engineer the nightmare, being a four-cylinder angular oscillating steam engine with cylinders of 48-inch bore and 33-inch stroke. The steam pressure was but 15 pounds per square inch; that meant box boilers, and a fuel consumption not lower than 3 pounds per indicated horsepower hour. Of course there was jet condensation with constant blowing down and replenishing of the water in the boilers with seawater. Her engine turned a two-blade propeller, 15-foot diameter and 22-foot pitch, at 60 r. p. m. full power. If her engine and boilers and condensers were economic crimes from our present standards, aft of her engine she was way ahead of any modern auxiliary, and it is that superiority which justifies the writing and publishing of this article.

Line Shaft Clutch

Aft of her engine was a powerful clutch that transmitted the power of the engine to the propeller shaft. That clutch was highly satisfactory in every respect, permitting the clutching and unclutching of the propeller and engine in half a minute by one man. For more than ten years this clutch successfully answered to every demand of perpetual clutching and unclutching in all kinds of weather, transmitting over 1000 I. H. P. The propeller was of large diameter and coarse pitch which was the reason why it did not interfere with the ship's sailing when unclutched. These two features were responsible for the ship's success. Brunel, the engineering genius responsible for the Great Western and Great Eastern, was the engineer responsible for the Victoria, and under his auspices a series of trials was carried out. Here are the results which no modern auxiliary can duplicate or even approach:

Recently the La France, the largest sailing ship in the world, which had been equipped as an auxiliary with twin Carels-Schneider Diesel engines, has been reconverted into a plain sailing ship. The question naturally arises in the minds of the marine engineer and naval architect: why was not the Diesel engine left in and the masts and sails taken out?

The La France is of about the same deadweight tonnage as those two successful motorships, the Selandia and the Jutlandia. The La France had two 900 B. H. P. two-cycle Diesels; the Selandia two 1050 B. H. P. four-cycle Diesels. Is the La France as a sailing ship under present working conditions going to prove more economical than these two famous Burmeister & Wain motorships?

Mr. John L. Bogert, consulting engineer of New York, has had a very wide experience with Diesel motorships. He is going thoroughly into the matter of auxiliary powered sailing ships and believes an auxiliary can be built which on certain routes will surpass in economy even the motorship. Those of our readers who are interested in sailing ship operation will find this article very interesting reading in connection with an article along similar lines on "American Sailing Vessels," by C. O. Liljegren, which was published in Pacific Marine Review for February, 1920.

Results of Trial

1. Under steam alone, at full steam power, a speed of 11.66 knots was maintained on a fuel consumption of 1 ton, 10 cwt. per hour. The sea was smooth and calm. No indicator cards are available, but at 3 pounds per I. H. P. the above fuel consumption would appear to point to about 1120 I. H. P. It is a pretty safe bet that those engines and boilers could not do better than 3 pounds per I. H. P. hour.

2. Under full steam and canvas, wind strong, a speed of 13 knots was attained.

3. Under sail alone, disconnecting the screw, so as to allow the ship to run freely under canvas, the wind free, moderate and light, all plain sails set, a speed of 8½ knots was averaged, passing easily three sailing vessels on the same course.

4. Under sail alone, with the screw disconnected, "by the wind," the ship made 5½ knots: stood well on both tacks.

5. Under sail alone, the wind free, light and moderate, the screw was stopped hard and fast in an upright position (behind the stern post). The speed fell to 5½ knots and the ship refused to obey the helm. When the screw was disconnected the ship's speed rose to 7½ knots.

6. Disconnecting the screw, so as to allow the ship to run freely under canvas, one man disconnected the screw while the engines were turning over in less than 30 seconds; one man reconnected the screw in 30 seconds.

7. The screw revolving by steam, the ship answered her helm quickly and perfectly. The engine being stopped and the vessel being under sail only, the screw being disconnected, the ship answered her helm as quickly and perfectly under sail alone as under steam. The screw being connected and placed upright hard and fast in front of the rudder, the ship ceased to obey the helm. The screw being connected and placed hard and fast athwartships, the ship answered the helm, but not so well as when disconnected. In all cases, the screw being fixed hard and fast diminished the speed about 2 knots and diminished the power of steerage. And in every case, the screw being disconnected and permitted to revolve freely, the steerage and speed were immediately restored; the operation in no case required more than 30 seconds.

The practical conclusions drawn from these experiments were as follows:

1. The power of sailing and quickly disconnecting the screw without stopping the ship or engines, as effected by the Victoria, is of great value to screw-steamships.

2. That the steerage of a ship may be injuriously affected when, either through ignorance or the lack of proper means, the screw is not disconnected while the engines are not at work.

3. That when the screw of the Victoria is disconnected and runs freely, neither the steerage nor speed

of the ship appears to be sensibly affected.

4. That the Victoria answered her helm and performed her functions equally well, under sail alone, as under steam alone.

The following are the principal dimensions and characteristics of the Victoria:

Length of loadwater line	261′
Beam extreme	38′
Depth at the side	27′ 8″
Gross registered tonnage, tons	1350
Net registered tonnage, tons	1150
Draft light	10′ 6″
Laden	17′ 5½″
Area midship section light	330 sq. ft.
Laden	590 sq. ft.
Area lgt. water line plane	6970 sq. ft.
Laden	7600 sq. ft.
Wetted surface light	9947 sq. ft.
Laden	12,694 sq. ft.
Displacement light	1567 tons
Laden	3000 tons
Masts	4
Canvas in sails	13,860 sq. ft.
Weight of iron in hull	800 tons

On the basis of the foregoing figures, the admiralty coefficient of the Victoria figures out closely 295 when the ship, displacing 3000 tons, attained a sea speed of 11.66 knots per hour on an hourly consumption of 3360 pounds of coal, indicating 1120 I. H. P.

Feathering Screws

It seems singular that no auxiliary has been fitted with feathering screws—similar to the Bevis feathering screw-propeller. More than 2500 H. P. has been transmitted through one of these wheels, and they have uniformly given satisfaction to the ship-owner.

The pitch of propellers fitted to oil engines is usually 9/10 of the diameter, and sometimes even less. A pitch of 9/10 of the diameter means a blade angle at the tip of 16 degrees with a thwartships plane, and a blade angle of but 22 degrees at its center of area. It would be quite hopeless to expect a propeller with blades having such thwartships angles to turn freely when disconnected from the engine, under the action of the ship moving through the water propelled by her canvas alone. In fact the drag that results from such fine pitch propellers has been measured, and turns out to be most serious, as was to be expected.

If the propeller or propellers have sufficient area of blade to be economically suitable for the power propulsion of the ship, the loss of speed when under canvas alone is about 25 per cent of the speed the same ship coud attain under the same sails, with the same conditions of wind, but free of the obstruction of propeller or propellers. D. W. Taylor mathematically demonstrated with certain justifiable assumptions as to the flow of water past the blades that a diameter-pitch ratio of .35 was characteristic of the most efficient element of a propeller blade. That means that approximately an angle of 45 degrees is the thwartships angle of the most efficient element of the surface of a propeller blade. When the pitch-diameter ratio of the tips of the blades is 1.5, the angle of the blades at their center of area is very nearly 45 degrees. It is easy to perceive that a coarse pitch propeller, if unclutched from the engine, will turn, under the action of the ship passing through the water, with much less resistance than a fine pitch propeller.

It was this characteristic of the early steamship propellers that made them effiecient sailing vessels. All marine steam engines seventy years ago were slow-turning engines, and their propellers had pitches as coarse as twice the diameter. All early steamships were sailing ships, and expected to use their sails, to save coal, whenever and wherever possible. They were handicapped by heavy cumbersome, wasteful machinery, and coal bunkers that occupied valuable cargo space. The Victoria was an example of how well they could sail with disconnected screws. One of their great defects was the length of time it took to get up steam. They none of them had water-tube boilers, and hours were required to raise steam. It would often happen that the wind would fall light just as the fires had been allowed to die out, and vice versa, the wind would spring up just as the boilers got good and hot and the propeller had been clutched to the engine.

Oil Engine Auxiliaries

The oil engine requires a high rotative speed, to keep cost, weight and space occupied down, and the result of directly driving the propeller from the engine has been to ruin the propeller, so far as sailing is concerned. The use of Bevis feathering screw-propellers would be one solution of this difficulty; the adoption of gearing between the engine and the propeller would be another. Probably the best solution of all would be the use of electric drive on the propeller shaft in combination with oil-engine driven dynamo and storage battery. Electrically driven mast-winches, capstans, windlass and drums would materially reduce the labor of working ship. If there is going to be a future auxiliary, it will undoubtedly have all the auxiliary machinery of a modern motorship, besides handling its sails by power instead of by hand. It is my belief that such an auxiliary can be designed that will on certain routes surpass even the true motorship in the economical transportation of cargo.

Combination Ore and Oil Steamer G. Harrison Smith

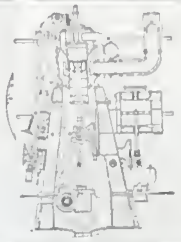
Delivered to International Petroleum Company

Combination oil and ore steamer G. Harrison Smith, recently delivered to the International Petroleum Company by the Sparrow's Point plant of the Bethlehem Shipbuilding Corporation

THE G. Harrison Smith, 20,000-ton combination ore and oil vessel built at the Sparrow's Point plant of the Bethlehem Shipbuilding Corporation, Ltd., for the International Petroleum Company, was delivered to her owners on September 12, after a very successful trial, which was run on August 30 at Sparrows Point, Maryland.

The vessel has a length overall of 571 feet 6 inches, a breadth of 72 feet, and a depth of 44 feet. She is equipped with three single-ended Scotch boilers and triple-expansion reciprocating engines with cylinders 25x41x68-inch diameter and 48-inch stroke. The boilers are equipped with the Bethlehem-Dahl mechanical oil burning system fitted with Howden type of forced draft.

Oil Engines and Motorships



PROGRESS IN MOTOR SHIP BUILDING

THE Emergency Fleet Corporation now has one first class sea-going motorship, the William Penn, and that good vessel, now on her maiden voyage, is demonstrating to the corporation the value of Diesel engine propulsion.

For the benefit of those of our readers who have not read the previously published descriptions of this vessel we will give her principal specifications.

She has a length of 455 feet overall, a beam of 60 feet, and a molded depth to shelter-deck of 36 feet 8 inches. Her deadweight capacity on 28 feet 4¾ inches draft is 12,375 tons, of which 11,725 tons is net capacity for cargo. She has twin six cylinder, four cycle, directly reversible marine Diesel engines of 29.134 inch cylinder bore and 45.275 inch stroke, built by Burmeister & Wain of Copenhagen and installed by William Cramp & Sons Ship and Engine Building Company of Philadelphia. These engines at the designed speed of 115 r. p. m. have a rating of 2250 i. h. p. each.

On her deep sea trials the William Penn was not fully loaded, her mean draft being only 24 feet. In this condition, with the engines averaging 109.7 r. p. m., they developed a mean i. h. p. of 4202, driving the ship at 11.77 knots an hour on a fuel consumption for all purposes of 0.308 pounds per indicated horsepower. The fuel used was 29.4 degrees Baume Diesel oil with a thermal value of 19,450 b. t. u.

The William Penn at the time of this sea trial had in her holds 129,374 cases of oil, 500 barrels of grease, and a miscellaneous general cargo, amounting to a total of about 6200 tons. Immediately after her trials she cleared for Savannah on the first leg of a round the world voyage. At Savannah she loaded 3350 bales of cotton and 1450 barrels of resin. Twelve hundred tons of fuel oil were taken at New York. From Savannah the William Penn goes to Balboa, thence through the Canal to Honolulu, at both of which ports the fuel oil tanks will be filled to capacity. Cargo will be discharged at Oriental ports and return cargo picked up there for the homeward trip via Suez and British ports to New York. The Barber Lines operating the William Penn have already arranged profitable return cargo.

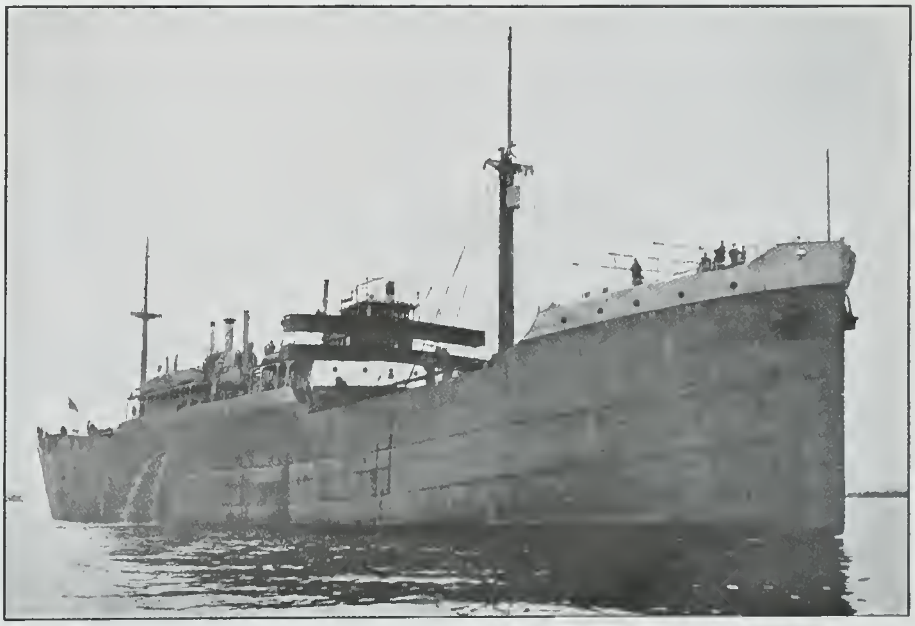
The Kennecott is making some very creditable records in economy of operation and has been running coastwise with full cargoes and practically no maintenance or repair bills on her propelling machinery. This vessel, built by Todd Dry Dock and Construction Corporation of Tacoma, Washington, and engined by McIntosh & Seymour of Auburn, New York, is a more strictly American product than her larger sister and for that reason perhaps more interesting. As we go to press she has just completed her second round trip from Puget Sound to New York, and her engines have not been forced to shut down once during her entire sea experience.

From that earlier motor tanker, the Charlie Watson, of the Standard Oil Company of California, comes the same report. The Charlie Watson, a first class steel vessel of 2600 tons deadweight capacity, was built by the Union Construction Company and engined by the Pacific Diesel Engine Company, both of Oakland, California.

A larger tanker along the same lines, the H. T. Harper, of 4750 deadweight tons capacity, is just being delivered to the Standard Oil Company by the Moore Shipbuilding Company of Oakland, and thus with four first class sea-going steel motorships of respectable capacity the American merchant marine faces a desperate cut-throat competition in the overseas freight business, having already demonstrated on many lines that against European motorships competition with its steamers is quite hopeless.

In the meantime Great Britain, Sweden, Norway, Denmark, Germany, Italy and Holland are busy building great fleets of these economical carriers, in addition to their present motorship tonnage.

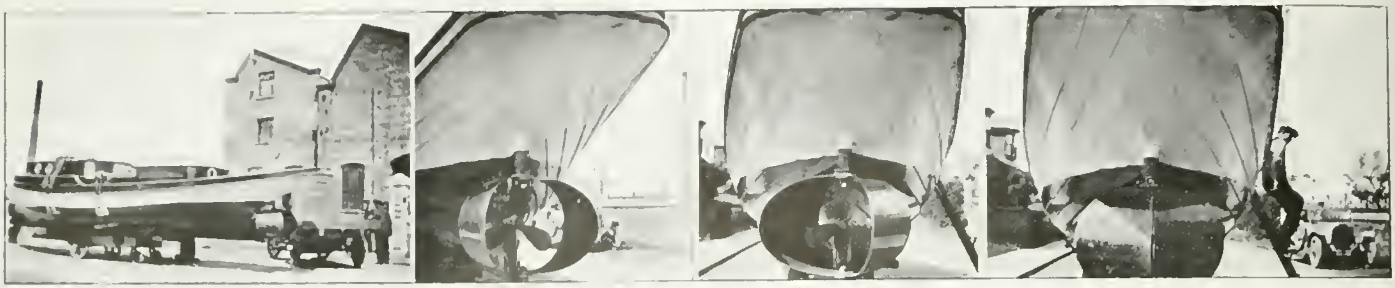
It is up to American shipowners in the overseas business to convert their wasteful steamers and up to the Emergency Fleet Corporation to assist in that good work.



United States Shipping Board sea-going motorship William Penn, 12,375 deadweight tons capacity on 28 feet 4¾ inch draft

SOME OBSERVATIONS ON THE KITCHEN RUDDER

By R. Z. DICKIE



Left to right—Launch Abertay leaving shop for her trials, showing side view of Kitchen rudder. View of stern showing rudder in straight ahead position. Stern showing rudder hard aport. Sern showing rudder closed in hard astern position

CONSIDERABLE interest is being manifested in the launch Abertay, which is being operated on the Firth of Tay, Scotland, as a ferry between Tayport and Broughty-Ferry, as she is equipped with a Kitchen rudder to demonstrate its maneuvering qualities with an engine which operates in the ahead motion only.

The Abertay was built by the Abertay Engine Works of Tayport, and is 31 feet long by 7 feet 6 inches beam, with a draft of $1\frac{1}{2}$ feet forward and 2 feet aft light, propelled by a gas engine with four cylinders $3\frac{3}{4}$ inches diameter by $4\frac{1}{2}$ inch stroke turning about 870 revolutions per minute and delivering about 16 horse power. She is arranged with a cabin forward and cockpit in middle with engine in separate house, as is shown by the photographs, and is proving a very able sea boat in all kinds of weather.

To be as effective as possible an ordinary rudder should be placed in, or very near, the propeller race. This ensures that the speed of the water passing over the rudder will be greater than the speed of the vessel through the water by a varying value which may be as much as 30 per cent; and that in starting the ship from rest there will be a flow of water over the rudder, giving steering power before the vessel has much weigh on. Kitchen rudders do this in the most efficient way possible, since they not only are in the propeller race but entrain it.

Messrs. D. & R. B. Scott of Abertay Works made a series of trials to demonstrate the peculiar qualities of the Kitchen rudder. The photographs, some of which were taken from the Tay bridge in a vertical position, show how perfectly the claims of the inventor are justified.

The diagram illustrates the various positions of the rudder and the resultant maneuvering qualities, and by comparing the same with the photographs the direction of the wake will bear out the diagram.

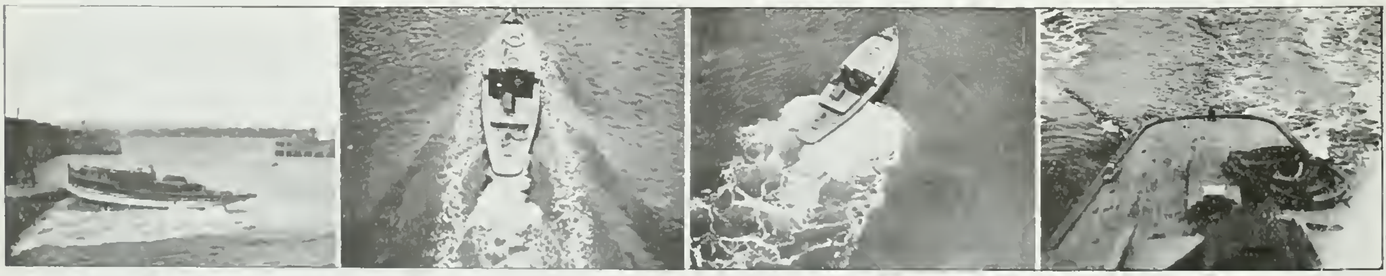
From full speed ahead to a standstill can be accomplished in less than a boat's length, and from full speed ahead the boat can be stopped in about two and a half times her own length with the engine not running. In turning it was found that she would make a complete circle at a radius of about 30 feet in 40 seconds, starting from full speed. In swinging astern, with the rudder hard over, half a circle can be accomplished easily within a radius equal to half the length of the boat.

A remarkable feature of this type of rudder is the control of the vessel when backing, as it has been considered almost an impossibility for the ordinary type of rudder, and this without changing the direction or speed of the engine.

A valuable asset in favor of the rudder which cannot be overlooked in the case of a high speed engine requiring a propeller with a low pitch is that the efficiency is not lost in backing as the engine always runs in one direction while with an ordinary reverse gear the low pitched propeller would be very inefficient for backing if properly designed for going ahead.

Experiments with Kitchen rudders have shown a gain in propeller efficiency when the rudder is partly closed. With the same power applied there has been a uniform gain in speed of approximately five to ten per cent over that obtained with the ordinary rudder, but the exact amount gained with the rudder closed is a matter of experiment, for no two boats seem to give the best results with the rudder closed the same amount.

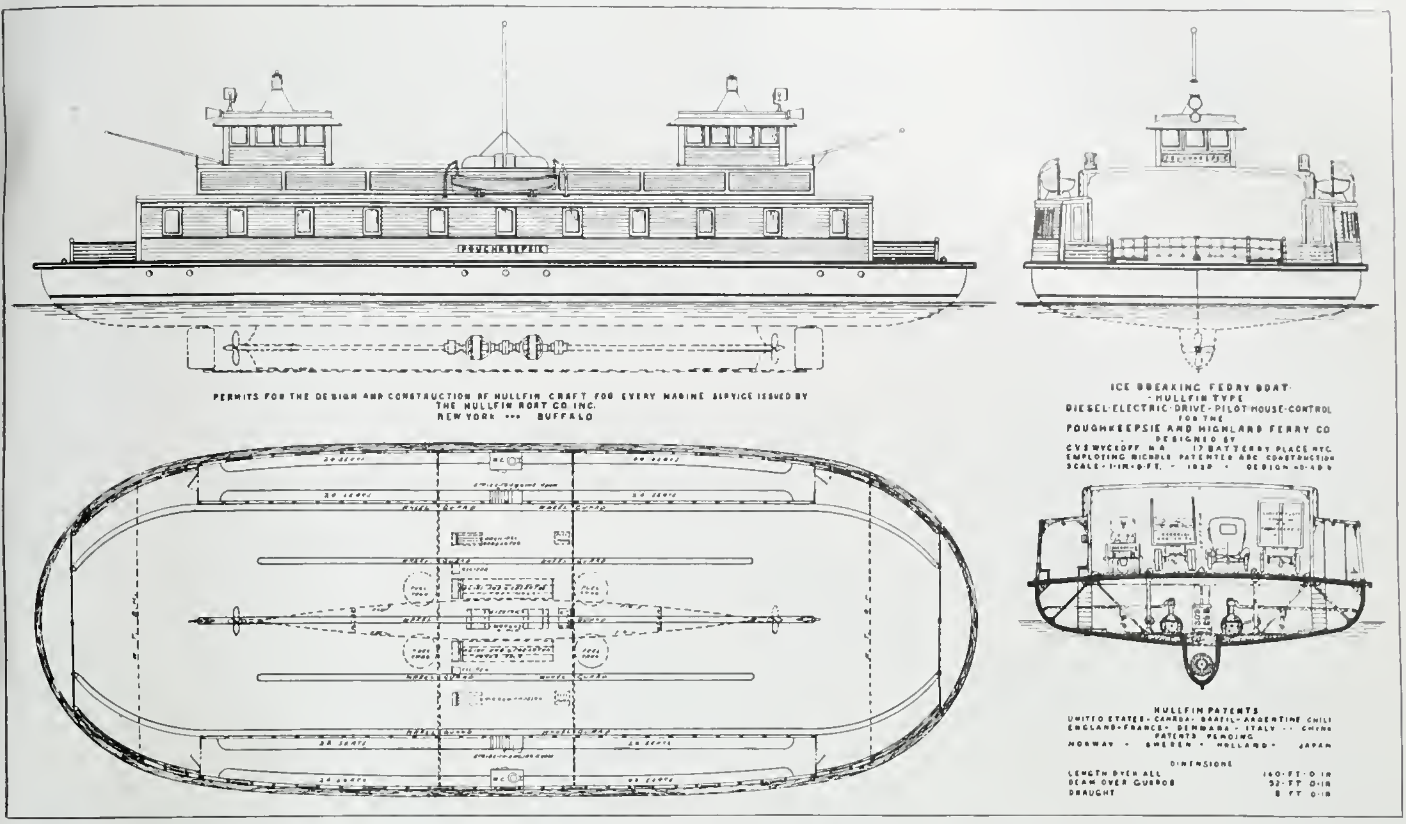
In conclusion it might be added that when a boat is equipped with a Kitchen rudder and in the hands of a skilful operator the control is almost absolute.



Left to right—Abertay maneuvering at dock swinging to port. View from Tay Bridge looking down on launch as rudders are closed to stop. View looking down showing launch almost stopped. Note action of rudder on water. View of wake full speed ahead. Above—side view of launch brought to stop position with engines full speed ahead.

THE DIESEL ELECTRIC ARCONSTRUCT-HULLFIN FERRY BOAT POUGHKEEPSIE

By C. V. S. WYCKOFF
Naval Architect


POUGHKEEPSIE
PERMITS FOR THE DESIGN AND CONSTRUCTION OF HULLFIN CRAFT FOR EVERY MARINE SERVICE ISSUED BY
THE HULLFIN BOAT CO INC.
NEW YORK ••• BUFFALO
ICE BREAKING FERRY BOAT
HULLFIN TYPE
DIESEL-ELECTRIC-DRIVE-PILOT HOUSE-CONTROL
FOR THE
POUGHKEEPSIE AND HIGHLAND FERRY CO
DESIGNED BY
C V S WYCKOFF N A 17 BATTERY PLACE NYC
EMPLOYING NICHOLS PATENTED ARC CONSTRUCTION
SCALE 1 IN 8 FT 1929 DESIGN NO 40
HULLFIN PATENTS
UNITED STATES - CANADA - BRAZIL - ARGENTINE CHILI
ENGLAND - FRANCE - DENMARK - ITALY - CHINA
PATENTS PENDING
NORWAY - SWEDEN - HOLLAND - JAPAN
DIMENSIONS
LENGTH OVER ALL 140 FT 0 IN
BEAM OVER GUARDS 52 FT 0 IN
DRAUGHT 8 FT 0 IN

THE ferry boat Poughkeepsie, now being built by the Atlantic, Gulf and Pacific Company, Mill Basin, Brooklyn, for the Poughkeepsie and Highland Ferry Company, will be unique in several particulars. She will be one of the first commercial vessels to be propelled by the Diesel electric system; the first to be built with a "hull-fin" and on the "arconstruct" principle; and because of these features she will have an unusually large carrying capacity and is expected to be very economical in operation.

Conditions of Service

The Poughkeepsie will have a length over guards of 140 feet; a beam over guards of 52 feet; a beam of hull at water line of 46 feet; a draught of 9 feet; a displacement of 400 tons; and a speed of 12 knots. Her hull will be of steel and her superstructure of wood.

She will ply between Poughkeepsie and Highland on the Hudson River, a distance of about three-quarters of a mile; and the two special conditions of her service are a heavy automobile traffic in summer and thick ice in winter.

The use of the Diesel electric drive gives her exceptional carrying capacity because it permits of a perfectly clear main deck without center casing or even a stack. Consequently she will have, in addition to two passenger cabins on this deck, four driveways instead of only the two permitted to steam-propelled ferries.

What this means can be understood by comparing the Poughkeepsie with the new Staten Island ferry, the largest of her type in America. Though this latter boat is to be 250 feet long and will have a 66-foot beam, she will have only 440 feet of driveway and a capacity of 28 cars, whereas the Poughkeepsie will have 472 feet of driveway and will be able to accommodate 32 cars.

In order to operate all winter the Poughkeepsie will have to contend with ice up to three feet thick, with occasional windrows down to the bottom of the river. She will, therefore, be very substantially built; but more especially her hull-fin design will permit her to overcome ice conditions that would tie up a boat of the ordinary type.

The Hull-Fin

As shown by the drawings, the hull of the Poughkeepsie is of very novel design. Instead of the regular narrow hull extending to the keel, she will have a comparatively shoal hull with a "hull-fin" below. This hull-fin, which is patented by Captain Samuel Golden, has several special advantages.

The hull-fin places the propellers under the boat, where they are always immersed in solid water, instead of at the extreme ends, where the water is broken and where they can emerge in rough weather. This location, together with the shape and fine ends of the fin, greatly increases the efficiency of both propellers, and also permits of the use of propeller speeds that are much higher than ordinary practice, thus increasing the efficiency of the propelling machinery.

The broad hull with the fin keel imparts a high degree of stability to the vessel, owing to the breadth of the stability angles. The Poughkeepsie could, in fact, carry her entire load on one side without capsizing. She will also possess superior maneuvering power.

The ice-breaking features of the hull-fin design are obvious at a glance. Instead of wedging into the ice, the Poughkeepsie will ride over it, crush it with her weight, and then push it aside, exactly as the specially-designed Russian and Swedish ice-breakers act. Then, too, her rudders and propellers are so placed as to avoid actual contact with solid ice, and the propellers will act as centrifugal pumps to draw the ice fragments out from under the hull.

The depth of the Poughkeepsie's hull will be 10 feet, its draught $3\frac{1}{2}$ feet, and that of the hull-fin $5\frac{1}{2}$ feet.

In the arconstruct system of design and construction, all the relative transverse sections are arcs of the same radii. In other words, every transverse curve in the hull, whether in the bottom, bilge or side, is a relatively longer or shorter arc of the same circle.

This simplification of the lines greatly reduces the cost of the mold loft, fabrication and plating work, and also increases the strength of the hull. Moreover, since the same arc is always presented to the water, the water when once disturbed follows the hull freely without further disturbance, the usual resistance of increasing area, and thus the ship-efficiency is still further increased.

Diesel Electric Propulsion

The use of the Diesel electric system of propulsion is in accord with the best marine engineering practice for this class of vessel. The high economy and unparalleled maneuvering power of this drive are too well known to require discussion here.

There will be propeller controls in the pilot houses and in the engine room, and the pilot can directly and instantly control every movement of the boat. The fact that the Poughkeepsie will be able to accelerate to full speed in minimum time, come to a full stop from full speed in a few seconds, and reverse her motion in less time than is possible with steam drive, will not only improve her schedules but will decrease possibilities of collision or damage when entering the slip. She is, in fact, expected to make regularly three trips per hour instead of the two trips made by the present ferry boat.

Her main engines, as specified, will consist of two 150 horsepower, six-cylinder Winton Diesel engines of 450 r. p. m., each of which will drive a 90 kw. Westinghouse generator.

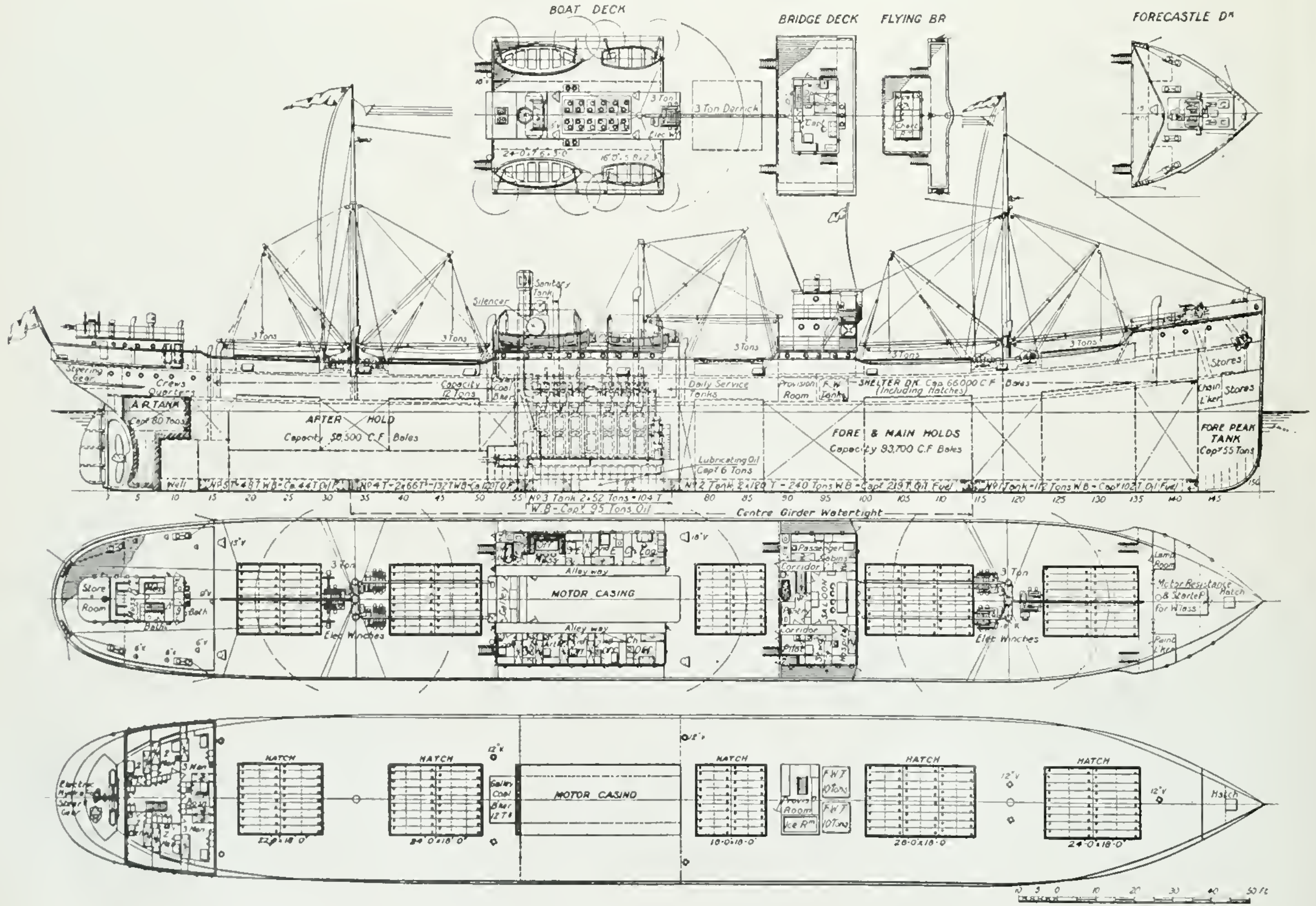
Her propellers, which are to be normally rigidly connected together, will be driven, according to specifications, by two 100 horsepower Westinghouse motors. Either or both engines, and either or both propeller motors, can be used at any time. The engine room will be located in the Poughkeepsie's hull, and the propeller motors and shafting in the hull-fin.

The propellers will operate with full power at the unusually high speed of 600 r. p. m., but their location at the ends of the hull-fin makes this possible without cavitation or excessive slip. The propellers will be of the standard three-blade design, 48 inches in diameter and 28 inches pitch.

It is expected that the Poughkeepsie will be in operation by next spring.

RADIO FOG SIGNALS INSTALLED

It is the intention of the Lighthouse Service to establish additional radio fog signal stations at important points as rapidly as funds are available. Plans are now under way for installing a radio fog signal sending apparatus on San Francisco Light Vessel No. 70, California, and the lighthouse tender Sequoia, stationed in the eighteenth district, will be equipped with a radio compass. These will be the first installations of this character made by the Lighthouse Service on the Pacific Coast.



Single screw motorship Leise Maersk engined with long stroke slow speed Burmeister and Wain motor

THE FIRST BURMEISTER AND WAIN SINGLE SCREW MOTORSHIP

Messrs. Burmeister and Wain of Copenhagen, Denmark, stand out head and shoulders above all the world's shipbuilding and engineering firms in the application to marine propulsion of the full Diesel engine. Realizing the interest which has been aroused among shipowners by the uniform success of real motorships and anticipating a very wide and large demand for the conversion of existing steamships, they have developed a long stroke, slow speed Diesel motor suitable for the driving of single screw medium speed, average size freight carriers. In this article is described the first installation of this character in a new motorship.

SINCE the comparatively recent announcement by Burmeister and Wain, Copenhagen, that they had developed a long stroke, slow speed marine Diesel engine which was especially adapted for single screw cargo motorships, the operators and owners of ships have been looking forward with a great deal of interest to the first sea trial of this motor. Pacific Marine Review is now glad to be able to present to its readers an account of the results of the trial trip of the motorship Leise Maersk, the first vessel in which this type of engine has been installed.

The Leise Maersk is of the closed shelter-deck type with a length between perpendiculars of 299 feet 6 inches, a molded breadth of 44 feet, and a molded depth to shelter-deck of 28 feet 11 inches. She has a registered gross tonnage of 3015, a deadweight tonnage of about 4400, and a displacement tonnage of 6350 on a 22 feet ½ inch draft. The capacity of the holds for bales is about 21,200 cubic feet. The specifications call for a normal average speed at sea of 10½ knots per hour on a consumption of 5 tons of fuel oil per day.

Engine Dimensions

The engine is of the 4-cycle type with 6 cylinders, having a diameter of 630 mm. and a stroke of 1300 mm. At 85 r. p. m. the i. h. p. is 1500 and the b. h. p. 1150.

On September 2, 1921, in four runs at sea with a displacement of 2204 tons and a mean draft of 8 feet 2½ inches, the Leise Maersk averaged 11.71 knots per hour with the engines turning over 91.9 average r. p. m. and developing 1665 average i. h. p. The maximum h. p. developed over one nautical mile was 1710 with the engine turning 92 revolutions, producing a speed of 12.6 knots.

Low Fuel Consumption

In a test for fuel consumption, running at 88.9 r. p. m., the engines developed 1565 i. h. p. at a fuel oil consumption of 0.1265 kilograms per i. h. p. hour, the fuel used having a heating value of 18,350 b. t. u. This fuel consumption was considerably lower than the guarantee, amounting to 4.5 tons per 24 hours.

The main engine is of the enclosed forced lubrication type, cooling water and forced lubricating oil being furnished by electrically driven pumps. For nominal and continuous sea speed of 10.5 knots, these engines deliver 1150 b. h. p. at about 85 r. p. m. The compressor giving the necessary air (about 60 atms.) pressure for injection of the fuel oil is directly coupled to the crankshaft and built integral with the main engine. A governor of the Burmeister and Wain type, which can be set for any stipulated number of revolutions, immediately stops the supply of fuel oil to the cylinders in any emergency which would produce racing in the propeller.

Auxiliary Plant

Power for auxiliary machinery is supplied by three Diesel engine driven generators, any one of which can supply the necessary current for normal working at sea, the other two being standbys for use in port maneuvering, handling of cargo winches, anchor windlass, warping winch, etc. A small oil-fired boiler with a heating surface of 55 square feet is used for supplying steam for heating purposes.

The weight of the propelling unit with the auxiliary generating sets and all of the engine room auxiliaries, including floor plates, grating, ladders, airpipes, piping, silencers, spares, workshop tools, etc., is about 332 tons when designed with shafting dimension according to Lloyd's latest rules.

The weight of a corresponding steam engine installation on the single screw steamer St. Thomas, also built by Burmeister and Wain, is 337 tons. The machinery on the St. Thomas consists of a triple expansion engine developing 1150 b. h. p. at 80 r. p. m. and two Scotch boilers. The weight of steam machinery includes main engines and boilers, auxiliaries and fittings as are listed for the Diesel installation. Both weights include shafting and propeller.

The length of the engine room on the motorship Leise Maersk is 42 feet; length of boiler and engine on the steamship St. Thomas, 44 feet. The coal bunkers of the St. Thomas take up 14 feet additional so that the Diesel motorship gains 16 feet in this comparison. The engine staff of the motorship consists of 7 men. The engine staff of the St. Thomas consists of 15 men.

The Sulina

The Leise Maersk was built by the Odense Shipyard for the Svenborg Steamship Company of Copenhagen.

A similar ship, the Sulina, powered with the same engines, was being built at the same time by the Oresunds Shipyard in Sweden, her engines being supplied by the Götaverken.

The Sulina is 299 feet 6 inches in length between perpendiculars with a beam of 44 feet, a molded depth of 28 feet 11 inches, and a mean loaded draft of 22 feet 2¾ inches. She also has recently run successful sea trials, attaining a speed of 12 knots on a fuel consumption for all purposes of 5.1 tons per twenty-four-hour day.

The Sulina is owned by the Swedish Lloyd Line, which is controlled largely by Dan Bröstrom, who is so strongly in favor of the motorship that he is now preparing plans and specifications for a 20,000-ton, 18-knot trans-Atlantic motor liner for the Swedish American Line. The Swedish Lloyd Line has a third single screw ship similar to the Sulina and the Leise Maersk now being completed at a Swedish shipyard.

U. S. Shipping Board
TAKE NOTICE

The performance at sea of these single screw omtorships should be of great interest to the United States Emergency Fleet Corporation, as this new type of motor makes possible the conversion of the ordinary triple expansion steam plant into an economical Diesel engine plant with little or no structural changes in the hull of the steamer. The Emergency Fleet Corporation now has quite a number of steel steamers running from 3500 to 5600 tons deadweight capacity which could be converted into very economical sea-going motorships by the installation of plants similar to those described in this article.

CONSOLIDATED BALANCE SHEET

THE AMERICAN SHIP BUILDING COMPANY AND SUBSIDIARY COMPANIES

At the Close of Business June 30th, 1921

ASSETS

PERMANENT				
Land, Buildings, Equipment, etc				$ 7,049,405.11
GOOD WILL				
As valued on the Company's books				5,192,165.57
CURRENT				
CASH				
On hand and on Deposit			$ 913,200.39	
U. S. GOVERNMENT SECURITIES				
Liberty Bonds and Accrued Interest	$ 8,872,473.28			
Less Allowance to reduce to market value	965,498.74	$ 7,906,974.54		
War Savings Stamps		908.00	7,907,882.54	
NOTES RECEIVABLE				
Customers' Notes and Accrued Interest			3,146.15	
ACCOUNTS RECEIVABLE				
Customers		$1,066,573.83		
Unbilled Day Work Charges		277,131.40	1,343,705.23	
INVENTORY				
Materials and Supplies on hand and in process		$ 729,575.78		
Surplus Materials		245,976.11		
Special Stock		66,175.17	1,041,727.06	11,209,661.37
OTHER ASSETS				
Completed Ships on hand			$ 5,401,752.93	
Notes Receivable and Accrued Interest For Ships Sold)			2,157,800.00	
Bonds and Stocks and Accrued Interest.			688,655.00	
Deposits, Advances and Miscellaneous Accounts Receivable			127,992.62	8,376,200.55
DEFERRED				
Buildings, Machinery, Equipment, etc., built and installed on account of War Production		$ 9,417,198.32		
Less. Reserve for Amortization		8,307,481.20	$ 1,109,717.12	
Prepaid Expenses, etc			57,646.58	1,167,363.70
				$33,291,796.30

LIABILITIES

CAPITAL STOCK				
PREFERRED—7% NON CUMULATIVE				
Authorized	$ 15,000,000.00			
Less: Unissued	7,100,000.00	$7,900,000.00		
COMMON				
Authorized	$ 15,000,000.00			
Less Unissued	7,400,000.00	7,600,000.00	$15,500,000.00	
CURRENT				
ACCOUNTS PAYABLE				
For Purchases, Expenses, Unpaid Pay Roll, etc.		$ 245,262.42		
ACCRUED AND DEFERRED				
State, County and City Taxes, etc		114,009.01		
UNPAID DIVIDENDS				
Preferred 1¾% Declared June 22nd, 1921, Payable August 1, 1921	$ 138,250.00			
Common 4% Declared June 22nd, 1921, Payable August 1, 1921	304,000.00	442,250.00	801,521.43	
RESERVES				
For Fire Insurance		$ 148,751.56		
For Workmen's Compensation Insurance		1,009,355.56		
For Additional costs of Ships Delivered		174,181.45		
For Federal Taxes, Amortization, Demobilization, Contingencies, etc		1,297,366.36	5,629,954.93	
PROFIT AND LOSS SURPLUS			$11,360,319.94	
			$33,291,796.30	

THE American Shipbuilding Company of Cleveland is without doubt the largest shipbuilding institution in the world located on fresh water. Its annual statement is always a matter of interest because this company is so conservatively and so successfully financed and managed. Our readers will be interested in the reproduction of the consolidated balance sheet shown above and in the following excerpts from the annual letter to the stockholders of the company by President M. E. Farr:

"The results from operation for the fiscal year just ended, in view of the setback in shipping, and in consequence shipbuilding, are better than were expected. The shortage of cargoes in the deep-sea trade is largely responsible for the slump in water shipping at the present time. The impression prevails that the present depression in water shipping is caused solely by an over-production of vessels. Statistics recently published by Lloyd's Register prove that the world's steam tonnage, after eliminating wooden vessels and those obsolete, improperly designed and poorly constructed, is not greatly in excess of the tonnage in 1913. The cost of ship construction is still high, which it must be understood, bears no relation to the low prices now quoted for vessels already built. There are few enquiries for new tonnage, and the prospects of the company's securing new business in the immediate future are not encouraging.

"During the year eight cargo ships, of 66,200 gross tons carrying capacity, were completed for company account. Four of these were bulk lake carriers and four of general cargo ocean type. The four lake ships have been sold at fair prices. Notwithstanding negotiations with foreign interests for the sale of a number of the ocean type ships were closed, the buyers either refused or were unable to carry out their part of the transaction. The Independent Steamship Company still holds title to ten ocean type ships, all of which are in first-class condition and now in ordinary.

"There were 260 vessels, aggregating 1,134,492 gross tons, drydocked at the various plants of the company during the year. The repair departments have been kept moderately busy, repairing and reconditioning vessels and rebuilding railroad equipment. The prospects for repair and replacement work during the coming year are fair.

"The frame building adjoining the Lorain Plant, known as the 'American House,' was sold in August, 1920, for $7500. This property was carried on the company's books at $2,321.03. Regular plant equipment, not needed, was sold for $113,491.96. Land forming a part of Lots Nos. 1, 2 and 3, St. Aubin Farm, Detroit Plant, has been leased for a period of ten years, at an annual rental of $6,600, free from all taxes, maintenance and other expenses, with option to purchase within two years for $107,616. Land located on the southeast corner of Pine street and Biddle avenue, Wyandotte, has been leased for ten years, at an annual rental of $900, free from all taxes and other expenses, with option to purchase within two years for $15,000. The land now occupied by the brass foundry, Detroit Plant, has been leased for ten years at an annual rental of $1500, the company to pay taxes and expenses.

"The property of the company is in good condition and free of incumbrance. The cost of replacing property damaged by fire amounted to $121,490.21, which with the exception of one item of $838, was fully covered by insurance.

"The premium set aside during the year to cover workmen's compensation and public liability risks amounted to $129,984.43, and the disbursements, actual and estimated, aggregate $88,714.41. The carrying of this form of insurance by the company, has not only been satisfactory but has resulted in a very large saving."

FULL SPEED AHEAD

EDITED BY ANDREW FARRELL

Full Speed Ahead: Steamship Operations, 669; Marine Insurance, 678; Shipbuilding, 683; With the Exporters and Importers, 691; Personals, 696.

Steamship Operations

What of the Future?

On the eve of a trade revival that may involve the larger portion of the world, steamship operators find themselves facing a situation of singular perplexity. So many old landmarks have been swept away by the storms of seven years that there is great difficulty in getting proper bearings. What will be the more remunerative trade routes at the end of five years, at the end of ten, at the end of twenty-five? Upon the answers to that question depends in a large degree the success or failure of individual companies and of the American merchant marine as a whole.

Things Have Changed

It is well enough to say that the old trade routes, as they were developed during a half-century of steam and several centuries of sail, will remain; so they will in great part, for the world has survived worse catastrophes than the World War and has groped its way back to normality again; but only the blind would fail to see that certain profound changes have come to pass. Aside from the temporary depression in countries relatively untouched by the war, and the more bitter and longer drawn out reconstruction era in devastated regions of Europe, both of which are altogether impermanent, there are certain factors making for change. Old trade routes will remain, yes, but as modified by at least three developments of the last seven years: new inventions, processes, manufactures and markets born of the war; the splitting up of a large part of Central Europe into small states, each of them possessing, in common with older nations, the power to erect tariff walls and other impediments to the free exchange of goods; and the opening of the Panama Canal.

There comes to hand such a pat and significant example of the first that it may be considered in some detail. As the world knows, there was a great expansion of the Chilean nitrate trade during the war, principally because of the enormous manufacture of munitions. Chile experienced a war-boom of proportions unusual even in a world of war-booms, and with the noteworthy inability of the suddenly prosperous to reconcile themselves to change, strove bitterly against declining prices last year. What of Chilean nitrate today? During the calendar year 1920 shipments through the Panama Canal averaged 166,325 tons a month and attained 195,885 tons in January, 1921. Mark what has happened since: shipments of May were 43,504 tons; of June, 58,801; of July, 26,051; although August rose to 39,349 tons. Temporary depression? Not according to Alejandro Bertrand, European delegate of the Association of Nitrate Producers. He sketches the rapid rise of other fertilizers: prior to 1908 sulphate of ammonia was the only rival, and an inferior one, to nitrate; from 1909 to 1913 cyanide and nitrate of calcium began to appear, while the production of sulphate of ammonia increased rapidly; in 1913, synthetic ammonia was produced, attaining its maximum production in Germany in 1918, one year after nitrate reached its peak; sulphate of ammonia, extracted from coal, is waxing; and chloride of ammonia and other new salts are being produced. In 1913-1917, Don Bertrand sums up, nitrate represented 56 per cent of the world's fertilizer production; at the time his report was made, about the middle of the year, it had fallen to less than 35 per cent, with a further decline imminent.

Coal Also Involved

Any shipping operator may compute what the loss of such seaborne cargo means to the world's merchant marine. But that effect is not all. Coal shipments to the West Coast of South America declined, as a direct result of the nitrate depression, from 76,157 tons in January, 1921, to 1664 tons in July. The nitrate and coal trades were mutually dependent, the Panama Canal Record points out, the decay of one involving a corresponding fall of the other.

It would not be difficult to multiply instances. There is, for example, the American production of dyes, hitherto largely bought in Germany. As cargo dyes may not be important, for a little bulk is very valuable; but Germany used dye exports to pay for such raw materials as cotton. Again: during the war American imports of Mediterranean silks declined greatly, with a resultant increase in purchases in the Orient; and on the other hand, Japan, which had bought its steel largely of Great Britain and Belgium, diverted to the United States an exceedingly brisk trade. Vegetable oils were imported in enormous quantities; copra attained a new importance, and the Manchurian soya bean was practically discovered by the United States. These and many other new trades and diversions of old were due principally to the war.

How Many Will Survive?

But how many are likely to survive? Japan already has seen Sweden return triumphantly to the match trade of Malaysia and India, which had been surrendered temporarily to Nippon. Is the fall of Chilean nitrate to be repeated in the case of Oriental raw silk? It was, in fact, so repeated last year, during the worst of our depression; but shipments are again on the increase. Japan doubtless can produce silk more cheaply than can the Mediterranean; yet what would happen if Japan were to transfer its steel trade again to Europe? Would we of America find other commodities for export sufficient to employ our Oriental tonnage and maintain our purchases in the Far East? Another factor may crop up here; the Washington conference on restriction of armaments also will consider Pacific and Far Eastern problems. There are many of those problems that are serious; it is to be doubted, however, whether any single one approaches Japan's lack of domestic iron ore. Only one can rank with it: Japan's demand for markets in Asia; but the two are closely akin; at any rate, Japan does not need an outlet for so-called surplus population so much as it needs raw materials for its factories. Nippon can and will follow the example of Great Britain and Belgium and Germany there. But what of our Oriental steel trade if the conference should find a way to permit Japan to open up Chinese mines? Practically speaking, cotton and lumber would remain the only members of our present great triumvirate of raw or semi-manufactured exports to the Orient.

So much for a few examples of change, accomplished or potential. What of the many new states of the world and the erection of tariff walls by them and by other countries? Will open trade be realized in the hodge-podge of Central Europe? Will Germany find it possible to buy wheat of Poland, or will America and Canada find here a more or less permanent market? Portland, Oregon, has an interest here. What measure of success will be realized by the "nationalists" of India in their proposed boycott of foreign cotton cloth? Such a measure, if successful, would be felt by Great Britain, Japan and the United States, all manufacturers of cloth for export, and by every cotton-grower in the South, and, as a result, by every American and foreign steamship line. How far will that late insistent demand for the development and protection of "essential" industries go? To revert to the case of dyes: our domestic production of those essential goods certainly will react strongly on our seaborne trade with Germany. So with our agricultural tariff wall. If the Western wool-growers demand and receive protection, to what extent can Australia buy lumber and manufactured goods in the States? There remains also a somewhat disconcerting fact: the United States increased its manufactures enormously during the war, so that it became a dangerous rival to the older nations of Europe and to Japan in Asia. To what agricultural and grazing countries are all these manufacturing states to sell, especially, if, as in the case of America, a nation is both agricultural and manufacturing and is committed to the policy of protecting both interests?

We have finally the case of Panama. The influence of that canal on the world's commerce is only dimly apparent now and perhaps will not be fully disclosed for twenty-five years. This much is certain: Asia has been placed next door to the manufacturing centers of the Atlantic Coast; Australasia is closer to both the Eastern states and to Europe; the Pacific Coast of the United States and Canada has been moved many thousands of miles nearer to Europe. The trade routes between these sections of the world are the most promising now. Will they remain so? Have San Francisco and Seattle any opportunity to restore their old transcontinental import and export business? What of trade between the East Coast of South America and the fruit-growing districts of the Pacific? Is there, in view of shortened steaming tracks, a market for Douglas fir in Argentina? Will the Pacific Coast and Hawaii ever buy Atlantic coal in preference to that of Japan or Australia? Even today Honolulu is getting a shipment from Cardiff. In the event that the example of Hawaii is emulated by the Philippines, if that archipelago again is made attractive for American capital, if in short sugar production increases greatly, where will the crop go? If to New York or Philadelphia, as seems probable, what vessels will transport it? And will there be decreased imports from Cuba as a result?

Perhaps the most perplexing problem connected with Panama Canal and other trade routes is how to remedy the unequal movements of tonnage. Trade balances trade in terms of dollars, pounds, yen or taels; there is no tonnage equality; and there is likely to be none when steel is exchanged for raw silk or cotton for Sheffield cutlery. It is well known that the Pacific Coast of the United States is experiencing great difficulty in filling vessels in the Orient for return voyages, partly because Japan still has an "unfavorable" balance of trade and partly because of the disparity between values and tonnages of imports and exports. Instances of similar tendencies could be multiplied indefinitely. Take the Panama Canal statistics for any month or any year, but preferably for August, the last month reported at this time. A singular situation is encountered. Here are some movements in long tons:

Trade Route	Atlantic to Pacific	Pacific to Atlantic
United States Coastwise	55,387	129,792
United States-Far East	112,454	29,308
Europe-United States	684	174,198
Europe-South America	23,500	45,625
United States-South America	10,949	47,717
Europe-Australasia	16,266	54,877
United States-Australasia	31,150	1,585
Canada-Europe	8,828	17,702
Mexico-South America	17,718	....

There is not, in all that list, one balanced trade route. Perhaps the figures for any one month may convey an exaggerated idea of the disproportion, but that in the main they are accurate may be seen by referring to the tables for the fiscal year, published on page 674 in this issue. Well, what can be done to remedy such a condition? If the tendency were strongly in one direction the answer might be a complete round-the-world service. In August the Atlantic-Pacific total was 317,970 and the Pacific-Atlantic 521,303 tons, a fact that indicates a pronounced eastbound superiority; but for the fiscal year there was almost an even balance, the Atlantic-Pacific being 5,892,078 tons and the Pacific-Atlantic 5,707,136. Here is no great disparity in the aggregate, yet individual trade routes were strikingly ill-proportioned.

No similar statistics of Suez Canal traffic are available, but the case probably is not greatly different.

Triangular Routes a Solution

What is the solution? To seek one before Europe becomes stable probably would be useless. When trade begins again, much the same condition doubtless will continue, for, as was pointed out, raw silk and steel scarcely have the same value a ton. Then the steamship operator probably will be compelled to search for trilateral or quadrilateral routes; but planning such routes calls for great skill and wide knowledge.

The fact is that there is little enough today to guide the operator. Normality is an ideal that has manifested itself little enough in the last seven years. From 1914 to 1918, inclusive, the world was at war; 1919 witnessed a tremendous trade caused by the imperative necessity of accumulating some stocks of essentials, and so that year accordingly was about as abnormal as 1918; general world-wide depression was manifest in 1920 and 1921. Yet the signs of revival, in the United States as well as Asia and to a lesser degree in Europe, point to the stern necessity of American steamship operators seeking for everything that can possibly serve as a guide. If they do not, John Bull and Watanabe Nippon will.

Steamships and a Rail Strike

A good deal of loose thinking is being done regarding the role of intercoastal steamship lines in the event of a national railroad strike. There appears to be, on the part of many persons, an unreasoned assumption that the whole load could be transferred from railroad to steamship without any serious dislocation of business. Those who hold such a belief and act upon it are likely to find themselves in trouble.

From Dock to Dock

There is no doubt whatever that there are steamships enough, in view of the idleness of many and the small cargoes of those engaged in active service, to handle any conceivable amount of freight from dock to dock, from any port of the Pacific to any of the Atlantic. From dock to dock: there's the gist of the trouble. But how will merchandise be transported to tidewater? Although rivers and canals would be factors, yet reflection should convince anyone that the number of factories or mills having actual docking facilities on water, whether deep or shallow, must be very small indeed. A factory may be situated in Seattle, New Orleans or Boston and yet be as dependent upon a railroad for connection with tidewater as though it were five hundred miles inland. There remains, therefore, the necessity of land transportation, and with the railroads eliminated the motor-truck alone remains.

Despite the exaggerations of many of its so-called friends, who have had it supplanting the railroad, the automobile might be of great value in moving essential foodstuffs. The cost of transportation in this case would be of secondary weight. But what of low-value, bulky commodities such as coal, steel, fertilizers, lumber, which go far toward maintaining the industrial life of the country? Can anyone imagine them being moved in any quantity by truck? How many three-ton trucks would be needed to fill a steamship of 9000 tons deadweight, of 12,000, of 14,000? At the middle of October there were about 86 steamships engaged in the intercoastal trade. Are there enough trucks in the world to handle their cargoes even a hundred miles inland from tidewater? What of Pittsburgh steel moving to the Pacific Coast by intercoastal steamship; what would transport the steel to Baltimore or New York? How would Kentucky tobacco be landed in New Orleans, even with the Mississippi-Warrior barge service in operation? Resin is produced in the interior states of the South. Will it be hauled several hundred miles by automobile? It is true that much Pacific Coast canned goods and cotton piece goods and hardware of New England might be delivered to docks by truck, but how would such commodities be spread from New York to Chicago or from San Francisco to Ogden?

Embargoes Probable

Besides all these adverse factors, there remains the probable imposition of embargoes at the principal seaports of both coasts. A national railroad strike would result in congestion in many a port that would overshadow the worst that Havana experienced last year, and in self-defense the ports probably would be compelled to shut out all except essentials.

It appears that the intercoastal steamship lines would lose as much or more than they would gain. Some new business would go to them; they would lose an enormous amount now delivered by the railroads; and they could not, in any case, make their influence felt more than a few miles inland.

During a hundred years American railroads became practically self-sufficient transportation systems; the intercoastal, as well as the deep-sea, steamship remains dependent upon the rail line. To believe otherwise is to cherish false hopes.

The I. C. C. Specter

At a recent meeting of the North Atlantic-Pacific Westbound Conference, W. J. Love, vice-president of the Emergency Fleet Corporation in charge of the traffic department, urged upon the members of the conference the advisability of living up to its regulations. The Shipping Board, he said, had power to check such abuses as rebating, making various concessions and violating in other ways the conference agreement, but it preferred that the members voluntarily mend their ways. In the course of further discussion, one line admitted that it had cut a rate on cast-iron pipe in order to permit Philadelphia to compete with New Orleans, this particular instance apparently being what Mr. Love had uppermost in his mind Just prior to adjournment Mr. Love, again addressing the members, reminded them that there was in Washington a vigorous movement, almost tantamount to a lobby, to have the intercoastal steamship lines placed under the jurisdiction of the Interstate Commerce Commission.

This Is News

If Mr. Love "reminded" the conference of the existence of this movement, then it is something with which that body was familiar. Not so with the general public. That such a campaign is in progress is in the nature of news; news, too, of a great deal of importance, bearing, as it does, not only upon the regulation of intercoastal steamship services and rates, but also upon the competition of steamships with railroads and the obligation of the Interstate Commerce Commission to see that the latter earn 5½ per cent.

Very little opposition indeed is to be expected from the railroads to such a plan. They are wedded, for better or worse, to the I. C. C.; but by no token would they object to seeing their mate become polygamous or polyandrous by taking another spouse. The larks of some steamship lines doubtless would come to a sudden end under the sobering roof-tree of the commission; gone the poker game and the now tabued bottle; gone, too, the merry stroll home through quiet railroad streets lined with sleeping houses. Such doubtless are the thoughts of the railroads as they sit by the fire and spin; it is a matter to cause surrise, however, that some influential steamship men (who are not wont to participate in many mad parties) hold similar views. They also would like to see the gayety ended. They regard some sort of regulation as certain and much prefer the Interstate Commerce Commission to the Shipping Board, which appears to them as being more or less a political plaything and not at all of the standard of the railroad body.

A Quick Thinning Out

Yet another consideration, not devoid of self-interest, underlies the willingness of some lines to join the I. C. C. family. They believe that the wilder blades among the intercoastal companies would have a good deal of difficulty in remaining in business once the commission had taken hold. Inability to cut rates or make other and more devious concessions might make the weaker lines unable to compete with their stronger brethren and perhaps with the railroads as well, with a consequent immediate thinning out of those companies that have remained in business only because of their violations of conference regulations.

Despite the potency of these considerations, there are traffic authorities who are unable to believe that the steamship companies, or any of them, for that matter, would be willing to submit to the yoke of the I. C. C. Such individuals point to the great cost of filing tariffs, making reports and complying with the intricate and multitudinous rules of the commission. They assert, also, that heretofore the intercoastal lines have shown a desire to avoid the commission, for they have not quoted joint rail-and-water rates, apparently for fear of incurring supervision, and have carried this policy to such a point that they send vessels to Oakland, California, to be berthed, despite the fact that transshipping cargo by rail oftentimes would be cheaper.

That $5\frac{1}{2}$ Per Cent

Perhaps, too, these traffic authorities believe that the Interstate Commerce Commission would hold paramount the necessity of the railroads earning minima of $5\frac{1}{2}$ per cent and would base steamship rates accordingly. And increased rates received by the intercoastal lines might not necessarily mean more revenue, inasmuch as a good deal of their business is due to their relatively low rates; all other factors being equal, there is little doubt that the majority of shippers would prefer to deal with the railroads, which never mention general average and to which marine insurance is alien. The I. C. C. could divert a great deal of traffic from steamship to railroad by the simple expedient of increasing water rates, although it is quite true that some steamship lines would be able to compete with the transcontinental railroads in almost any circumstances; but such lines are first-class and are relatively few.

On the other hand, it does not necessarily follow that I. C. C. supervision would be attended by any policy detrimental to intercoastal shipping. So long as railroad and steamship are in direct competition, the tariffs of the former are likely to be reflected in the latter; not invariably, but usually. Well, the railroad makes a rate that is "reasonably" remunerative, that exceeds the actual out-of-pocket cost of handling the traffic; in this event, the commission probably would be inclined to let the rate stand; now comes the steamship with a quotation 20 per cent or so less. But who can doubt that the rail rate would be much more than barely remunerative if there were not that bogey of steamship competition in the background? And might not the I. C. C. take a hand and hinder the workings of direct competition by insisting that steamship rates be raised?—this for the purpose either of increasing railroad tariffs beyond the "reasonably compensatory" minimum or of diverting trade from the water line.

This Is the Trouble

By and large, the railroads at the present time are rather resigned to seeing their old seaboard-to-seaboard business handled by steamships. What the transcontinental carriers do object to most vigorously, however, is the spectacle of freight destined from New York to Salt Lake City, let us say, moving via the Panama Canal to Los Angeles or San Francisco and thence by rail to its destination; or from San Francisco to Cleveland via New York. The existence of such traffic routes illuminates the situation greatly and makes clear one of two conclusions: railroad rates are too high or steamship rates are too low. Inasmuch as quite a number of intercoastal shipping companies are making money, the second suggestion is likely to be rejected.

There is more than one interesting potentiality here and the success or non-success of the Washington lobby will be watched closely.

The Philippines and the Coastwise Law

There is good reason to believe that President Harding intends to proclaim that adequate American shipping services exist between the United States and the Philippine Islands and that accordingly the coastwise laws will be extended to the archipelago soon after February 1, 1922, the earliest date when such extension could be made under the Merchant Marine Act. For several months the Shipping Board has been building up the Pacific Coast-Philippine service, with the result that the Pacific Mail has a direct service via Honolulu and also, in common with the Pacific Steamship Company, has the usual indirect service via Japan and China. At the present time the Pacific Mail has three 535's in the indirect service and three 502's in the direct and the Pacific Steamship has received notice that the last of its five 535's has been allotted. In addition to these combination vessels there are freight lines.

They Are Calmer

Recent developments in the Philippines, such as the appointment of General Wood as governor-general, the evident fact that talk of immediate independence is bosh, the much more subdued tone of Manila politicians, the severe strictures that have been passed on native policy and the growing restiveness of Americans at the trend of events, all indicate that the islands will accept inclusion within the coastwise laws a great deal more calmly than they would have done eighteen months ago. The failure of the legislature to make its perennial demand for independence is significant of the moderating temper of the islands.

Much interest attaches to the plans of American steamship lines to extend their services to Manila and other ports. It is an open secret that the Matson Line has such plans, as it would have in view of its close relationship with Hawaiian sugar planters who have large Philippine holdings. The Oceanic Steamship Company is another that probably would view a Manila service favorably, inasmuch as John D. Spreckels, president of the Oceanic, has great sugar interests in the Philippines, although up to this time the crop has been transported largely by vessels of the Java-Pacific Line, for which the Oceanic company is agent. The J. P. L. of course would be shut out of the Philippine service because of the Dutch registry of its vessels.

Benefit Trans-Pacific Lines

All foreign lines now calling at Manila probably would suffer by the extension of the coastwise laws, but the T. K. K. and Blue Funnel, by reason of their large hemp cargoes, probably would be hit hardest. Their business would go largely to the large and fast combination vessels, it is believed on the Pacific Coast, for direct Atlantic-Philippine freighters probably would have much difficulty in competing with trans-Pacific steamships, even though the latter would have to discharge their cargo for rail or water transshipment to the Atlantic.

The Bareboat Charter

Only two bareboat charter ripples have disturbed the Pacific. One is the taking by the Pacific Steamship Company of two vessels to load grain at Portland and Seattle for Europe at 50 cents a deadweight ton. The other is the refusal of the Shipping Board to charter to a company operating government tonnage under the MO4 agreement. Neither of these is of great significance, for the Pacific Steamship charters, although the first closed, are for bulk cargoes and not for the general berth; and as regards the other development, the reasons that actuated the board are not altogether clear and may have no bearing on the broad question of competition between chartered and allocated tonnage.

New Form Not Completed

Despite the closing of the Pacific Steamship charters, the new bareboat form had not been completed at the middle of October. The party used for the two vessels was merely the draft so far as it had been completed at the time; and the final form, at this writing, has not been made public.

The rate of 50 cents a deadweight ton does command attention. It exceeds by quite a few cents the maximum charter that shipping men generally expect the board to get for its vessels, but that is no sign that there can be any appreciable amount of chartering at the same rate. In fact, as things are today, despite the improved outlook for export trades, it is doubtful whether operators would consider any sum in excess of 25 or 30 cents a deadweight ton a month. Dant & Russell have taken a time charter for one year of three 8800-ton Norwegian freighters at $1.10; over in Japan recent brisk shipments leave operators cold and they are not taking much tonnage at yen 2.50, which is equivalent to $1.25 American gold, but exceeds by 13 cents or so the recent British rate of 6 shillings. The Japanese prefer to contract for their space instead of to charter.

Might Consider Reductions

What does the 50-cent rate mean then? One view is that the board regards it as the minimum; the other, and apparently the more plausible, is that the rate merely is a point of beginning and that reductions might be considered.

Indications multiply that the board will not disrupt its allocated services by indiscriminate chartering. It will be recalled that both the American Steamship Owners' Association and the Pacific American Steamship Association, on discussing the bareboat form several months ago, insisted that allocated vessels should not compete with chartered; but when the associations assumed that attitude they took for granted that the old-time operators under MO4 would have the first opportunity to take vessels on the bareboat form. What, then, of vessels being chartered and competing directly with allocated tonnage? Although the situation is the reverse of what the shipowners had in mind, it simmers down to much the same thing: the company operating government vessels, whether under MO4 or a bareboat charter, whichever happens to be the prevailing plan at the time, expects protection against indiscriminate competition of vessels taken under the other arrangement. There appears little doubt that the board intends to comply with that demand, even though announcement was made October 7 that the board had decided to charter vessels on the bareboat form for trans-Pacific voyages.

Allocation System Doomed

Nevertheless, the allocation system appears to be doomed. Some few routes may remain untouched, of course, but many will go. If the change be made gradually and business improve sufficiently to warrant bareboat charters and the board make an attractive rate, little harm probably would result; but in spite of recent improvements business has a long road to travel and the 50-cent rate, it should be emphasized, is not attractive.

For the present there is little danger that there will be any general withdrawal of allocated tonnage, notwithstanding rumors afloat on the Pacific Coast. Most freighter operators are down to one sailing a month, which is almost the irreducible minimum if a line is to be maintained at all.

Times Not So Bad

For some time it has been evident that many individuals who could see nothing but gloom in the present shipping situation were suffering from short memories, or, indeed, had no long experience on which to base comparisons. Not so many complaints are being heard from Japan, however, because the older shipowners of the empire have put themselves in a position to weather gales and also have experienced worse times than these. Proof of the latter statement is found in a tabulation of dividend rates of some principal Japanese lines, the 1921 figure being for the first six months only.

	'14	'19	'21
	%	%	%
Nippon Yusen Kaisha	10	60	25
Osaka Shosen Kaisha	10	60	10
Toyo Kisen Kaisha	6	50	10
Meiji Kaiun Kaisha	....	20	....
Taisho Kisen Kaisha	....	45	....
Kawasaki Dockyard	8	40	20
Osaka Iron Works	....	35	20
Yokohama Dockyard Co.	....	35	15

In the following table Wakamatsu-Yokohama coal rates generally accepted as standard coastwise quotations of Japan; charter rates, and average prices of vessels are compared, figures being in yen:

	Coal Rate	Charter Rate	Price Ship
1914—			
July	0.76	1.76	40
1919—			
October	10.00	12.00	420
1920—			
April	4.65	9.50	350
June	4.33	8.00	300
August	2.43	5.50	300
October	3.10	4.50	250
December	2.37	3.80	200
1921—			
January	1.73	3.00	180
March	1.77	3.00	150
May	1.90	2.90	180
June	1.95	2.98	150
July	1.85	....	150

Charter rates of May and June are for near-sea services, no standard quotations having been made for off-shore trades.

Although a marked improvement in Japanese shipping has been manifest, about 50,000 deadweight tons of idle vessels having been put into service during July, there is little change in the steady decrease of vessels chartered to foreigners. The following table shows the number of vessels and deadweight tonnages by months of 1921:

	No.	D.W.T.
January	36	133,168
February	33	110,819
March	27	87,428
April	29	90,995
May	26	86,927
June	29	94,515
July	20	65,900

Of the twenty vessels under charter at the end of July, nine were to Chinese and the remainder to Britons and Americans.

* * *

The two 11,000 deadweight ton motorships under construction for the American-Hawaiian by the Merchant Shipbuilding Corporation will be named Californian and Missourian. They will be launched about November 11. The original A.-H. vessels of these names were sunk during the war, the Missourian in the Mediterranean and the Californian off the north coast of France.

* * *

The Alaska Steamship Company will act as Puget Sound agent of the Williams Line, effective October 1, succeeding the Thorndyke-Trenholme Company.

* * *

The Yamashita Kisen Kaisha, which recently opened an Oriental-North American-Australasian service, has entered the Japan-Tsingtao field in competition with the O. S. K., N. Y. K. and Harada Kisen Kaisha.

* * *

The Pacific Steamship Company has been allotted the combination 535 Pine Tree State. When she is turned over about November 1 the company will have five vessels of her class.

* * *

Fahy & McNulty, for many years San Francisco representatives of the British-American Tobacco Company, have incorporated under the name of the Western Terminals Company and will engage in weighing, reconditioning, strapping, general stevedoring and ship clerking.

No Sympathy Here

The Japanese Shipowners' Association has decided not to submit to the international conference in London in November the proposal of the Kurihara Shosen Kaisha that 30 per cent of the world's tonnage be tied up, say advices from the Orient. Only the United States would be aided by such a plan, inasmuch as it had at the end of July 3,500,000 tons of idle shipping, or 28.6 per cent of its total, as against Britain's 2,000,000 tons, or 10 per cent; Japan's 140,000 tons, or 4.5 per cent, and France's 300,000 tons, or 9.8 per cent. The total of the four countries was 7,940,000, or 14.64 per cent. These are rough estimates submitted to the association, which has displayed consistency by deciding to be rough toward the United States.

Besides the desire of Nippon not to aid Mr. Lasker, the following reasons were of weight:

It is doubtful that the raising of freight rates would result in active movement of cargo.

The proposal is too artificial and it is feared that the Department of Communications would intervene in such an artificial method of adjustment of depression.

At a time when the tied-up vessels in Japan are steadily decreasing, such a proposal would only aggravate the depression.

Except for its ignoring the fact that such a plan could not be expected to succeed, the Japanese Shipowners' Association appears to have covered the ground well.

The Year at Panama

The most important trade route through the Panama Canal in the fiscal year ending June 30, 1921, on the basis of total cargo shipped, was that between the Atlantic Coast of the United States and the West Coast of South America, says the Panama Canal Record. Of the total of 11,599,214 tons of goods shipped through the canal during the year, 1,908,858 tons were moving over this route. This was 16.46 per cent, approximately one-sixth, of the total cargo handled. Shipments from the United States to the West Coast of South America were 933,261 tons; and from the West Coast to the United States, 975,597 tons.

The Largest Trade

The heaviest shipments one way over any route, however, were those from the Atlantic Coast of the United States to the Far East. They amounted to 1,213,906 tons, over one-tenth of all the cargo handled. But return shipments over this route amounted to only 428,044 tons; the total moving between the areas by way of the canal was accordingly 1,641,950 tons, which was less than the total movement between the East Coast of the United States and the West Coast of South America. The combined United States - Far East cargo movement through the canal, 1,641,950 tons, was 14.15 per cent, or slightly less than one-seventh of the total cargo passing through the canal in the period.

United States coastwise traffic was third in importance, in total quantity of cargo handled both ways. The combined shipments amounted to 1,372,388 tons, of which 698,429 tons were shipped from Atlantic to Pacific and 673,959 tons from Pacific to Atlantic. The total was 11.83 per cent, over one-ninth of all cargo carried through the canal during the year.

The route fourth in quantity of total cargo was that between the West Coast of the United States and Europe, and the fifth was that between the West Coast of South America and Europe. The figures for these routes, as well as for the others by which cargo was classified, are presented in the following table:

COMMERCIAL TRAFFIC THROUGH THE PANAMA CANAL DURING THE FISCAL YEAR 1921, BOTH WAYS, OVER PRINCIPAL TRADE ROUTES.

Route.	Direction.	Number of ships.	Panama Canal net tonnage.	Tons of cargo.
Between east coast of United States and west coast of South America	A. to P.	253	837,254	933,261
	P. to A.	239	778,868	975,597
Total		492	1,616,122	1,908,858
Between east coast of United States and Far East	A. to P.	187	915,720	1,213,906
	P. to A.	74	351,904	428,044
Total		261	1,267,624	1,641,950
United States coastwise	A. to P.	177	783,420	698,429
	P. to A.	145	647,557	673,959
Total		322	1,430,977	1,372,388
Between west coast of United States and Europe	A. to P.	80	383,028	144,591
	P. to A.	158	782,117	1,154,840
Total		238	1,165,145	1,299,431
Between west coast of South America and Europe	A. to P.	136	533,323	297,166
	P. to A.	178	743,148	922,499
Total		314	1,276,471	1,219,665
Between Australasia and Europe	A. to P.	72	489,763	391,848
	P. to A.	100	701,530	579,745
Total		172	1,191,293	971,593
Between east coast of United States and Australasia	A. to P.	90	476,854	620,428
	P. to A.	27	156,283	147,877
Total		117	633,137	768,305
Between east coast of Mexico and west coast of South America	A. to P.	77	383,466	654,659
	P. to A.	79	400,455	230
Total		156	783,921	654,889
Between east coast of Mexico and west coast of United States	A. to P.	27	143,046	261,205
	P. to A.	40	204,977	8,155
Total		67	348,023	269,360
Between Cristobal, C. Z., and west coast of South America	A. to P.	151	228,108	85,190
	P. to A.	155	237,486	139,547
Total		306	465,594	224,737
Miscellaneous trade routes and sailings	A. to P.	207	566,920	591,395
	P. to A.	224	670,649	676,643
Total		431	1,237,569	1,258,038
Battleships, cruisers, etc., other than United States	A. to P.	14	(1)	....
	P. to A.	2	(2)	....
Total		16	(3)	....
Grand totals	A. to P.	1,471	5,740,902	5,892,078
	P. to A.	1,421	5,674,974	5,707,136
		2,892	11,415,876	11,599,214

A. to P.—Atlantic to Pacific. P. to A.—Pacific to Atlantic.

[1] Panama Canal net tonnage unavailable; displacement tonnage aggregated 87,473.

[2] Panama Canal net tonnage unavailable; displacement tonnage aggegated 36,888.

[3] Total displacement tonnage of 124,361.

The preponderance of cargo movement in one direction over some of the routes is striking, notably in the traffic between the Atlantic Coast of the United States and the Far East and between Europe and the West Coast of both North and South America. The movements from Atlantic to Pacific, and those from Pacific to Atlantic, are shown separately in order of quantity in the tables following, which also state the percentage of cargo which passed over each route:

COMMERCIAL TRAFFIC THROUGH THE PANAMA CANAL DURING THE FISCAL YEAR, 1921, BY TRADE ROUTES.

ATLANTIC TO PACIFIC.

	Number of ships.	Panama Canal net tonnage.	Tons cargo.	Percentage of cargo.	
				Atlantic to Pacific.	Both directions.
East coast of United States to Far East	187	915,720	1,213,906	20 60	10 46
East coast of United States to west coast of South America	253	837,254	933,261	15 84	8 05
United States coastwise	177	783,420	698,429	11 85	6 02
East coast of Mexico to west coast of South America	77	383,466	654,659	11 11	5.64
East coast of United States to Australasia	90	476,854	620,428	10.53	5.35
Europe to Australasia	72	489,763	391,848	6.65	3 38
Europe to west coast of South America	136	533,323	297,166	5 04	2 56
Mexico to west coast of United States	27	143,046	261,205	4.44	2 25
Europe to west coast of United States	80	383,028	144,591	2.46	1 25
Cristobal to west coast of South America	151	228,108	85,190	1 45	0 74
East coast of United States to west coast of Canada	13	59,598	82,827	1 40	0.72
East coast of United States to Balboa, C. Z	7	42,531	69,128	1 17	0 60
Cristobal, C. Z., to west coast of United States	24	43,578	32,048	0 54	0.27
Cristobal, C. Z., to west coast of Central America	32	21,013	15,227	0 26	0.13
West Indies to west coast of United States	4	10,931	3,466	0 06	0 03
West Indies to west coast of South America	4	5,261	2,512	0 04	0 02
Miscellaneous trade routes	123	384,008	386,187	6.55	3.33
Warships, cruisers, etc., other than United States	14		....	.....	....
Totals	1,471	5,740,902	5,892,078	100 00	50 80

PACIFIC TO ATLANTIC.

	Number of ships.	Panama Canal net tonnage.	Tons of cargo.	Percentage of cargo.	
				Pacific to Atlantic.	Both directions.
West coast of United States to Europe	158	782,117	1,154,840	20 23	9 96
West coast of South America to east coast of United States	239	778,868	975,597	17 09	8 41
West coast of South America to Europe	178	743,148	922,499	16 16	7 95
United States coastwise	145	647,557	673,959	11 81	5 81
Australasia to Europe	100	701,530	579,745	10 16	5 00
Far East to east coast of United States	74	351,904	428,044	7 50	3 69
West coast of Canada to Europe	22	103,234	154,513	2 71	1.33
Australasia to east coast of United States	27	156,283	147,877	2 59	1 28
West coast of South America to Cristobal, C. Z	155	237,486	139,547	2 45	1.20
West coast of South America to Azore Islands[1]	17	59,910	106,910	1.87	0 92
West coast of South America to West Indies	12	30,696	47,989	0 84	0 42
West coast of Central America to Cristobal, C. Z	39	25,733	17,378	0 31	0.15
West coast of United States to Cristobal, C. Z	23	41,976	14,578	0 26	0.13
West coast of United States to east coast of Mexico	40	204,977	8,155	0 15	0 07
West coast of Central America to east coast of United States.	4	3,214	1,431	0 03	0 01
West coast of South America to east coast of Mexico	79	400,455	230	. . .	. . .
Balboa, C. Z., to east coast of United States	9	51,448	. . . .	. . .	.....
Balboa, C. Z., to east coast of Mexico	9	46,972		. . .	.....
Miscellaneous trade routes	89	307,466	333,844	5.85	2 87
Warships, cruisers, etc., other than United States	2		. . . .	.....	.....
Totals	1,421	5,674,974	5,707,136	100 00	49 20

In the calendar year ending December 31, 1920, the total cargo carried through the canal was 11,236,119 tons of cargo. The 11,599,214 tons passing through the canal in the last fiscal year were 363,085 tons more than during the calendar year, a gain of 3.2 per cent.

In the calendar year the leading route was, as in the fiscal year, that between the United States and South America, with a total of 2,341,242 tons; and second place was held by the traffic between the United States and the Far East, aggregating 1,827,913 tons.

Third place, however, which had been held by the traffic between Europe and South America in the calendar year 1920, was taken in the fiscal year by the United States coastwise trade. The Europe-South America traffic decreased from 1,322,623 tons to 1,219,665, while the United States coastwise trade increased from 1,061,652 to 1,372,388 tons. The Europe - South America traffic occupied fifth place in the fiscal year 1921. The fourth place was taken by the trade between Europe and the West Coast of the United States, with 1,299,431 tons. The latter route was fifth in the calendar year, with 859,848 tons.

The route between Australasia and Europe occupied sixth place in both the calendar and fiscal years. The tonnage of cargo moving over it in the calendar year was 770,403 tons. For the fiscal year it was 971,593 tons.

Atlantic to Pacific

A summary by origin and destination shows that of a total of 5,892,078 tons of cargo passing through the canal from Atlantic to Pacific in the fiscal year, 3,712,029 tons, or 63 per cent, originated in the United States; 1,071,782 tons, 18.2 per cent, in Mexico; 545,419 tons, 9.3 per cent, in British Isles; 262,926 tons, 2.3 per cent, in other parts of Europe, and smaller quantities in other areas.

Of the 5.892,078 tons passing from America, 22.3 per cent to the Far went to the West Coast of South America, 22.3 per cent to the Far East, 20 per cent to the West Coast of the United States, 18.4 per cent to Australasia, and small quantities to the other areas shown in the table.

Pacific to Atlantic

The total cargo movement from Pacific to Atlantic during the year amounted to 5,707,136 tons. Of this quantity, 40 per cent originated on the West Coast of South America, 34.1 per cent on the West Coast of the United States, 12.7 per cent in Australasia, 8.9 per cent in the Far East, and smaller proportions as shown in the table.

Of those 5,707,136 tons from Pacific to Atlantic, 39.4 per cent was destined to the East Coast of the United States, 30.9 per cent to the United Kingdom, 19.6 per cent to other parts of Europe; and the remaining 10.1 per cent was distributed as shown.

Combined Origins

The total quantity of cargo handled in both directions was 11,599,214 tons. In shipping 3,712,029 tons of that from Atlantic to Pacific and 1,948,848 of that from Pacific to Atlantic, the United States was the country of origin of a total of 5,660,877 tons, or 48.8 per cent, of the total cargo shipped.

South America shipped 2,280,593 tons from her West Coast, and 27,507 tons from her East Coast through the canal, a total of 2,308,100 tons, or approximately 20 per cent of the aggregate movement.

Canada shipped 39,561 tons through the Canal from her East Coast and 125,638 tons from her West Coast, aggregating 165,199 tons, or 1.4 per cent of all shipments.

Mexico shipped 1,071,782 tons from her East Coast through the canal, but such shipments as came from her West Coast were bulked with those from the West Coast of Central America, which amounted to 49,265 tons. Total shipments from Mexico were about 9.4 per cent of the grand total.

No other areas classified sent cargo through the canal in both directions.

With respect to the receipt of the total of 11,599,214 tons which made up the traffic in both directions, the Atlantic Coast of the United States was the destination of 2,248,843 tons and the Pacific Coast of 1,176,424 tons, a total of 3,425,267 tons. This was 29.5 per cent of the total handled.

South America received 1,938,542 tons on the West Coast, and any receipts on the East Coast through the canal were not classified. South America was the destination of about 16.7 per cent of all the cargo, approximately one-sixth of the total shipments through the canal.

Canada received 126,414 tons on the West Coast and 16,558 tons on the East Coast, through the canal. The total, 142,972 tons, was 1.2 per cent of the total movement. The receipts in Mexico are not classified separately and no other classified areas received cargo from both directions through the canal.

Combined Shipments and Receipts

The United States, through originating or receiving cargo (doing both, of course, in the case of the 1,372,388 tons handled in the United States coastwise trade), participated in the handling of 9,086,144 tons. Similarly, South America either shipped or received a total of 4,246,642 tons. Canada was concerned in the handling of 308,171 tons. The total in which Mexico was concerned was 1,071,782 tons, as far as classified.

Of those countries or areas not so situated as to receive cargo passing through the canal in both directions, the United Kingdom, despatching 545,419 tons and receiving 1,763,431 tons, participated in the handling of a total of 2,308,850 tons through the canal; other European countries, despatching 262,926 tons and receiving 1,116,115 tons, were interested in a total of 1,379,041 tons. The West Indies shipped 92,667 tons through the canal and received 136,334 tons, a total of 229,001.

On the Pacific side, shipments to the Far East through the canal were 1,311,641 tons, and from it, 506,072 tons, a total of 1,817,713 tons. Shipments to Australasia amounted to 1,081,875 tons, and shipments from that area to 726,949 tons, a total of 1,808,824 tons.

Tons of Cargo Carried by Commercial Vessels Passing Through the Panama Canal from its Opening to June 30, 1921, by Fiscal Years.

Nationality.	1915.	1916.	1917.	1918.	1919.	1920.	1921.	Total.
Belgian					464	406	12,700	13,570
Brazilian						8,916	6,700	15,616
British	2,200,514	1,570,660	3,393,750	2,615,675	1,876,939	2,830,268	3,738,257	18,226,063
Chilean	50,879	53,573	184,446	153,259	161,340	101,738	61,737	769,972
Chinese				13,417	13,421	13,700	14,400	54,938
Colombian						27		27
Costa Rican			3,069	2,091	1,137		2,112	8,109
Cuban			7,370				1,200	8,570
Danish	116,603	94,950	242,567	420,063	325,277	42,533	322,059	1,564,052
Dutch	26,402	61,959	314,203	233,063	119,297	128,442	216,488	1,099,854
Ecuadorian					72			72
Finnish							7,101	7,101
French	13,600	7,176	36,680	159,859	286,812	125,249	132,836	762,212
German						59,239	73,837	133,076
Greek				5,741	8,301			14,042
Honduran		321						321
Italian	900		5,700	13,793		63,441	47,988	131,822
Japanese	42,600	117,780	446,358	407,399	503,427	726,338	758,617	3,002,519
Jugo-Slovak							8,325	8,325
Mexican			22,545	253	142		3,785	26,725
Nicaraguan	6							6
Norwegian	166,522	229,366	597,581	1,090,823	577,679	404,323	637,887	3,704,183
Panaman			135			872	1,500	2,507
Peruvian	8,202	62,210	159,609	143,344	121,521	119,418	105,322	719,629
Portuguese						10,775		10,775
Russian	21,030	24	3,230	7,059	8,340	12,867	11,343	63,893
Spanish			71,080	35,394	10,047	101,563	143,076	361,160
Swedish	53,292	47,236	94,515	132,521	143,516	74,244	128,919	674,243
United States	2,187,904	848,857	1,475,725	2,098,277	2,758,886	4,547,140	5,163,025	19,079,814
Totals	4,888,454	3,094,114	7,058,563	7,532,031	6,916,621	9,374,499	11,599,214	50,463,496

More Canal Statistics

Commercial traffic through the canal in August was greater than it had been during any month since March, 1921. The month of March established a high record in tonnage of vessels and tolls earned; but in the months following March there was a distinct decline, a part of the general business and marine depression over the world.

The extent of this decline in the canal traffic, and of the recovery in August, is indicated in the following summary of the traffic through the canal in the past six months:

1921	No. of ships	Canal net tonnage	Tolls	Tons of cargo
March	255	1,112,818	$1,105,536.55	1,084,563
April	227	955,503	927,977.09	907,613
May	210	864,617	835,882.77	792,735
June	192	761,477	751,964.12	694,720
July	206	810,613	804,503.11	708,982
August	236	965,276	955,380.78	839,273

In June, 1921, the tolls were lower than they had been for any month for a year preceding; in June, 1920, the tolls amounted to $711,159.19, and they have never since been less than that. In tons of cargo carried through the canal, June, 1921, was the lowest month since November, 1919, when the aggregate cargo was 575,480. July showed a distinct increase, and the traffic in August was about as great as that in October and November of last year.

January, 1921, Leads

On the basis of the number of commercial ships making the transit, the traffic in August, 236 ships, was less than the average a month during the fiscal year ending June 30, 1921, in which 2892 vessels made the transit, an average of 241 per month. The vessels in August, however, were more than the average per month for any other period of twelve months since the opening of the canal. The month of most ships and greatest quantity of cargo in the history of the canal was January, 1921, with 279 commercial vessels and 1,177,052 tons of cargo.

March, 1921, exceeded January in tonnage of vessels and in the tolls earned.

The increase of August traffic over the preceding months was due in part to the heavy grain shipments from the West Coast of the United States and Canada. Out of a total of 120 vessels passing through the canal from the Atlantic to the Pacific, 44 were bound to ports on the West Coast of the United States and Canada, many of them in ballast; and of 116 vessels transiting the canal from the Pacific to the Atlantic, 51 had sailed from ports of western United States and Canada, carrying principally grain, canned goods, and lumber.

Shipments of Grain

Between January 1 and August 31, 1921, wheat shipments through the Panama Canal from Pacific to Atlantic aggregated 565,058 tons. They were heaviest in July (99,267 tons) and lightest in April (39,108 tons). The United States contributed 506,583 tons to the total, Canada 3500 tons, Australasia 36,437 tons, South America 13,648 tons, and the Far

East 4890 tons. Barley shipments during the same period aggregated 200,788 tons, of which 173,827 tons originated in the United States, 26,934 tons in South America, and 27 tons in Australasia. Shipments of oats totaled 27,511 tons, of which 18,842 were from South America, and 8669 tons from Australasia. All of this grain was consigned to European ports.

Growth of Coastwise Trade

The rapid growth of the United States coastwise trade through the Panama Canal during recent months is indicated by a comparison of the statistics for the period of eight months from January 1 to August 31, 1921, with those for the calendar year 1920:

Period	Atlantic to Pacific Ships	Atlantic to Pacific Cargo tons	Pacific to Atlantic Ships	Pacific to Atlantic Cargo tons	Total Ships	Total Cargo tons
Calendar year 1920..	116	416,819	122	644,833	238	1,061,652
Jan. to Aug., 1921....	141	569,300	123	634,203	264	1,203,503

Both the number of ships and the cargo tonnage were greater during the first eight months of the current year than during the entire year 1920.

Crude Oil Cargoes

During the calendar year 1920, 828,223 tons of crude oil was shipped from the Mexican oil fields through the Panama Canal to the West Coast of North and South America. During the first six months of 1921 crude oil shipments aggregated 684,227 tons. This is equivalent to a monthly average of 114,038 tons. But in July the crude oil tonnage dropped suddenly to 14,491, and the August shipments amounted to only 36,454 tons.

It is understood that this sudden decline resulted from the imposition of a higher export tax on Mexican oil, and that rather than pay the tax certain companies temporarily stopped their shipments.

Briefs

The Shipping Board 535 Empire State, operated by the Pacific Mail, arrived at San Francisco September 24, having made the voyage from Yokohama via Honolulu in 12 days, 19 hours and 40 minutes. This voyage broke the Golden State's record of 13 days, 7 hours and 48 minutes. The Empire State made the run from Yokohama to Honolulu in 8 days and 40 minutes, also a new record. She was built by the New York Shipbuilding Corporation.

* * *

The purchase of a 7500-ton ocean freighter by the Taiyo Kaiun Kaisha (Ocean Transport Company) in Germany, and the fact that it is said to be negotiating for other vessels, have led to reports that the company will resume some of its old offshore services.

* * *

Crowell & Thurlow, New York, have placed four 9600-ton vessels in the intercoastal trade under the Sea Carriers, Inc., Intercoastal Lines (I. S. C.); Houlder, Weir & Boyd are New York agents. Struthers & Dixon acted as general Pacific Coast agents for the first two vessels and thereafter withdrew. The I. S. C. is reported to be cutting conference rates greatly.

* * *

Norton, Lilly & Company will act as general agents on the Pacific Coast for Ellerman's Wilson Line, which will operate a service between the Pacific Coast and Europe. Norton-Lilly also will represent the Federal Steam Navigation Company, which will send at least two large freighters to the Pacific Coast this year. These ships will have large refrigerator capacities.

* * *

Frank Waterhouse & Company, Seattle agents of the Furness-Prince Europe-Pacific service, will act in San Francisco also, with headquarters in the Oceanic building.

* * *

The California Steamship Agency has been formed at Los Angeles by J. McMillan, manager of the Los Angeles office of Swayne & Hoyt, and by W. S. Wheaton and Charles F. Kruger. The company will act as agent of the Clan Line and Swayne & Hoyt's Pacific - Argentine - Brazil and Pacific-Caribbean-Gulf lines.

* * *

A. C. Stubbe, formerly manager of the Columbia-Pacific Shipping Company, and William H. Lyng head a syndicate that has purchased the Northwest Shipping Company, Portland, Oregon.

* * *

A radio compass station at Fort Stevens, Oregon, has been placed in operation.

* * *

The Luckenbach steamship Edward Luckenbach arrived at San Francisco October 12 after a voyage from New York of 15 days and 11 hours steaming time and 18 days elapsed time. She sailed from New York at 8 p. m. September 24 and arrived at Panama 4 p. m. September 30, 5 days and 20 hours out. She sailed from the canal at 5 p. m. October 1 and arrived at Los Angeles at 3 a. m. October 10, 8 days and 13 hours from Panama and 14 days and 9 hours steaming time from New York. She departed from Los Angeles for San Francisco at 3 p. m. October 11 and arrived at 5 p. m. October 12.

* * *

An international shipping conference will be held in London November 23, 24 and 25. Among the questions to be discussed will be standardization of charter parties and bills of lading, limitation of shipowners' liability on bills of lading, an international understanding with regard to the carriage of deck cargoes of wood, adoption of an international load line policy, an agreement on the construction of bulkheads with a view to greater safety of passengers and crews.

* * *

A new radio compass station has been placed in operation by the Navy at Tatoosh, at the entrance to Puget Sound.

Pacific Port Charges

Charges at various ports of the Pacific, as summarized and upheld by the intercoastal conferences, follow:

San Diego (Ordinance No. 5856)—Wharfage, 10 cents a ton; handling charges, merchandise not otherwise specified, 60 cents a ton.

Los Angeles—Wharfage, merchandise not otherwise specified, 10 cents; at the outer harbor, 12½ cents; handling charges, 60 cents.

San Francisco (Tariff No. 2)—State toll charge of 15 cents a ton on foreign and intercoastal business; handling charge of general, N. O. S., 52 cents; iron and steel, 40 cents.

Oakland—Wharfage charge, 10 cents; handling charge, San Francisco rates apply.

Portland (Tariff No. 5)—Wharfage, 25 cents in, 30 cents out; handling charge, 60 cents both in and out (applies at Municipal Terminal).

Seattle (Tariff No. 1)—Wharfage, 30 cents; handling, 65 cents; transshipment rate, Seattle to Bremerton, 10 cents a hundred pounds; wharfage and handling rate, 75 cents at each end.

Tacoma (Tariff No. 2)—Freight not otherwise specified, wharfage, 25 cents; handling charge, 60 cents.

Victoria—Wharfage charges, general merchandise, 50 cents; handling charges, ship slings to warehouse or vice versa, 75 cents; cost of discharging general cargo, 54 cents; loading, 59 cents.

Vancouver, B. C.—Wharfage merchandise, 50 cents; loading and unloading general merchandise, N. O. S., to dock, 75 cents; to cars, 85 cents.

Marine Insurance

CHARLES F. HOWELL
Eastern Contributing Editor

Foreigners as Settling Agents

American marine underwriters are decidedly encouraged by the increasing spirit of co-operation that has been manifesting itself among them during the last twelvemonth, but many of them feel that this get-together attitude could be advantageously manifested still further if some concerted action were to be taken in the very important matter of installing Americans in the place of foreigners as settling agents of our companies in other countries. Trade secrets are, it is well known, falling into competitive hands through the employment of other nationalities than ours in this vital particular. It is at present the rule rather than the exception to have American underwriters represented at foreign ports by men of that nation, and too often they are merchants, trained in insurance, it is true, but also actively interested in mercantile pursuits of their own country. The result is that such a settling agent is frequently the competitor of the consignee who is buying American goods, and by reason of the secrets secured through his insurance connections he is in a position to take advantage of the American shipper and his foreign customer. This opportunity is particularly open to him when handling claims for damaged goods. In order to prove his claim the consignee must file with the settling agent of the American underwriter a full set of documents, including the invoice. Through the invoice the settling agent obtains complete information about the prices and terms of the sale, and this knowledge he can, and frequently does, communicate to his principals at home, thus enabling them to undersell the American shipper. If the American exporter is to compete on equal terms with his foreign rivals this condition must be corrected. The men who are being sent abroad by our foreign trade institutions are, unfortunately, not equipped to handle insurance matters. The question naturally follows: are our marine insurance companies in position to afford the establishment of American-filled settling agencies throughout the world? It would seem that one way out of this dilemma would be through co-operation among themselves, and securing the support of the banks and steamship companies, to the end that the men who are sent out are seen to be capable of adjusting marine losses and of handling the details of general insurance transactions.

Hazards in Foreign Credits

Sellers in this country are frequently obliged to extend long-time credits to foreign purchasers on account of prevailing conditions abroad. This often means that goods are held in storage at foreign ports pending the taking up of the draft by the buyer. American underwriters have to work in the dark when they cover these stored goods, as they are without information as to the types of warehouses employed and as to the fire hazards incurred. Marine insurers feel that goods in long-time storage are more properly subject to fire underwriters' consideration, and yet they are anxious to stand behind our exporters in the effort to build up a foreign trade. With the close of the war came a wholesale repudiation of contracts and enormous quantities of goods were left on shore in foreign countries unprotected by insurance because the underwriters declined to extend their policies to cover for an indefinite period. This attitude was scored by the banks as "arbitrary and unfair." And yet it would seem that the underwriters were entirely justified in the stand they took, because a general extension of their covers would have made them liable for enormous values in little known and, in many instances, unprotected locations. Indeed, the banks themselves were chiefly to blame for that situation, due to their lack of foresight in extending credits to foreign buyers without taking into consideration the probable effects of the termination of the war. In a word, it was much more a credit question than one of underwriting; and as the banks were responsible in a large measure for the state of chaos that ensued it was entirely proper that they should be expected to bear the consequences. But now, however, the situation is materially different, and underwriters are in a position to weigh the various influences surrounding each risk and to take such steps as may be necessary to protect themselves. It is through co-operation in all our foreign trade agencies, and through nothing less, that we can hope to make adequate progress in the building up of our foreign trade.

A Leak-proof Barrel

Any improvement in containers is a matter of serious interest to marine underwriters, and consequently it is natural that they should receive with satisfaction the news that an inventive member of Lloyd's, London, by the name of Kenward, has perfected a barrel that appears to be absolutely proof against leakage. It is said to have stood up admirably under recent exhaustive tests. Its capacity is 40 gallons, and it is made in two sections, sealed by a flexible band at the joint when filled, but capable of being nested and packed in a small space when empty. It is constructed of steel sheets, and is 35 inches long, $24\frac{1}{2}$ inches in diameter, and 18 inches across the ends. In the severe test to which it was submitted it was filled to within five gallons of its capacity and then slung to a height of 90 feet on a crane and lowered in a series of violent jerks. Next it was dropped from a good height into the quay; but despite this rough treatment no leakage developed. It now remains to see whether it will stand a rough voyage as successfully as it did its land tests, and should this transpire it will doubtless revolutionize the insurance rates on leakage. Already British underwriters are quoting reduced rates on liquids shipped in the Kenward barrel.

Court Decision on Exchange

The exchange muddle has been cleared up by a decision rendered a few days ago by former Judge Clarence J. Shearn of New York, acting as arbitrator in the case of the Liberty Commerce Corporation against R. A. Corroon & Co. According to this finding you may arrive at the proper liability by dividing the losses in dollars by the rate named in the clauses. Judge Shearn argued that insurance companies should not be exposed to losing through fluctuations in the rate of exchange, which is something they could not possibly measure in advance. It would be both dangerous and unsound for insurance companies to speculate in exchange, thus jeopardizing their solvency. Said he in conclusion: "Reckoning the loss should not be left to the fluctuating exchange, the nearest approach to protection for the insured is to stipulate that the loss shall be adjusted at the rate of exchange fixed in the contract, that being the rate prevailing at the time the policy was written. . . . It is entirely clear that under the stipulated facts the proper method by which to compute the loss is to take the number of dollars represented by the goods destroyed, divide by the stipulated rate of exchange, and thus determine the number of pounds due from the underwriters." This is regarded as an important victory for marine insurance companies, especially for those located in other countries and for their brokers here who negotiate the coverage.

"Received for Shipment"

Underwriters are in receipt of the second interim report of the British Chamber of Shipping and Pilferage, and it throws an interesting light upon one aspect of the phrase "received for shipment," which is occasionally used in bills of lading in place of the more familiar term "shipped in apparent good order and condition." The following recommendation is made by the committee of the chamber: "The custom of issuing bills of lading for goods received for shipment, except where the circumstances make no other form appropriate, should be discouraged, as it gives scope for pilferage, and in no case should shipowners, under whatsoever pressure from merchants, issue a 'shipped' bill of lading until the goods are on board the steamer, as the difficulties of protecting the steamer against claims for pilferage which may have happened before shipment are thereby greatly increased."

The "Series" Clauses

Brokers complain that the insured is at a disadvantage in the employment of the so-called series clauses, and perhaps a word or two might be written to good purpose in explanation of this method. These clauses are principally used in connection with the insurance of commodities in bags, such as flour, sugar, etc., and provide for a percentage of average on each series of 25, 50 or 100 bags. Their purpose was to relieve the underwriter from paying such small claims as are involved in granting average on each package, as in many instances the bagged commodity is worth only $10 a bag, which, under a 3 per cent average clause on each package, would mean a claim if the damage amounted to 30 cents. Unfortunately, under prevailing methods employed in discharging cargo, it is practically impossible in event of a damage to determine to what series the damaged bags belong. It is customary to separate the damaged sacks from the sound as they come out of the ship, and when the vessel is unloaded the damaged bags are in one pile and the sound ones have either gone forward or are held on the dock in a separate pile. The consequence is that the insured is at a disadvantage if the underwriter insists upon proof that the stated percentage of average has been attained on each series, because there is no means of securing such proof. The better method, for both underwriter and insured, is to make use of a clause that provides a minimum loss on the shipment of, say, $100 or $150, depending on the value of the insured cargo. With such a clause it is merely a question of determining whether or not the loss amounts to the required amount; if it does the underwriter is liable; if not, there is no liability. C. F. H.

The Bayard-Beaver Case

Judge M. T. Dooling, United States District Court, San Francisco, has handed down an interesting decision in the Bayard-Beaver case. The suit was for demurrage for delay caused by a collision, liability for which was admitted by the San Francisco & Portland Steamship Company, owner of the Beaver. Despite the admission of liability in the case, however, Judge Dooling denied demurrage because Olson & Company, managing owners of the Bayard, had refused to charter another vessel, the Brazil, at Shipping Board rates, and the judge held that this fact signified that the Bayard also would have been idle even though undamaged. The decision should be of much interest to nations that were neutral during the war, belligerents not being concerned greatly, if at all.

Judge Dooling's decision follows in full:

IN THE SOUTHERN DIVISION OF THE UNITED STATES DISTRICT COURT, FOR THE NORTHERN DISTRICT OF CALIFORNIA, FIRST DIVISION, IN ADMIRALTY.

Aktieselskapet Bonheur, a corporation, Libelant, vs. American Steamer Beaver, her tackle, etc., Respondent; San Francisco & Portland Steamship Company, a corporation, Claimant.	No. 16303

Nathan H. Frank, Esq., and Irving H. Frank, Esq., proctors for libelant.

Farnham P. Griffiths, Esq., and McCutchen, Willard, Mannon and Greene, proctors for respondent and claimant.

The Bayard and the Beaver collided in the harbor of San Francisco on November 3, 1917. The respondent Beaver admits liability for the collision and the only question left for determination is the question of damages. The cost of repairs to the Bayard must, of course, be allowed. The fact that other repairs, not necessitated by the collision, were made, but which did not delay the completion of repairs so necessitated, is, as I view the case, immaterial. The period covered by the making of the repairs was forty-eight days. It would, however, in any event have taken at least two weeks to have arranged for the acceptance by the owners of a charter satisfactory to the Shipping Board. The Brazil, a ship of the same general type as the Bayard, entered San Francisco harbor on November 13, 1917, ten days after the collision, and remained there idle until the middle of January, 1918. During all of this time Olson & Company, of Norway, were the managing owners of both the Bayard and the Brazil. Moore & Company had offered a lump sum of $400,000 as charter hire for the Bayard for a voyage to the Orient and return, and it is on this offer that libelant bases its claim for the amount of damages sought as demurrage. But it is quite clear that a charter at that rate would not have been approved by the Shipping Board, which had fixed a basic rate of 45 shillings per deadweight ton per month. While the Bayard was laid up for repairs the Brazil was also idle in port, although there was a great demand for ships and she could have sailed at any time at the rates fixed by the board. The fact that she did not do so leads me to the belief that the owners were unwilling to accept those rates, and preferred to wait in the hope or expectation of securing a more profitable figure. They were in fact unwilling to accede to the regulations of the Shipping Board in regard to rates, and seemingly desired to take their chances of getting higher rates later by leaving the ship idle during this period. If it were not for the voluntary idleness of the Brazil I would allow demurrage to the Bayard at the rate of 45 shillings per deadweight ton per month for the period of 34 days. But as the owners preferred to leave the Brazil idle when she could have been chartered at those rates, it is reasonable to conclude that they would not have accepted them for the Bayard had she been in commission. A higher rate would not have been approved by the board.

A decree will be entered in favor of libelant for the amount expended in making the repairs rendered necessary by the collision. If the parties do not agree as to this amount, the cause will be referred to the commissioner to ascertain and report the same.

Salvage Association Functions

The following statement has been issued by the American marine insurance syndicates:

At a special meeting of the board of managers of the American marine insurance syndicates held on

FIREMAN'S FUND

Insures Hulls, Cargoes,

HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Tuesday, October 18, steps were taken to transfer the organization and business of Syndicate A to its successor corporation, United States Salvage Association, Inc. The salvage association, the entire capital stock of which is held by the subscribers to Syndicate A, is a nonprofit-making organization, designed to provide for the American shipping trade a service which shall be the counterpart of that furnished to the British shipping trade by the famous Salvage Association of London. It will have agents throughout the world and, in fact, through its arrangement with Syndicate A, will at once be provided with carefully selected agents at many of the leading ports. It also takes over the present American organization of the syndicate, which has established its own offices in Boston, Philadelphia, Baltimore, Norfolk, Savannah, New Orleans, Galveston and San Francisco, with its principal operating office in New York. The surveying staff of the salvage association will be headed by W. C. Foley, as chief surveyor, and J. A. Wilson, as deputy chief surveyor. The officers elected at the organization meeting are Benjamin Rush, president; Walter Wood Parsons, vice-president; Gomer H. Rees, secretary, and Charles B. Page, general manager. The salvage association will commence active operation on November 1, on which date Syndicate A will withdraw.

Page Joins Fireman's Fund

Announcement has been made in New York by J. B. Levison, president of the Fireman's Fund Insurance Company, that F. H. & C. R. Osborn have resigned as managers of the Atlantic marine department effective December 31 and will be succeeded by Charles R. Page, manager of Syndicate A.

Mr. Page entered the employ of the Fireman's Fund in June, 1902, after being graduated from Yale. He resigned early in 1906 to enter the service of Hind, Rolph & Company, San Francisco, but rejoined the Fireman's Fund in July of the same year, became general auditor in February, 1915, and remained with the company until he went to the Shipping Board in 1918. After the war he became treasurer of the Atlantic, Gulf & West Indies Line; next was vice-president of the Clyde & Mallory lines; and left that position to manage Syndicate A.

Japanese Loadline

An announcement was made by the Japanese Department of Communications September 12 to promulgate regulations for the application of the loadline law and the rules of the loadline as preliminary to enforcement of the law passed by the forty-fourth session of the Diet, says the Japan Advertiser. The former consists of seven chapters and sixty articles, while the latter consists of sixteen chapters and 104 articles. On the whole, the new enactments were formulated on the basis of regulations promulgated by the British Board of Trade with a view of acting in harmony with the enactments of other governments. It is said that the Japanese government has proceeded to negotiate with other countries on mutual recognition of the laws affecting the waterline of their craft and approval has been obtained from a certain country. It is expected that with the enforcement of loading law, all the vessels arriving in the Japanese ports should bear a lawful loadline mark in conformity with Japanese enactments and considerable difficulty is expected on this point. But those ships that have Plimsoll mark from Lloyd's or other competent associations will be exempted from application of the new Japanese laws. Those craft on which the proposed enforcement of the Japanese loadline law is to be applied will be ships that have no Plimsoll mark granted by the above-mentioned associations, ocean-going ships and the ships of near sea-service of 500 tons or more now under construction or to be constructed. The total tonnage of this sort of ships is estimated at 1,000,000 tons or more and the total number is approximately 700. It is said the Japanese government expects to complete application of its loadline law on all vessels arriving at Japanese ports within three years after the laws went into effect. The date of enforcement remains to be determined until formal recognition by other governments of the promulgated enactments has been obtained.

In Re Lining

When T. A. Lee, Pacific Coast representative of Furness, Withy and Company, was in Portland, Oregon, late in September in connection with the loading of a wheat cargo in the steamship Mongolian Prince, he bestirred himself in a manner that promises to have a marked effect. Mr. Lee said to the Portland Chamber of Commerce that his company had spent $4000 lining the hold of the Mongolian Prince and that the expense was altogether unnecessary. The chamber, immediately taking up the point raised, requested the insurance committee to make a special investigation. At this writing its work has not been completed, however, because advices were received that E. L. Woods, secretary of the Board of Marine Underwriters, San Francisco, was conferring with the London board upon the adoption of uniform regulations to apply throughout the world; and the committee chose to await further advices from London before completing its report.

Two Sides of It

Those who hold that lining now is unnecessary say that the requirement is a heritage from old sailing ship days, when vessels were at sea for a long time and were exposed to moist tropical airs. To this statement surveyors retort that the rules

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA
W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING
F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK
AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

have been modified since sailing vessels took most of the West Coast grain cargoes around the Horn and that lining remains necessary if damage is to be prevented.

Perhaps the best statement of the owners is that of T. Morimoto, of the New York office of Suzuki & Company, who is quoted as follows in the Portland Oregonian:

> I inspected the holds of a steamer that had just finished lining for sacked wheat. There was much more lumber used than is required on the Atlantic and Gulf coasts by the New York Board of Underwriters. At Galveston the average cost of lining and loading a standard 9400-ton steamer is about $2500. I understand that it costs $1600 here to line merely the 'tween-decks. This cost is out of proportion.

Safety Primary Consideration

> Another thing to consider about the cost of lining ships is that lumber good enough for this purpose can be bought at Portland for $12 a 1000 feet. At Galveston this same grade of lumber costs around $16 per thousand, so the lining cost here should be less than on the Atlantic and Gulf coasts. Labor costs are practically the same, except here you have liners who are specialists, while at the southern and eastern ports the longshoremen do the lining.
>
> The safety of the vessel is the only reason for lining. When you have taken the necessary precautions to keep the wheat out of the bilges and to prevent the cargo from shifting you have done all the lining that is necessary to assure the seaworthiness of the vessel, and that is all that ought to be required.

Japanese Seek Support

In spite of the slight improvement in the marine insurance business due to somewhat increased shipments, marine insurance companies generally are still suffering from the depression, and it is said that some of the minor companies are faced with closing down or being merged into larger concerns, says the Japan Advertiser, Tokyo.

Before the European war there were only five companies exclusively engaged in marine insurance. These were the Tokio Kaijo, Kobe, Teikoku, Nippon, and Toyo. Besides, four companies undertook marine insurance in addition to fire and other kinds of insurance. There were thus only nine marine insurance companies before the war, but the wartime prosperity in shipping and foreign trade caused many new marine insurance companies to come into being. Indeed, such companies numbered no less than 35.

Large War Business

During the war there were brisk shipping movements, while the construction of new vessels in this country amounted to 600,000 or 700,000 tons a year. In the circumstances all the marine insurance companies did a very good business by insuring cargo and hull or by undertaking reinsurance. But not only have shipments since greatly decreased, but the output of tonnage shows a marked falling off, there being almost no new orders for merchantmen. The number of tied-up ships has somewhat diminished of late, but the present improvement in shipping is confined to particular lines, and the freight market continues depressed, taken as a whole. While hull insurance has decreased, it has become more dangerous, because of the increase in accidents at sea.

Small Companies Have Trouble

These factors have combined to make the position of marine insurance companies difficult. The first-class companies which have existed since before the war are on firm ground and are able to sustain the strain, but this is not the case with some of the smaller concerns which were established during the war. Smaller companies are doubly hit, because shippers and shipowners naturally prefer to effect insurance with larger companies. Even of the smaller companies, those which have special relations with more substantial concerns have greater facilities for holding their own, but those which stand alone helplessly find themselves compelled to face extinction or seek absorption by other companies. Where there is hope for holding out if assistance is obtainable, efforts are being made to contract special relations with concerns that are stronger financially.

Thus the Teikoku and the Toyo have special relations with the Tokio Kaijo, the Nisshin and the Nitto with the Kobe Kaijo, the Settus with the Osaka, the Yachiyo with the Nisshin, the Tokiwa with the Chiyoda, the Dai Nippon with the Kyoda, and the Daito with the Nippon. It is said that this method of tiding over the difficult situation is advisable for the marine insurance business of the country as a whole.

Alaska Wreck Decision

Inspectors Frank H. Turner and Joseph P. Dolan, United States Steamboat - Inspection Service, San Francisco, have returned a decision placing the entire blame for the loss of the steamship Alaska on Captain Harry Hobey, who went down with the vessel, and exonerating William E. McClintock, first officer; Earl Du Pree, second officer; J. P. Heikkila, third officer, and M. J. Albin, fourth officer. Sections of the decision bearing on Captain Hobey's responsibility follow:

> . . . The Alaska . . . left Portland, Oregon, at 11 a. m. on August 5, 1921, via Astoria, leaving Astoria at 3 p. m., same date, bound for San Francisco, California, in command of Captain Harry Hobey, who, after crossing Columbia River bar on August 5, 1921, at 9 p. m., took his departure from the lightship and set his course for Cape Blanco, distant 201 miles, which was not sighted, owing to the fog. When he had run his distance, he estimated his bearing as being from 5 to 10 miles off Cape Blanco and changed his course,

which he altered to SE by S½S., to pass Blunt's Reef lightship, 2½ miles off, a distance of 113 miles from Cape Blanco, but took no soundings. At 6:26 p. m. on August 6, without taking a cast of the lead, his course was changed to south, and 49 minutes later she struck Blunt's Reef. In fact, from the time the Alaska took her departure from the Columbia River lightship on August 5, 1921, until she struck Blunt's Reef, no cast of the lead had been taken. About 9 p. m. the man on the lookout reported a whistle ahead (which, no doubt, was the fog whistle on Blunt's Reef lightship). At this time the master ordered Earl Du Pree, the second mate, who was with him on the bridge, to go aloft to listen for the whistle and look for the light. The second mate reported the whistle again to the captain. Immediately thereafter, at about 9:15 p. m., while the second mate was still in the rigging, the vessel running full speed, struck the reef, which proved to be the westerly group of rocks forming Blunt's Reef. The wreck bears 269 degrees true, 700 yards distant from the most westerly rock of the reef in 13 fathoms of water, and from the lightship N. 58 E. true, distant 1½ miles. . . .

After careful consideration of the evidence adduced at the trial, it is positively shown that Captain Hobey was responsible for the loss of the steamer Alaska through his negligence in navigating his vessel full speed in a dense fog without taking soundings, and it is the painful duty of this board to place the responsibility upon the master, Captain Harry Hobey, who was in charge of the bridge when the vessel took the rocks, for not slowing or stopping and using the lead, which was his duty to do in order to confirm his position. Had he done so and taken a cast of the lead at 8:26 p. m. when a whistle was reported ahead, and at which time he changed his course, this accident would not have occurred. Also, as a ship's master, he should have had knowledge of the unreliable and erratic nature of the currents off the California coast, and in shaping his course from Cape Blanco to Blunt's Reef lightship, due regard should have been given to a possible inshore set and allowance made therefor. Secondly, as he expected to be in the vicinity of Blunt's Reef lightship at about 9 p. m. as testified to by the second mate and the chief engineer, and knowing he was on soundings, one cast of the lead would have shown him that he was inside of the 35 fathom curve; and lastly, had he stopped his ship when he heard the whistle and by timing the sound, determined beyond a doubt that it was Blunt's Reef lightship on his starboard bow, he would have cleared the reef. The Alaska had no submarine bell receivers nor did she have any radio communication with the shore, regarding bearings, though she was equipped with wireless.

1920 Hawaiian Business

For the calendar year 1920, insurance companies doing a marine business in the territory of Hawaii have reported to the insurance commissioner totals of $257,298,093.96 in business written; $678,024.58 in premiums received, and $56,254.21 in losses paid. The commissioner's preliminary report, from which these figures are taken, does not list losses incurred; nevertheless, the showing must be eminently satisfactory to every company concerned.

The aggregate of all insurance written in the territory in 1920 was $368,141,575.29, more than two-thirds of which was marine; the aggregate of premiums, all forms, was $3,662,671.96; plus $1,408,146.66, life renewals; and all losses paid, life included, aggregated $1,121,031.05. The volume of business written increased $145,030,082.69 over 1919, probably because of the great value of sugar in the 1920 season, and losses increased $319,298.69.

Marine business of 1920 is shown in the following table:

Name of Company	Insurance written	Premiums	Losses Paid
Aetna	$ 21814,697.00	$ 56,410.34	$20,422.03
American and Foreign	32286,960.00	69,855.48	3,526.88
Alliance	15,618.00	243.09	13.22
Automobile	101,769.00	1,136.49	690.20
British and Foreign	15812,389.94	49,408.40	2,182.61
Canton	2698,959.00	3,011.70	4,189.67
Fireman's Fund	18760,169.00	24,400.66	27.48
Great American	2680,319.00	12,747.69	....
Home (New York)	450,970.00	3,112.47	334.86
Hartford	7307,276.00	34,159.17	2,827.07
Ins. Co. of N. America	65424,996.78	163,921.76	6,452.22
New Jersey	140,170.00	7,970.47	5,865.18
National Union	773,787.00	1,753.83	....
Norwich Union	913,020.00	9,797.53	130.76
National Liberty	697,700.00	11,897.15	....
Phoenix	8448,040.00	15,445.22	12.13
Queen	17,700.00	169.69	....
Switzerland General	55783,323.00	140,270.26	6,086.56
Tokio	933,801.26	5,875.01	65.66
Thames & Mersey	14,330,239.00	43,733.93	2,336.39
Union Marine	7906,189.98	24,704.24	1,091.29
Totals	$257298,093.96	$678,024.58	$56,254.21

Something of a novelty on the Pacific Coast, to-wit, rain insurance, recently was placed by the C. H. Williamson Company, San Francisco, with a New York company, covering all the baseball games of a winter league. Policies of this nature are appealing more and more; although they have been largely confined to open-air gatherings, business houses that would be adversely affected by an untimely rain are beginning to show interest.

* * *

During the third week of October, with the threatened railroad strike a week or more distant, there was some little inquiry regarding protection, but few or no policies were being written so early. Rates depended upon the individual company's own opinions, just as was the case with war risk; in general, however, it appeared that the opening rates would be from one-fourth to one-half of 1 per cent, the latter being for a blanket policy.

* * *

At the end of June, 1921, the Tokio Marine & Fire Insurance Company had yen 6,884,930,000 written on marine risks; yen 2,534,500,000 on fire risks; yen 1,700,702,000 on transportation, and yen 65,847,700 on automobile, says the Japan Times. This great business was being done on a capitalization of yen 15,000,000, although the company proposes to double its capital.

Profits for 1920 were yen 9,116,100, this sum including yen 7,500,000 carried over from the preceding year, however.

Pacific Briefs

The Todd Drydocks, Seattle, received a contract for repairs to the American-Hawaiian steamship Arizonan, which struck a ledge off San Juan Island, Puget Sound, in a heavy fog October 4. The Todd bid was $42,900. Ten plates on the starboard side abaft of the engine-room were torn. Two large holes were ripped in the starboard bilge, the oil-tanks being punctured.

Shipbuilding

Vessels Planned

Regarding rumors of new construction for the Matson Navigation Company, an official said that tentative data were being assembled but that no statement could be made as to the details of design or when building would begin. The company was not in a position, he continued, to make public any plans it might have in connection with the Philippine trade, provided that President Harding decided that adequate services under the American flag existed on or before February 1. In the various rumors that have been heard new construction and the Philippines trade are closely connected.

Reports from the East are authority for the statement that the Merchants & Miners' Transportation Company of Baltimore will have designs drawn for a combination vessel. Preliminary plans for a 200-foot day passenger boat for the Hudson River Day Line are reported to have been drawn.

The San Francisco & Portland Steamship Company is reported to have had plans drawn for the construction of three steamships for the Pacific coastwise trade. Each will have accommodations for 275 cabin and 100 steerage passengers and will make about 17 knots an hour.

New Repair Firm

Pacific Coast shipbuilding and ship-repairing circles were greatly interested in the announcement made during October that George A. Armes, former president and general manager of the Moore Shipbuilding Company, recently resigned, had joined the firm of Mooney & Young, San Francisco. Within a few days after this first announcement came another to the effect that the three had incorporated the General Engineering Company, with Mr. Armes as president; J. F. Mooney as vice-president and general manager, and James Young as secretary and treasurer.

The company intends to expand as rapidly as conditions justify, said Mr. Armes. He withheld any statement as to plans for a drydock, but said that for the time being arrangements were in effect with the Crowley and Barnes & Tibbitts interests, San Francisco, for the docking of vessels up to 5000 tons gross, and that, when the new marine railway of the Hanlon yard, Oakland, was completed, vessels up to 12,000 tons gross would be docked there. The equipment of the Triangle Engineering Company, San Francisco, has been bought outright by the General Engineering Company.

Mr. Mooney formerly was superintendent of Skinner & Eddy, Seattle, and Mr. Young was his assistant. Both were with the Hanlon yard for a few months after the closing of Skinner & Eddy.

A New Drydock

Reports from Vancouver say that J. Coughlan and Clarence Wallace, shipbuilders of Vancouver, and the Dominion government have concluded negotiations for a subsidy for a drydock to be constructed at Burrard Inlet and that the Burrard Drydock Company has been incorporated. The cost of the dock is estimated at $2,500,000. There has been some complaint recently regarding charges at the Esquimault dock, N. A. Yarrow, manager of Yarrows, Ltd., having said that dues had increased 240 per cent since 1919, so that Canadian repair yards were at a decided disadvantage in competing with American.

Changes in the Yards

A new firm known as the Montreal Boatbuilders, Inc., has been established at Lachine, Quebec, to build vessels. Its capitalization is $100,000. The principal owners are citizens of Montreal.

The Fletcher Ship Repairing Company, Ltd., Levis, Quebec, was incorporated recently with a capital stock of $500,000, by W. J. Bishop, W. F. Fletcher and other stockholders.

The H. W. Sweet Shipyard & Machine Works, Inc., Greenport, New York, has been incorporated with a capital of $75,000 by H. W. Sweet, F. B. Corey and C. W. Thorn, to operate a shipbuilding plant and general machine construction and repair works.

The Saginaw Shipbuilding Company, established in 1917 with six building ways, has retired from shipbuilding and has been merged into the Ruggles Motor Truck Company, which will use the Saginaw plant, remodeled. The Newark Bay yard of the Submarine Boat Corporation is doing shore work, such as for theaters, hotels, apartment houses, stadia, tanks, motion-picture theaters, office buildings, etc.

The Maryland Wrecking Company, Inc., Stone House Cove, Curtis Bay (Baltimore harbor), has purchased the Carolina Shipyard at Wilmington, N. C., from the George A. Fuller Company. The purchasers will maintain the yard on a smaller scale.

With the launching of the Standard Transportation tanker Dixie Arrow at the South Yard of the New York Shipbuilding Corporation September 29, all the ways were cleared. The yard is owned by the Emergency Fleet Corporation, but is operated by New York Ship. Four combination vessels and four tankers have been launched at the yard, which was completed at a cost of $10,000,000 only a short time before the armistice was signed.

The Tank Shipbuilding Corporation has temporarily suspended operations at Newburgh and will entertain proposals for the leasing of the property and equipment. The plant, which was established in 1915, includes two 500-ton marine railways and seven launching ways.

Recent Repair Contracts

Some recent repair and alteration contracts follow:

United Engineering Works, San Francisco, Inter-Island Steamship Mauna Kea, repairs, about $14,000.

Todd Shipyards Corporation, Robins Plant, Anderson Overseas Corporation steamship St. Louis, reconditioning.

National Drydock & Repair Company, American-Hawaiian steamships Floridian, Ohioan, Panaman, installation fuel-oil heating system, $12,750.

Todd Shipyards Corporation, Tietjen & Lang Plant, Ward Line chartered steamship San Jacinto, reconditioning, in excess of $1,000,000.

Same yard, Mallory Line steamship Henry R. Mallory, repairs and installation of auxiliary machinery, $45,740.

Morse Drydock & Repair Company, Ole Time Molasses Company's steamship Delmira, reconditioning, $119,650.

Bethlehem Shipbuilding Corporation, Fore River Plant, Furness-Bermuda steamship Fort George, installation oil-burning system, about $44,000.

Main Iron Works, San Francisco, installation of engines 15½ by 26 by 43-33 and two Main Iron Works watertube boilers for George E. Billings.

Alterations in Big Vessels

The Shipping Board has approved of alterations to the George Washington and America, the changes in the first case being converting some of the steerage quarters into rooms and in the second converting some of the first cabin into second cabin, at a cost of about $70,000. The board also is reported to be about to ask for bids for reconditioning the Leviathan, a large vessel of which much has been heard during the last two years. The C. G. M. M.

will install refrigerator space in the Canadian Highlander, the Canadian Scottish and the Canadian Winner, so that they may engage in the Australasian-North American meat trade. The Kidston Company, Montreal, will outfit the Highlander. The Canadian Skirmisher already has refrigerator space.

The Clinton Shipbuilding & Repair Company of Philadelphia has closed with a Mexican company for the construction of some small steel barges to be used for lighterage work in shallow harbors of Mexico. The barges will be knockdown and galvanized throughout.

The General Electric Company will supply auxiliary electric equipment for five Diesel barges recently built by the McDougall-Duluth yard. The equipment will consist of three 10 kilowatt, 400 r. p. m. generators.

Naval Retrenchment Effect

The halt in naval construction, which involves several important yards, should have quite an effect upon costs of construction for private tonnage, inasmuch as plants that are engaged largely or wholly on naval building will seek to hold their organizations intact pending expected resumption of work on men-of-war. On the Pacific Coast the Todd Drydock & Construction Corporation, Tacoma, has three large scout cruisers, Omaha, Milwaukee and Cincinnati, all of which have been launched, and with no private work on hand this yard probably will prove a dangerous contender for whatever offers. Union Plant of Bethlehem is little affected, because its only naval work is submarines.

On the Atlantic the reaction has been greater. The Fore River Plant of Bethlehem has two scout cruisers, a battleship and a battle-cruiser and nineteen submarines, and only two merchantmen, both of which have been launched. Cramp has five scout cruisers, all held up. Newport News will finish its last private work probably next month, but that yard has two battleships and two battle-cruisers, one of which has been launched. New York Ship has the largest volume of commercial work in the country, as well as a battle-cruiser and two battleships, and therefore will not feel the pinch so soon as other plants. Such yards as these will make a spirited effort to get new work before suffering their organizations to disband, unless of course the Washington conference should lead to the definite abandonment of most if not all the vessels now on the ways.

Most of the navy yards also are practically at a standstill.

Wage Reductions

The pay of the Navy Yard employes has been reduced from 13 to 30 per cent, effective in September. About 70,000 men were affected. The department said that reductions were necessary because of a small budget. The Lake Torpedo Boat Company, which had been operating under the Navy scale, adopted the new rates September 19, reducing mechanics to 73 cents and laborers to 41. Canadian Vickers, Montreal, announced a reduction in wages of skilled men from 65 cents to 62½, which followed a former cut from 80 cents to 65. The Federal Shipbuilding Company, Kearny, made effective on September 12 a new scale as follows: mechanics, 70 cents, 66, 62, 58 and 54; helpers, 46 cents, 42 and 40, and laborers, 38 cents, 34 and 30. On the next day the Texas Steamship Company, Bath, announced a scale of 60 cents, 54 and 48 for first, second and third-class mechanics; 42 and 38 for helpers and 38 cents for laborers. Members of the Charleston Ironmasters' Association have published a schedule of 77 and 72 cents for mechanics; 60, 54 and 43 for helpers, and 38, 30 and 25 for laborers. The New York Shipbuilding Corporation's schedule is being followed by the Philadelphia Ship Repair Company and the Clinton Shipbuilding & Repair Company. The Harlan Plant of Bethlehem has reduced wages another 10 per cent, making the scale approximately 27 per cent below the Macy award. Pusey & Jones have announced a top rate of 58 cents for first-class mechanics with intermediate rates in most crafts. The scale is much the same as that of Harlan. The Greenport Basin & Construction Company reduced all wages October 1, the new maximum for mechanics being 60 cents with intermediate rates in all departments. Laborers receive 40 cents. Additional changes are under consideration by the Atlantic Coast Shipbuilders' Association, Delaware River Section.

In the Wood Yards

The wood yard of Arthur D. Storey, Essex, Massachusetts, has resumed work after reducing wages from 65 and 70 cents to 40 and 50. The George Lawley & Son Corporation, Boston, made effective a nine-hour week on September 8 and announced a new scale of 49 cents to 85 for carpenters and joiners, the averages being 64 for the former and 69 for the latter; 54 to 65 for mechanics, the average being 62; and 44 cents for average helpers. The John H. Mathis Company, Camden, established a new scale October 6. Mechanics are rated at 65 and 60 cents; helpers at 40 and 35, and laborers at 35 and 30. The Noecker & Ake Shipbuilding Company, Camden, reduced wages October 1 to 65 and 60 cents for first and second-class carpenters and to 60 and 50 cents for caulkers. The G. G. Deering Company is paying carpenters 45 cents, with a 5-cent bonus for a few highly skilled men, and is paying laborers 37½ cents.

Ship-painters employed by New York contractors have accepted a reduction of 10 cents an hour, from 70 to 60 for ordinary work, and from 80 to 70 for interior or yacht painting.

World Building September 30

Less than 8 per cent of the tonnage building in the shipyards of the world is being constructed in the United States, according to a statement just issued by Lloyd's Register of Shipping. Of the world total, almost 60 per cent is in the United Kingdom. Returns from the quarter ended September 30 give the total of shipping under construction as 5,542,000 gross tons, of which 3,283,000 tons represents the British portion, 434,000 tons the American, and 1,825,000 tons that of other countries. The British figures, although representing contracts placed for construction, do not represent merely construction on which work is actually proceeding. Included in the British aggregate are 731,000 tons on which work has been suspended and 457,000 tons postponed, a total of 1,188,000, so that the active British shipbuilding program is now 2,094,000 tons. This reduction of more than a third in the work under way is due to the general depression in shipping, and is reflected in the returns from other countries, the total suspensions outside of the United Kingdom being reported as 375,000 tons, or about 10 per cent of the total, Italy and the United States being chiefly affected.

Further Declines Probable

That further declines in the amount of work on hand may be looked for is indicated by the marked discrepancy between the tonnage being turned out and the new construction begun. In Great Britain, for instance, during the past three months, although 306,000 tons of shipping was launched, work was commenced on only 50,000 tons. This is in sharp contrast with the returns issued by Lloyd's Register at the beginning of this year, which showed new construction amounting to 503,000 tons, in comparison with launchings of 576,000 tons.

How sharp the shrinkage in shipbuilding has been since the beginning of this year is indicated by the decline of nearly 900,000 gross tons in the United States alone, compared with about 425,000 tons for the United Kingdom, and about 325,000 tons for other countries, as the following table shows, the figures representing gross tons:

	Jan. 1, '21	Oct. 1, '21
United Kingdom	3,708,000	3,283,000
United States	1,310,000	434,000
Other countries	2,161,000	1,825,000
World total	7,179,000	5,542,000

Tanker Construction

Even the construction of tankers, which on July 1 showed a decrease of only 18,000 tons from the total at the beginning of the year, has now fallen off markedly, the October 1 figures being 220,000 tons less than those for July 1. The reduction has been greatest in this country, as the accompanying tonnage table shows:

	July 1, '21	Oct. 1, '21
United States	388,868	222,292
United Kingdom	585,980	527,791
Other countries	176,730	181,730
World total	1,151,578	931,813

Although the United States still stands second in the ranking of ship producing countries, American shipyards now have in hand less than 50,000 tons more than the total reported for Italy. No returns are available for Germany.

Small Nations Shift

There have been several shifts in the rating of the smaller shipbuilding nations during the last quarter. Holland, which followed the United Kingdom and the United States in order at the beginning of July, is now exceeded by Italy and France, Italy's total in hand having increased 87,000 tons during the past quarter, while the total for all other countries fell back. The status of the minor shipbuilding nations, as compared with three months ago, is shown in the following table, giving gross tons of work in hand:

	Oct. 1, '21	July 1, '21
Italy	397,544	310,333
France	350,681	390,453
Holland	349,122	391,389
Japan	186,782	229,262
Brit. Dom'ns	144,460	177,912

Compared with the 4,186,000 tons under construction in American shipyards at the first quarter of 1919, which was the world record, today's production in this country is only a little more than a tenth of that total, representing a decline of 3,752,000 tons.

Drop of 2,500,000 Tons

The 5,543,000 tons, representing the total shipping building throughout the world today, is a decline of about 2,500,000 tons from the peak of 8,048,000 tons, attained in September, 1919, or a decrease of more than 30 per cent.

Since the beginning of this year British shipyards have increased their lead over American yards about 500,000 tons, the gap, which at the end of 1920 was 2,398,000 tons, now being widened to 2,848,000 tons.

American Building

The bulletin of the American Bureau of Shipping reports that on September 1 there were 70 seagoing steel vessels of 542,117 gross tons under construction or contract in yards of the United States; 59 vessels of 436,217 tons were for private owners and 11 of 105,900 were for the Shipping Board; the Atlantic was building 48 vessels of 389,079 tons, the Pacific 18 of 125,438, and the Gulf 4 of 27,600. There were 20 cargo vessels of 129,851 tons, 42 tankers of 328,266 tons and 8 combination vessels of 84,000. Only one vessel, a cargo-carrier, was to be exclusively a coal burner; 7 were for either coal or oil and all the others were for oil alone. The following table classifies work according to propulsion:

COAST	RECIPROCATING				TURBINE				DIESEL				NO POWER				TOTAL			
	Cargo		Tank		Cargo		Tank		Cargo		Tank		Cargo		Tank		Cargo		Tank	
	No.	G.T.	No.	G.T.	No.	G.T.	No.	G.T.	No.	G.T.	No.	G.T.	No.	G.T.	No.	G.T.	No.	G.T.	No.	G.T.
Atlantic	9	60,851	23	177,628	3	18,000	3	33,000	2	15,600	..	......	..	......	..	......	14	94,451	26	210,628
Pacific	4	23,400	13	98,788	.	......	..	......	..	......	1	3,250	..	......	..	......	4	23,400	11	102,038
Gulf	..	......	2	15,600	2	12,000	..	......	..	......	..	......	..	......	..	......	2	12,000	2	15,600
Total	13	84,251	38	292,016	5	30,000	3	33,000	2	15,600	1	3,250	..	......	..	......	20	129,851	42	328,266
	Pass. & Cgo.				Pass. & Cgo.														Pass. & Cargo	
Atlantic	..	......	..	......	8	84,000	..	......	..	......	..	......	..	......	..	......	..	......	8	81,000

Pacific Building

On October 1 there were 10 seagoing steel merchant vessels of an aggregate deadweight of 129,350 tons under construction in yards of the Pacific Coast of the United States, according to returns compiled by Pacific Marine Review. Vessels for the Navy and Coast Guard are not included. Three tankers of an aggregate deadweight tonnage of 33,140 were delivered in September, one being the 16,340-ton Tamiahua, built by Moore for the Southern Pacific's Atlantic Line and the others being the 8400-tonners Amalthus and Semiramis, built by Union Construction and Southwestern for Anglo-Saxon Petroleum and Dutch Shell. They were the last vessels for foreign account under construction.

Canada delivered one 8350-tonner to the Canadian Government Merchant Marine.

No new contracts have been announced.

The following table shows work as of October 1:

American Yards:	No. Vessels	Agg'te D.W.T.
Freighters, U.S.S.B.	2	22,000
Tankers, private	6	67,350
Freighters, private	2	40,000
Totals	10	129,350
Canadian Yards:		
Freighters, C.G.M.M.	2	16,740
Comb'n, private	1	600
Totals	3	17,340

Eastern Keel-layings

UNITED STATES

Tanker Atlantic Refining Company, Bethlehem Shipbuilding Corporation, Harlan Plant, August 20.

Steelore, ore and oil, Ore Steamship Company, Bethlehem Shipbuilding Corporation, Sparrows Point Plant, July 20.

Eastern Launchings

UNITED STATES

Nutmeg State, combination U. S. S. B., Bethlehem Shipbuilding Corporation, Sparrows Point Plant, September 17.

B. D. Benson, tanker Standard Oil Company, Oscar Daniels Company, Tampa, September 15.

Dixie Arrow, tanker Standard Transportation Company of New York, New York Shipbuilding Corporation, September 29.

Tugboat Staples Transportation Company, Staten Island Shipbuilding Company, August 4.

Canadian Constructor, freighter C. G. M. M., Halifax Shipyards, September 24.

Munargo, combination Munson Steamship Company, New York Shipbuilding Corporation, September 17.

Samuel Q. Brown, tanker, Tidewater Oil Company, Merchant Shipbuilding Corporation, October 15.

Eastern Deliveries

UNITED STATES

G. Harrison Smith, ore and oil International Petroleum Company, Bethlehem Shipbuilding Corporation, Sparrows Point Plant, September 13.

Oak, lighthouse tender U. S., Consolidated Shipbuilding Corporation, October 10.

Hawthorn, lighthouse tender U. S., Consolidated Shipbuilding Corporation, October 10.

T. J. Williams, tanker Standard Oil Company, Oscar Daniels Company, September 17.

San Leopoldo, tanker Eagle Oil Transport Company, Globe Shipbuilding & Drydock Company of Maryland, July 28.

San Leonardo, tanker Eagle Oil Transport Company, Globe Shipbuilding & Drydock Company of Maryland, August 20.

Robert E. Hopkins, tanker Tidewater Oil Company, Merchant Shipbuilding Corporation, October 6.

John D. Archbold, tanker Standard Oil Company of New Jersey, Newport News Shipbuilding & Drydock Company, September 24.

Dixiano, sugar ship American Sugar Refining Company, Staten Island Shipbuilding Company, July 1.

Southern Cross, combination U. S. S. B., New York Shipbuilding Corporation, September 26.

J. N. Pew, tanker Sun Oil Company, Sun Shipbuilding Company, September 14.

Agwiharve, tanker Atlantic, Gulf & West Indies, Sun Shipbuilding Company, August 16.

Agwimex, same, October 4.

Hoosier State, combination U. S. S. B., New York Shipbuilding Corporation, September.

Empire Arrow, tanker Standard Transportation Company, New York Shipbuilding Corporation, September.

Pacific Keel-layings

UNITED STATES

Ferryboat Six Minute Ferry Company, Bethlehem Shipbuilding Corporation, Alameda Works, August 27.

Pacific Launchings

UNITED STATES

H. M. Storey, tanker Standard Oil Company of California, Bethlehem Shipbuilding Corporation, Alameda Works, September 28.

Modoc, cutter United States Coast Guard, Union Construction Company, October 1.

CANADIAN

Canadian Freighter, freighter C. G. M. M., J. Coughlan & Sons, October 12.

Canadian Britisher, freighter C. G. M. M., Wallace Shipbuilding & Drydock Company (Prince Rupert Drydock & Engineering Company), October 6.

Pacific Deliveries

UNITED STATES

F. H. Hillman, tanker Standard Oil Company of California, Bethlehem Shipbuilding Corporation, Alameda Works, October 21.

Semiramis, tanker Dutch Shell, Southwestern Shipbuilding Company, September 22.

West Prospect, freighter U. S. S. B., Los Angeles Shipbuilding & Drydock Company, October 5.

Haida, cutter United States Coast Guard, Union Construction Company, October 25.

Amalthus, tanker Anglo-Saxon Petroleum Company, Union Construction Company, September 28.

La Purisima, tanker Union Oil Company, Southwestern Shipbuilding Company, October 20.

CANADIAN

Canadian Transporter, freighter C. G. M. M., J. Coughlan & Sons, September 14.

Shipyard Reports

Pacific Coast, United States

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Purchasing Agent: O. W. Street.

Submarines USN: S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145; S-41, hull 146; all launched; outfitting proceeding slowly.

Alameda Works

Chilore, hull 5309, combination ore and coal carrier Ore Steamship Co; 571-6 LOA; 550-1 LBP; 72 molded beam; 44 molded depth; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; Curtis turbines with Falk reduction gears, 5000 SHP; 3 Scotch SE boilers, 17-6x12, each 4287 sq ft; oil burners.

Lebore, hull 5310, combination ore and coal carrier Ore Steamship Co; sister to above.

F. H. Hillman, hull 5311, tanker Stand Oil Co of Cal; 500 LBP; 68 beam; 25-11 loaded draft; 11 loaded speed; 15,000 DWT; rec engs, 4000 IHP; 3 Scotch marine boilers, 16x12-9; keel Jan10/21; launch July28/21; **deliver Oct21/21.**

H. M. Storey, hull 5312, tanker Stand Oil Co of Cal; sister to F. H. Hillman; keel Jan19/21; **launch Sept 28/21**; deliver Jan1/21, est.

W. S. Rheem, hull 5313, tanker Stand Oil Co of Cal; sister to F. H. Hillman; keel Mar1/21; launch Nov 10/21, est.

No name, hull 5314, ferryboat Six Minute Ferry Co; 230 LOA; 63-6 beam over guards, 42 molded; 19-6 molded depth; TE eng, 1400 IHP; propeller drive; 3 WT boilers; **keel Aug27/21.**

No name, hull 5315, ferryboat Six Minute Ferry Co; sister to above.

HANLON DRYDOCK & SHIPBUILDING CO., OAKLAND

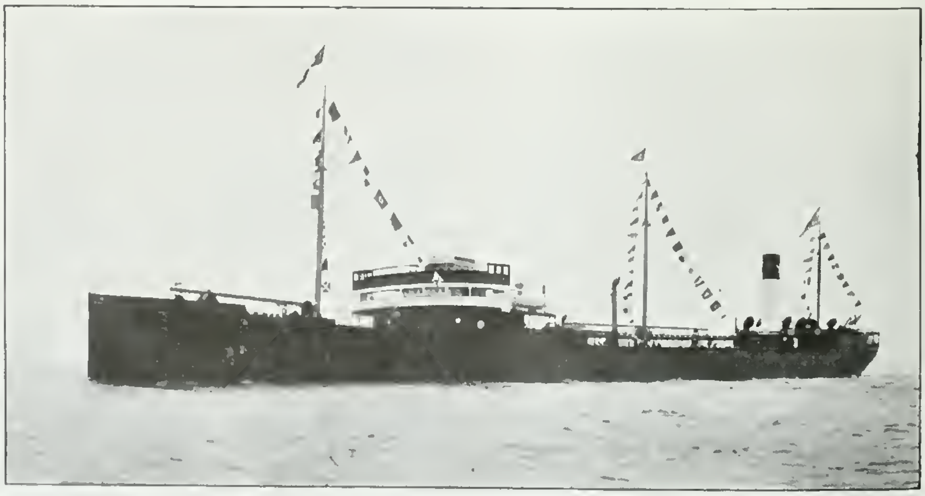
Purchasing Agent: R. Barker.

Dan F. Hanlon, hull 89, steam schr. D. J. Hanlon; 2500 DWT; 1400 IHP engines; 2 B&W boilers.

LOS ANGELES SHIPBUILDING & DRYDOCK CO., SAN PEDRO

West Prospect, hull 34, steel cargo USSB; 430 LBP; 54 beam; 28-2 loaded draft; 10½ loaded speed; 11,000 DWT; TE engs, 3500 IHP; 3 Scotch single end, 15-9; keel Dec 31/20; launch July 30/21; **deliver Oct5/21.**

West Chopaka, hull 35, steel cargo USSB; sister to above; keel Feb24/21; launch Sept19/21; deliver Nov 25/21, est.



The largest merchant vessel constructed on the Pacific Coast of the United States and Canada: the 16,340 deadweight ton tanker Tamiahua, built by the Moore Shipbuilding Company for the Atlantic steamship lines of the Southern Pacific. She broke the record of the sisters Manulani and Manukai, 14,000 tons deadweight, built by Moore for the Matson Navigation Company.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: W. E. Hostetter.

H. T. Harper, hull 163, tanker Standard Oil Co of California; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engs; keel Oct/20; launch June16/21; deliver Oct30/21, est.

Birkenhead, hull 166, tanker for Vacuum Oil Co; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec engs; 3 Scotch marine boilers, 15-2x12; keel Dec9/20; launch July9/21; deliver Oct25/21, est.

NAVY YARD, PUGET SOUND

Medusa, repair ship for government; 460 LBP; 70 beam; about 19 loaded draft; 17-5 loaded speed; turbine eng, 7000 IHP; 2 WT express type boilers; 10,000 tons disp; keel Jan2/20; launch and deliver dates not set.

Holland, submarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K loaded speed; turbine eng, 7000 IHP; two WT express type boilers; 10,000 tons disp; keel Apr11/21.

NAVY YARD, MARE ISLAND

Montana, battleship USN; 660 LBP; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 disp; turbo-electric engs, 60,000 SHP; 12 Bu's express boilers, 74,040 sq ft; keel Sept 1/20; work suspended.

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

La Purisima, hull 23, Isherwood tanker Union Oil Co; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engs, 2800 IHP; 3 Scotch boilers, 14x12; keel Dec22/20; launch Sept10/21; **deliver Oct20/21.**

Semiramis, hull 26, Isherwood tanker Nederlandsch-Indische Tankstoomboot Maatschappij; 412 LBP; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engs, 2700 IHP; 3 Scotch boilers, 15-6 x 11-7; keel Nov5/20; launch Aug6/21; **deliver Sept22/21.**

TODD DRYDOCK & CONSTRUCTION CORP., TACOMA

Purchasing Agent: C. L. Bankson.

Omaha, hull 100, scout cruiser USN; 555-6 LOA; 550 LBP; extreme beam 55-4; molded beam 54-9; depth molded 26; mean loaded draft 13-6; disp 7100 tons; Westinghouse Parsons turbines and reduction gear, 105,000 IHP; designated speed 34; 12 Yarrows WT boilers; keel Dec6/18; launch Dec14/20.

Milwaukee, hull 106, scout cruiser USN; sister to above; keel Dec13/18; launch Mar24/21.

Cincinnati, hull 107, scout cruiser USN; sister to above; keel May15/20; launch May23/21.

UNION CONSTRUCTION CO., OAKLAND

Purchasing Agent: A. J. Farnesworth.

Haida, hull 17, cutter USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engs, 2600 IHP; 2 WT boilers; keel Sept27/20; launch Apr19/21; **deliver Oct25/21.**

Mojave, hull 18, cutter USCG; same as the above; keel Apr16/21; launch Sept7/21; deliver Nov15/21, est.

Modoc, hull 19, cutter USCG; same as above; keel Apr19/21; launch Oct 1/21; deliver Dec15/21, est.

Shawnee, hull 20, cutter USCG; 150 LOA; 30 beam; 13-6 loaded draft; 12½ loaded speed; 1000 DWT; rec engs, 1000 IHP; 2 WT boilers; keel Jun1/21; deliver Jan1/22, est.

Amalthus, hull 23, oil tanker Anglo-Saxon Pet Corp, Ltd; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec engs, 2600 IHP; 3 Scotch marine boilers, 15-6x11-7; keel Mar12/21; launch Aug11/21; **deliver Sept28/21.**

Canadian

CHOLBERG SHIPYARD, VANCOUVER, B. C.

Purchasing Agent: W. Meed.

(These vessels to be completed by Dominion government.)

Sir Henry Drayton, hull 5, 4-masted barkentine Victoria Shipowners, Ltd; 250 LOA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel; shaft logs fitted for auxiliary but no machinery installed; keel May 15/20.

No name, hull 6, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel June4/20.

No name, hull 7, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel Feb/21.

J. COUGHLAN & SONS, LTD. VANCOUVER, B. C.

Purchasing Agent: J. Joseph.

Canadian Transporter, hull 20, steel freighter Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE eng, 3000 IHP; 3 Scotch boilers, 15-6 x11-6; keel Jan6/21; **launch Aug31/21; deliver Sept14/21.**

Canadian Freighter, hull 21, steel freighter Canadian government; sister to above; keel Jan 6/21; **launch Oct12/21.**

PRINCE RUPERT DRYDOCK & ENGINEERING COMPANY PRINCE RUPERT

Canadian Britisher, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Oct20/19; **launch Oct 6/21.**

This vessel is being completed by the Wallace Shipbuilding & Drydock Co, North Vancouver. The terms are time and material plus 8 per cent.

WALLACE SHIPBUILDING & DRYDOCK CO., VANCOUVER, B. C.

Princess Louise, Canadian Pacific; 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel Oct/20; launch Aug 29/21.

Atlantic and Gulf

AMERICAN BRIDGE COMPANY, PITTSBURGH, PENN.

Purchasing Agent: W. G. A. Millar.

Twenty-five coal barges Carnegie Steel Co; 175 LBP; 26 beam; 8 loaded draft; 20 launched.

Two tow boat hulls Carnegie Steel Co; 149-2x34 4-5 loaded draft; launch and deliver Jan/22, est.

Two coal barges, 175 LBP; 26 beam; 8 loaded draft; undisclosed interests.

Fifteen decked barges, 120 LBP; 30 beam; 7 deep; US Engineers, Memphis, Tenn.

BALTIMORE DRYDOCKS & SHIPBUILDING CO., BALTIMORE

A. G. Crosby, assistant general manager in charge of purchases.

Hull 125, tanker builder's account; 340 LBP; 49 beam; 23-6 loaded draft; 10 loaded speed; 6000 DWT; rec. eng, 2000 IHP; 2 Scotch boilers, 15-3; keel Nov24/20.

Hull 126, tanker builder's account; 430 LBP; 59 beam; 25-4½ loaded draft; 10 loaded speed; 10,250 DWT; turb eng, 3000 IHP; 3 Scotch boilers, 15-3; keel Sept27/20.

Hull 128, fireboat City of Baltimore; 115-6 LBP; 28 beam; 9-6 loaded draft; 12 loaded speed; rec eng, 1000 IHP; 2 B&W WT boilers; keel July15/21.

BETHLEHEM SHIPBUILDING CORP., FORE RIVER PLANT, QUINCY, MASS.

Lexington, hull 1300, battle-cruiser USN.

Raleigh, hull 1382, scout cruiser USN.

Detroit, hull 1383, scout cruiser USN.

Massachusetts, hull 1400, battleship USN.

And the following nineteen submarines USN: AA-2, hull 1270; hulls 1309 to 1320 inc, submarines S-18 to S-29 inc; hulls 1389 to 1394 inc; submarines S-42 to S-47 inc.

J. Fletcher Farrell, hull 1496, tanker Sinclair Nav Co; 430 LBP; 59 beam; 25-5 loaded draft; 11 loaded speed; 10,600 DWT; rec eng, 3200 IHP; 3 Scotch boilers, 15x11-9; launch June10/21.

William Boyce Thompson, tanker Sinclair Nav Co; sister to above; keel Nov11/21; launch July/21.

BETHLEHEM SHIPBUILDING CORP., HARLAN PLANT, WILMINGTON, DEL.

No name, hull 3477, tanker Atlantic Refining Co; 226 LBP; 39 beam; 17 loaded draft; 8½ loaded speed; 2600 DWT; turb eng, 750 IHP; B & W boilers; **keel Aug20/21.**

BETHLEHEM SHIPBLDG. CORP., SPARROWS POINT PLANT, SPARROWS POINT, MD.

Pine Tree State, hull 4195, combination USSB; 518 LBP; 72 beam; 30-7 loaded draft; 16 loaded speed; turb eng, 10,000 IHP; 8 Yarrows boilers; keel Feb15/19; launch Mar 19/21.

Palmetto State, hull 4196; combination USSB; sister to above; keel Feb19/19; launch June4/21.

Nutmeg State, hull 4197, combination USSB; sister to above; keel July29/20; **launch Sept17/21.**

G. Harrison Smith, hull 4210, ore and oil Internat'l Pet Co; 550 LBP; 72 beam; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; rec eng 4600 IHP; 3 Scotch boilers, 17-6x12; keel July22/20; launch July12/21; **deliver Sept13/21.**

Bethore, hull 4211, ore and oil Ore SS Co; sister to above; keel Feb24/21.

Marore, hull 4212, ore and oil Ore SS Co; sister to above, except turb eng; keel May2/21.

Steelore, hull 4213, ore and oil Ore SS Co; sister to above; **keel July 20/21.**

CONSOLIDATED SHIPBUILDING CORPORATION, MORRIS HEIGHTS, N. Y.

Purchasing Agent: Bruce Scrimgeour.

Oak, hull 251, US lighthouse tender; 160 LOA; 30 beam; 9-6 loaded draft; 875 DWT; TE eng, 700 IHP; 1 Scotch boiler, 14 diam; keel Nov 22/20; launch June18/21; **deliver Oct10/21.**

Hawthorn, hull 252, US lighthouse tender; sister to above; keel Nov 22/20; launch June28/21; **deliver Oct10/21.**

No name, hull 246, US lightship; 146-3 LOA; 30 beam; 12-7 loaded draft; 825 DWT; comp eng, 400 IHP; 2 Scotch boilers, 10-6 diam.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO., PHILADELPHIA

Purchasing Agent: Ed. C. Geehr.

(Work held up)

Richmond, hull 448, scout cruiser USN; keel Feb16/20; **launch Sept 29/21**; 74 per cent comp Oct1.

Concord, hull 449, scout cruiser USN; keel Mar29/20; 68 per cent comp Oct1.

Trenton, hull 501, scout cruiser USN; keel Aug18/20; 51 per cent comp Oct1.

Marblehead, hull 502, scout cruiser USN; keel Aug4/20; 46 per cent comp Oct1.

Memphis, hull 503, scout cruiser USN; keel Oct14/20; 40 per cent comp Oct1.

OSCAR DANIELS COMPANY, TAMPA, FLORIDA

B. D. Benson, hull 11, Isherwood tanker Standard Oil; 466 LBP; 60 beam; 26-7 loaded draft; 10½ loaded speed; 11,900 DWT; QE eng, 2800 IHP; 3 Scotch boilers, 15x11-6; keel June29/20; **launch Sept15/21.**

T. J. Williams, hull 12, Isherwood tanker Standard Oil; sister to above; keel Aug11/20; launch May3/21; **deliver Sept17/21.**

FEDERAL SHIPBUILDING CO., KEARNY, N. J.

Purchasing Agent: J. L. Hastings.

Steel Seafarer, hull 43, freighter US Steel Products Co; 425 LBP; 56 beam; 25-10 loaded draft; 12 loaded speed; 9400 DWT; turb engs, 3100 IHP; 3 Scotch boilers, 15 diam; keel May25/21; launch Oct/21, est.

Steel Pathfinder, hull 44, freighter US Steel Products Co; sister to the above; keel June1/21; launch Nov 12/21, est; deliver Dec3/21, est.

Steel Pioneer, hull 45, freighter US Steel Products Co; sister to the above; keel July/21; launch Dec10/21, est; deliver Dec31/21, est.

GLOBE SHIPBUILDING & DRYDOCK CO. OF MARYLAND, BALTIMORE

Purchasing Agent: H. B. McCauley.

San Leopoldo, hull 101, oil carrier Eagle Oil Transport Co; 401 LBP; 54 beam; 25-1 loaded draft; 10½ loaded speed; 8600 DWT; TE engs, 2800 IHP; 3 Scotch boilers, 15-3x11-6; keel Sept/20; launch June25/21; **deliver July28/21.**

San Leonardo, hull 102, oil carrier Eagle Oil Transport Co; sister to above; keel Sept/20; launch July8/21; **deliver Aug20/21.**

LAKE TORPEDO BOAT CO., BRIDGEPORT, CONN.

Purchasing Agent: C. D. Maxfield.

S-48, hull 48, submarine USN; launch Feb26/21.

S-49, hull 49, submarine USN; launch Apr23/21.

S-50, hull 50, submarine USN; launch June18/21.

S-51, hull 51, submarine USN; launch Aug20/21.

MERCHANT SHIPBUILDING CORPORATION, CHESTER, PENN.

Vice-President: J. L. Ackerson.

Robert E. Hopkins, hull 383, tanker Tidewater Oil Co; 424 LBP; 58 beam; 25-5 loaded draft; 10½ loaded speed; 10,000 DWT; TE engs; 3 Scotch boilers, 15-3x11-7; keel Aug 30/20; launch Aug6/21; **deliver Oct 6/21.**

Samuel Q. Brown, hull 384, tanker Tidewater Oil Co; sister to above; keel Oct1/20; **launch Oct15/21.**

Californian, hull 385, freighter American-Hawaiian SS Co; 445 LBP; 59-8 beam; 28-6 loaded draft; 11½ speed; 11,000 DWT; 2 6cyl, 4-cycle Diesel engs, 4500 metric; 1 vertical donkey, 400 sq ft HS; keel Feb5/21; launch Nov11/21, est.

Missourian, hull 386, freighter American-Hawaiian SS Co; sister to above; keel Feb10/21; launch Nov 11/21, est.

No name, hull 387, fireboat City of Philadelphia; 120-9 LOA; 28 beam; 12-9 deep; 9 loaded draft; comp eng, 500 IHP; 2 B&W WT boilers, oil; 4 turbine fire pumps, 1 30-foot tower, 2 15-foot towers; capacity 12,000 gals a minute; keel Sept 15/21; launch Dec/21, est.

NAVY YARD, BOSTON

Whitney, destroyer tender No. 4 USN; 460 LBP; 60-11 beam; 21 normal draft; 16 loaded speed; 10,600 normal disp; geared Parsons turbs, 7000 SHP; 2 WT exp small tube boilers; keel Apr23/21; launching indefinite.

NAVY YARD, PHILADELPHIA

(All work practically suspended since July 1/21.)

Dobbin, hull 7, destroyer tender USN; 460 LBP; 60-10 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp; Parsons geared turb single screw engs, 7000 SHP; 2 WT boilers; keel Dec23/19; launch May 5/21; deliver date not determined.

Constitution, hull 8, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive, 180,000SHP; 16 WT boilers; keel Sept 25/20; launch and deliver dates not determined.

United States, hull 9, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive, 180,000 SHP; 16 WT boilers; keel Sept25/20; launch and deliver dates not determined.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY, NEWPORT NEWS

Purchasing Agent: James Plummer, 233 Broadway, New York City.

West Virginia, hull 211, battleship USN; 600 LBP; 97-3½ beam; 30-6 mean draft; 32,600 normal disp; 21 speed; GE turbo-elec drive, 28,900 SHP; 8 B&W WT boilers, oil, 41,768 sq ft plus 4168 superheat; keel Apr 12/20.

Constellation, hull 215, battlecruiser USN; 850 LBP; 101-8¼ beam; 31 mean draft; 43,500 normal disp; 33¼ speed, est; Westinghouse turbo-elec drive, 180,000 SHP; 16 WT boilers, oil, 198,000 sq ft plus 18,000 superheat; keel Aug18/20.

Ranger, hull 215, battle-cruiser USN; sister to above; keel June23/21.

Iowa, hull 258, battleship USN; 660 LBP; 105 beam; 33 mean draft; 43,200 normal disp; 23 speed; GE turbo-elec drive, 60,000 SHP; 12 White-Forster WT boilers, oil, 82,800 sq ft plus 8940 superheat; keel May17/20.

John D. Archbold, hull 261, tanker Standard Oil NJ; 555 LBP; 75 beam; 30 loaded draft; 10¾ loaded speed; 20,300 DWT; twin screw, TE eng, 3800 IHP; 3 Scotch boilers, 17x12; keel Dec15/20; **launch Aug20/21; deliver Sept24/21.**

Wm. Rockefeller, hull 262, tanker Standard Oil NJ; sister to above; keel Dec15/20; launch Oct/21, est; deliver Nov/21, est.

NEW YORK SHIPBUILDING CORPORATION, CAMDEN, N. J.

Purchasing Agent: L. G. Buckwalter.

Southern Cross, hull 241, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 DWT; geared turbs, 12,000 SHP; 8 WT boilers; keel Aug/18; launch July20/19; **deliver Sept26/21.**

Bay State, hull 251, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 D WT; geared turbs, 12,000 SHP; 8 WT boilers; keel Oct15/19; launch July17/20; deliver winter/21, est.

Peninsula State, hull 252, combination USSB; sister to above; keel July20/20; launch July6/21; deliver spring/22, est.

Lone Star State, hull 255, combination USSB; sister to above; keel May 13/19; launch Oct23/20; deliver fall/21, est.

Hoosier State, hull 256, combination USSB; sister to above; keel May20/19; launch Oct23/20; **deliver Sept/21.**

Empire Arrow, hull 261, bulk oil Standard Trans Co of NY; 468 LBP; 62-6 beam, 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs, 3200 SHP; 3 SE Scotch boilers, 15-2x11-6; keel Sept14/20; launch May 24/21; **deliver Sept/21.**

Levant Arrow, hull 262, bulk oil Standard Trans Co of NY; sister to above; keel Nov4/20; launch July 25/21; deliver fall/21, est.

Munargo, hull 263, combination Munson SS Co; 414 LBP; 57-6 beam; 23 loaded draft; 15½ loaded speed; 4950 DWT; geared turbs, 5800 SHP; 5 SE Scotch boilers, 16-4x12-3; keel Sept30/20; **launch Sept17/21;** deliver winter/21, est.

Eurana, hull 264, bulk oil stock; 419-3 LBP; 56-3 beam; 25-9¼ loaded draft; 10¾ loaded speed; 9870 DWT; 3 cyl TE engs, 3000 SHP; 3 SE Scotch boilers, 15-10x11-4; keel Jan17/21; launch July16/21; deliver winter/21.

No name, hull 265, bulk oil stock; sister to above.

Dixie Arrow, hull 266, bulk oil Standard Trans Co of NY; 468 LBP; 62-6 beam; 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs, 3200 SHP; 3 SE Scotch boilers, 15-3x11-6; keel Aug11/20; **launch Sept29/21;** deliver winter/21, est.

Saratoga, hull 199, battle cruiser USN; 874 LOA; 850 LBP; 105-5¼ extreme beam; 31 mean draft; 43,500 normal disp; 33¼ loaded speed; GE turbo-electric drive; 180,000 SHP; 16 WT boilers, 198,000 sq ft plus 18,000 superheat; keel Sept25/20.

Colorado, hull 200, battleship USN; 624 LOA; 600 LBP; 97-3½ beam waterline; 30-6 mean draft; 32,600 normal disp; 21 loaded speed; Westinghouse turbo-electric drive, 28,900 SHP; 8 B&W WT boilers, 41,678 sq ft plus 4169 superheat; keel Mar29/19; launch Mar22/21.

Washington, hull 201, battleship USN, sister to above; keel June30/19; launch Sept1/21.

Kamoi, hull 267, fuel ship Japanese Navy; 497-8 LOA; 67 beam; 28 designed draft; 15 loaded speed; 13,000 DWT; elec drive, 8000 SHP; 4 B&W boilers; keel Sept14/21.

STANDARD SHIPBLDG. CORP'N, SHOOTERS ISLAND, MARINERS HARBOR, N. Y.

Purchasing Agent: Jamie Cortada.

John Purroy Mitchell, hull 32, fireboat City of New York; 121 LBP; 27 beam; 14-9 deep; 12 loaded speed; comp eng, 900 IHP; 2 B&W WT boilers, oil burning; keel Mar31/21; launch Aug6/21.

STATEN ISLAND SHIPBUILDING COMPANY, STATEN ISLAND, NEW YORK

Purchasing Agent: R. C. Miller.

Dixiano, hull 726, sugar ship Am Sug Ref Co; 360 LBP; 50 beam; 23 loaded draft; 10 loaded speed; 6300 DWT; TE eng, 2000 IHP; 2 Scotch boilers, 15x11; keel Sept9/20; launch May21/21; **deliver July1/21.**

Hell Gate, hull 728, dredge C. R. Browning; 140 LBP; 48 beam; 15 loaded draft; keel Aug28/20; launch Feb23/21.

Hull 736, tugboat Staples Trans Co; 136½ LBP; 27 beam; 16½ loaded draft; 10 loaded speed; 1 TE eng 700 HP; 1 Scotch boiler, 16x11½; keel May16/21; **launch Aug4/21.**

President Roosevelt, hull 737, ferryboat City of New York; 247 LBP; 66 beam; 19½ loaded draft; 15 loaded speed; 1 F&A comp eng, 3500 HP; 4 B&W WT boilers, 13,000 sq ft; keel May23/21; launch Nov5/21, est.; deliver Nov19/21, est.

Northwestern, tanker Am Pet Co; 242 LBP; 42 beam; 23 loaded draft; 10 loaded speed; TE eng; 2 Scotch boilers; lengthening job, additional 56 ft, making 2 new cargo tanks, 1000 DWT additional capacity. Vessel considered total loss by fire; raised; and now undergoing general repairs and at the same time lengthening. **Work completed.**

SUN SHIPBUILDING COMPANY, CHESTER, PENN.

Purchasing Agent: H. W. Scott.

J. N. Pew, hull 39, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs, 4300 IHP; 3 SE Scotch boilers, 15-10x 11-11¼; keel Nov5/20; launch Apr 23/21; **deliver Sept14/21.**

Agwiharve, hull 40, tanker A. G. W. I. S. Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 12 loaded speed; 12,500 DWT; single screw QE engs, 4300 IHP; 4 SE Scotch boilers, 15-10 x11-11¼; keel Nov26/20; launch Apr 2/21; **deliver Aug16/21.**

Agwimex, hull 41, tanker A. G. W. I. S. Co; sister to above; keel Dec8/20; launch Aug 6/21; **deliver Oct 4/21.**

Agwiscot, hull 42, tanker A. G. W. I. S. Co; sister to above; keel Dec23/20.

Agwistates, hull 43, tanker A. G. W. I. S. Co; sister to above; keel Jan3/21.

No name, hull 46, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs, 4300 IHP; 3 SE Scotch boilers, 15x11-11¾; keel not laid.

No name, hull 47, tanker Sun Oil Co; sister to above; keel not laid.

TEXAS STEAMSHIP COMPANY, BATH, MAINE

Purchasing Agent: A. R. Weber.

No name, hull 32, tanker Texas SS Co; 415-10 LBP; 56 beam; 25-7¾ loaded draft; 11½ loaded speed; 9600 DWT; TE engs, 3000 IHP; 3 Scotch boilers, 15-3x11; keel Nov 9/20.

Canadian

DAVIE SHIPBUILDING & REPAIRING COMPANY, LTD., LAUZON LEVIS, P. Q., CANADA

Purchasing Agent: N. W. Van Wyck.

Canadian Challenger, hull 476, single-screw cargo Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 D WT; TE surface cond engs, 3000 I HP; 3 Scotch marine boilers, 15-6x 11-6; keel May14/20; launch July 7/21.

NOVA SCOTIA STEEL & COAL CO., TRENTON, N. S.

Purchasing Agent: A. M. Seely.

Sea King, hull 9, exploring yacht Baron Bliss, Nassau, Bahamas; 137-10 LBP; 28-6 beam; 6 loaded draft; 7 loaded speed; semi-Diesel 440 BHP, twin-screw eng; keel Aug24/20.

Miscellaneous Construction

ALLAN CUNNINGHAM COMPANY, SEATTLE

On order and under construction: 6 steam and electric steering gears; 13 steam and electric anchor windlasses; 18 steam and electric and hydro-electric and hand capstans; 37 steam and electric winches.

M. T. DAVIDSON COMPANY, 154 NASSAU STREET, NEW YORK CITY

Vertical beam, twin-cylinder airpump, 9-18-18x12 and two vertical duplex boiler feed pumps 9-16x10 for New York City fireboat John Purroy Mitchell.

Vertical, twin-screw air-pump, 14-24-24x15, two vertical simplex boiler feed pumps 10-6x12, one horizontal simplex sanitary pump 5½x8 for Philadelphia fireboat Rudolph Blankenburg.

Similar equipment for second Philadelphia fireboat.

JAMES C. H. FERGUSON, SALES AGENT, MONADNOCK BLDG., SAN FRANCISCO

Pneumercator Co: 40 pneumercators for 4 Coast Guard cutters, Union Construction; 2 for West Chopaka, Los Angeles; 60 for 12 submarines USN, Bethlehem.

Rostand Mfg. Co.: air ports and lenses complete 5 Coast Guard cutters.

FORD & GEIRRINE, AGENTS, SAN FRANCISCO

Dean feed pumps, Dean Bros' Steam Pump Works, for 166 at Moore's; Reliance forced draft equipment, Jno Reid & Company, for hull 166 at Moore's; National stockless anchors Upson Walton Co., hull 166, Moore's; Dean feed pumps, Dean Bros' Steam Pump Works, hull 23, Southwestern; Willett Bruce whistle control, McNab Co., hulls 16, 17, 18, 19, Union Construction; McNab direction indicators, McNab Co., hulls 16, 17, 18, 19, Union Construction; Reliance forced draft equipment, John Reid & Co., hull 23, Southwestern; Anchor chain, Lebanon Chain Co., hull 23, Southwestern; windlass, gypsy and steering gear, Hyde Windlass Co., hull 20, Union Construction; Welin davits, American Balsa Co., hulls 5311-2-3, Bethlehem, hull 163, Moore; Willett-Bruce whistle control, McNab Co., hulls 5311-2-3, Bethlehem; McNab direction indicator, hull 35, Los Angeles; Balsa wood for cold storage, American Balsa Co, hulls 5311-2-3, Bethlehem; Mills releasing gear, hull 26, Southwestern; balsa wood cold storage, American Balsa Co, hull 23, Southwestern.

PACIFIC DIESEL ENGINE COMPANY, OAKLAND

(Formerly Skandia Pacific Oil Engine Company)

Purchasing Agent: A. Bolander.

Ten 850 BHP Werkspoor Diesel engs building for USSB; 6 cyl, 135 RPM; 8 delivered.

One 150 BHP Werkspoor Diesel marine engine.

One 100 BHP Skandia marine eng.

Several small Skandia engs from 9 to 36 BHP.

One 140 BHP Skandia marine engine.

STEWARD DAVIT & EQUIPMENT CORP., NEW YORK, SAN FRANCISCO, SEATTLE

Steward davits are being installed in the following: At Union Const Co: Coast Guard cutters, hulls 17, 18, 19; Canadian Pacific lines, Wallace yard, Vancouver.

Drydocking and Repairs

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Miscellaneous repairs, drydocking, painting: Annette Rolph, Wyadda (also new propeller), E. Antoni, T. C. Condare, Alvarado, Broad Arrow (also new tailshaft), Empire State, Baja California, China Arrow, La Hermite, Multnomah, Johanna Smith, Benj. Brewster (also boiler repairs). Engine, boiler, hull repairs, drydocking, painting: Ecuador, San Juan, Simaloer. Miscellaneous repairs: Wolverine State, Los Angeles, Walter Luckenbach, Sonoma, Kina, Semiramis, Romulus, Andrea Luckenbach, Willpolo, Walter Luckenbach, Natal, Lyman Stewart, Hattie Luckenbach, F. J. Luckenbach, Johan Poulsen. Electric welding on boilers: Frederick Luckenbach. Repairs to cargo pump: Olinda. Engine, boiler, hull repairs: Marama. Parts for main engine: Montebello. Remetaling bedplate bearings: San Juan. Repairs to main steam pipe: Northland. Repairs to circulating pump: Columbia. Two new propellers: Johanna Smith. Repairs to air compressor: Valparaiso.

Alameda Works

Miscellaneous repairs, drydocking, painting: John M. Mullin, P. C. Dredging Co. Dredge No. 5.

LOS ANGELES SHIPBUILDING & DRYDOCK COMPANY, SAN PEDRO

Cleaning and painting: Destroyers Renshaw, O'Bannon, Howard, Hogan, Wood, Stansbury; Tug San Pedro, Army tug Lt. G. M. Harris; North Bend, Oil barge No. 24, West Prospect, Submarines R-1, R-2, H-4, H-9; West O'Rowa (also reconditioning). Cleaning, painting, propeller, rudder, and extensive machinery repairs: San Joaquin. Boiler repairs: Andrea Luckenbach. Minor repairs: Harry Luckenbach, Cape Romain, Stockton, Edward Luckenbach. General overhauling: Pow Wow. Docks caulked: Pacific.

MOORE SHIPBUILDING COMPANY, OAKLAND

Engine and hull repairs: Creole State, Gleaner, Golden Gate, China, Buford, La Placentia. Hull repairs: Speedway, Berkeley, West Nomentum (also new stern frame), La Merced, Claremont. Engine repairs: Celestial, Lydonia, Woron, Maui, Santa Barbara, Manulani, Manukai. Drydocking, cleaning, painting: Hawarden, San Pablo, Sonoma. Drydocking, cleaning, painting, miscellaneous hull repairs: Christopher Columbus, Annie Johnson, Comanche, King No. 2. New strap for connecting rod: Sausalito. Drydocking, cleaning, painting, engine repairs: Columbia (also hull), Matsonia.

NAVY YARD, PUGET SOUND

Drydocking, miscellaneous repairs: Sinclair, Swallow, Doyen, Henshaw, McCawley, Meyer, Moody, Mahopac. Drydocking, cleaning and painting bottom, miscellaneous repairs: Tatnuck. Minor repairs: Great Northern, Wenatchee (also docking). Miscellaneous repairs: Laub, McLanahan, Greene, Ballard, Shubrick, William Jones, John Francis Burns, Saturn, Neptune. Repairs to cable machinery: Burnside. Miscellaneous repairs incident to operation as district craft: Eagle No. 57, Pawtucket, Sotoyomo, Iroquois, Oregon, Seattle, Missoula, Charlotte, S.C. 310.

PORT ARTHUR SHIPBUILDING CO., LTD., PORT ARTHUR, ONTARIO, CANADA

Repairs to bottom damage, cabin, etc.: Francis Widlar.

TODD DRY DOCKS, INC., SEATTLE

Cleaning and painting: Washington Tug & Barge Co. barges 11, 15, 19, 38; Tug Dan'l Kern, Waialeale, Puget, Eastern Glen (also miscellaneous repairs), Pioneer, Contra Costa. Remodeled for ferry steamer: Whatcom. Miscellaneous repairs: Yachts Hoqua, Sanwan, Hopestill; Redondo, Apus, West Ivan. Voyage repairs: Protesilaus, Ixion. Overhauling fan motor: Lewis Luckenbach. General betterments: Silver State, Wenatchee (also alterations). New cast iron propeller: Calista.

Insurance Notes

After a great deal of speculation had been aroused as to the cause of the flooding of the C. G. M. M. freighter Canadian Importer, which was a helpless derelict a few weeks ago, workmen at Vancouver discovered a crack 2½ feet long in a bathroom pipe passing through No. 2 hold. The pipe passed through the hull at the waterline and the crack in the pipe was just inside the hull. This might account for the vessel leaking. Her hull and valves were reported to be in perfect condition.

* * *

The schooner Columbia River, owned by the Fife Shipping Company, has been lost on Sunday Island, South Pacific. She was insured for $45,000, most of the risk being carried in San Francisco.

* * *

Willcox, Peck & Hughes have opened an office in the Railway Exchange building, Portland, Oregon, in charge of Frank C. Wynne.

* * *

Federal Judge Jeremiah Neterer, Seattle, has awarded Ray Small, master of the tug Aleut, and his crew salvage of $1200 for towing the Shipping Board steamship West Ison from the burning West Waterway Dock, Seattle, in July. Attorneys for the Shipping Board asserted that although the tug had been called to tow the West Ison, the steamer could have moved under her own power. The original claim was for $50,000, but was reduced to $15,000.

* * *

Young Brothers, tugboat owners of Honolulu, have installed fire engines on one of their vessels under an agreement with the harbor commissioners. The engines are 108-horsepower Seagraves attached to 1100-gallon, four-stage Seagraves pumps. Chemical apparatus also will be carried. Honolulu has had no fireboat protection heretofore.

With the Exporters and Importers

Pacific Rate Changes

Pacific Coast rates are showing a tendency to increase, although in some cases there is little more than a tendency and such actual raises as have been made are offset to some degree by reductions. The California Westbound Conference has made some increases and appears to be on the verge of making others; but rates have been faling so long that operators are almost at a loss when raises are discussed. In view of the actual shortage of cargo space, which is traceable to withdrawals of Shipping Board tonnage, freights easily might stiffen without any detriment to business.

Effective September 29 the conference made the following changes: spelter, reduced from $10 to $8, weight; wheat and flour to China and the Philippines, increased from $6 to $7, weight; overland leather, increased from $20 for sole, weight, and $18 for scrap, weight, to $14, weight or measurement, or substantially increases of from $2 to $4 because of the measurement plan; local leather, from $16, weight or measurement, to $16, measurement, new N. O. S.; rice and rice bran, from $6 to $7, weight.

Steel at $6.50

Steel remains a bugbear. In late September the North Atlantic-Far East lines were quoting $10 and some were accepting $8. Reliable information is to the effect that one steamship line offered to accept a shipment of 1000 tons from Washington, Pennsylvania, to the Far East at a rate of $9 a long ton. Inasmuch as the New York railroad rate of $2.90 or the Baltimore and Philadelphia rate of $2.50, in addition to other costs, would have to be deducted, the actual water rate offered on this particular consignment was $6.50 or less. Such a rate knocks into a cocked hat any immediate plans for restoring any movement of steel by the Pacific Coast, although the railroads are working on a plan that may be of some avail when the present North Atlantic demoralization has passed. That the end of the worst is in sight is indicated by the statement of a competent authority to the effect that bookings are increasing materially and that he expected the "space-filling" rates to stiffen greatly within 60 or 90 days from October 1, when shipments would be much larger.

Trans-Pacific Lumber

Trans-Pacific lumber remains in a curious position. On September 15 the Shipping Board operators made a rate of $15, but it was on paper only and resulted in no shipments being booked. In late September foreign lines raised the tariff to $17.50, and the board followed their lead; the Japanese then cut to $16. At the middle of October the San Francisco rate was $15, but no business was being accepted at less than $17.50; and the Columbia River was firm at $16. No business was being booked by Shipping Board vessels beyond January 1, and, inasmuch as most of them were filled with old contracts, new bookings of consequence could not be made. All in all, however, there has been a marked stiffening of lumber rates.

In the Far East the Trans-Pacific Freight Tariff Bureau of Japan has affirmed its intention of abiding by conference rates, regardless of cutting by outside lines, even though direct competition exists. The Japanese organization may be able to maintain that attitude, but it is well to recall that rate-cutting by nonconference lines usually forces the conference to reduce its tariffs. The China Mail advised the bureau that it intended to quit the conference after October 1.

Rates in Two Currencies

The Pacific Coast - Australasian Freight Tariff Bureau has succeeded in doing what many others have talked of doing. It has quoted lumber rates in both Canadian and United States currencies, thus avoiding the troubles attendant upon the difference in exchange, which has led to quite a bit of indirect rate-cutting through the acceptance of depreciated Canadian currency and also has given Canada an advantage over the United States in lumber-exporting. The new rates are reductions from the first published tariffs, but they do straighten up a tangled situation and in a real sense are increases. The changes follow: British Columbia to Sydney, Melbourne and Adelaide, $18, Canadian funds, the old rates being $22 Adelaide, $21 Melbourne, $20 Sydney, United States gold; British Columbia to New Zealand, $20, Canadian currency, as against the former rate of $20, U. S. G.; United States Pacific Coast to Sydney, Melbourne and Adelaide, $16.50, U. S. G., as against $20, $21 and $22, U. S. G., to those ports in order; United States Pacific Coast to New Zealand, $18, U. S. G., as against an old rate of $20. Redwood lumber from lumber ports has been set at $20, New Zealand, and $18, Australia; and from San Francisco at $18 and $16.50.

Other weight or measurement rates given in Supplement No. 1, Tariff No. 1, are: automobiles, not exceeding 5000 pounds, $20; dried codfish, $16; tires, $20; tree wash, $15; overland automobiles and motorcycles, $12; gasoline, distillate and kerosene in cases, 35 cents to Auckland, Wellington, Lyttleton, Dunedin, Melbourne and Sydney; other ports, 45 cents; lubricating oil, cut from $10 to $8 to Auckland, Wellington, Melbourne and Sydney, and from $12 to $10 to other ports. A movement of about 1000 tons of lubricating oil a month is expected to result from the reductions.

Williams, Dimond & Company, American-Hawaiian agents, announced a new rate on canned goods in strapped cases, Pacific Coast to United Kingdom, of 90 cents, effective October 10.

Intercoastal Lumber Charters

The North Atlantic-Pacific Coast Westbound Conference, acting in this instance for its sister organization, the Pacific Coast - North Atlantic Eastbound Conference, has adopted lumber rates and conditions to govern the movement of full cargoes and parcel lots from the Pacific to the Atlantic in the United States coastwise trade. Action was taken by the Eastern body because the Western had declined to draft a charter party at the behest of the Shipping Board, which thereupon appealed to the Atlantic conference.

Draft of Charter Form

Lumber rates and conditions as adopted at a special meeting of the North Atlantic-Pacific Coast Westbound Conference October 3 follow:

FULL CARGOES:

Rates $17 per M, board feet (net measurements to govern).

Loading 400,000 feet, board measure, per day.

Discharging 350,000 feet, board measure, per day.

Demurrage 15 cents per net registered ton.

No dispatch.

No brokerage.

No absorption of insurance on deck loads.

Free time—vessel to give charterers 24 hours' notice prior to the time vessel will be ready to load.

Lay days to start when vessel begins loading or at the expiration of 24 hours' notice.

If stevedoring is performed by the charterers they are to be allowed not to exceed $2 per 1000 feet board measure for loading and not to exceed $1.50 per 1000 board feet for discharging.

The Pacific Coast lumber scale shall be used in computing board measure of lath and shingles for the purpose of arriving at stevedoring allowance.

Loading districts on the Pacific Coast to be considered as follows: District No. 1, Puget Sound; District No. 2, Vancouver, B. C., district including Frazier River; District No. 3, Grays Harbor and Willapa Harbor; District No. 4, Columbia and Willamette rivers.

Charterers to be allowed to load at not to exceed two districts and not to exceed five lumber docks in two loading districts.

Charterers to be allowed one port of discharge on the Atlantic Coast, but two discharging berths at the port, if desired; the maximum of 1,000,000 feet to be discharged at either berth.

Time consumed in shifting steamer from one loading district to another or from one loading mill to another loading mill to be considered as charterers' lay days. Same conditions discharging.

If demurrage is incurred at loading ports same may be cancelled to the extent of time gained at discharging port over the charter requirements of 350,000 feet per day.

No wharfage allowed at shippers' or consignees' dock.

PARCEL LOTS (any amount that is not full cargo):

Rate $18 per 1000 board feet (net measurements to govern).

Shipper shall deliver to ship's tackle as fast as steamer can load. Shipper shall take delivery from ship's tackle as fast as steamer can discharge.

Steamer will not shift to load less than 500,000 feet unless shipper is to ship over 1,000,000 feet from same district on said steamer.

Steamer will not shift to discharge less than 750,000 feet.

If stevedoring is performed by the charterers they are to be allowed not to exceed $2 per 1000 feet board measure for loading and not to exceed $1.50 per 1000 board feet for discharging.

The Pacific Coast lumber scale shall be used in computing board measure of lath and shingles for the purpose of arriving at stevedoring allowance.

No absorption of insurance on deck loads.

No wharfage allowed at shippers' or consignees' dock.

No other allowances.

It is assumed that a charter party embodying these terms and conditions will be drafted soon.

This charter party is the outgrowth of a desire of the Shipping Board to have a basis of chartering steamships operated by the North Atlantic & Western, which at different times had had some of its intercoastal vessels available for full lumber cargoes. At first the board requested the Pacific Coast-North Atlantic Eastbound Conference to draft a form, but objection was made by a conference member on the ground that the body had no right to involve itself in full-cargo business, and the question was passed to the board. Thereupon the Eastern organization was requested to act.

The Hague Rules

The great result achieved by The Hague conference of the International Law Association, says the London Times, is the approval of an international code defining the risks to be assumed by sea carriers under a bill of lading, to be known as The Hague Rules, 1921. This code had its origin in a certain dissatisfaction expressed in various commercial circles respecting the contracting by shipowners out of liability on bills of lading for losses of, or damage to, goods carried arising from negligence. The code was originally drawn up by a sub-committee of the Maritime Law Committee, on which merchants were strongly represented. Officially, the shipowners took no active part in it, although, at the request of the merchants, an eminent lawyer associated with shipping interests assisted in an advisory capacity. But the code gave effect to the views of the merchants, bankers and underwriters, and the shipowners reserved the right to criticise its provisions when drafted.

£100 Liability a Package

This examination has now taken place, and all the various interests have agreed with the terms of the code as finally drawn. The shipowners, there is reason to believe, were in favor of a proposal, submitted at the conference by a leading French owner, which would have limited their liability, in the event of loss of packages, to sums equivalent to many times the freight paid. This seemed to them a fair and reasonable proposal, but because it came from a shipowner it was, apparently, held suspect by the representatives of other interests. In the end, agreement was reached on limiting the liability to £100 per package. This gives effect to the principle, which is understood to have been endorsed by the chairman, that what is needed is not the transference of all liabilities from the merchants to the shipowners, but the transference of such liability as shall insure the taking of every precaution by the shipowners in the carriage of the goods. The liability now willingly assumed by the shipowners would seem such as fully to insure this object.

One of the recommendations approved at the conference is that the new rules should be incorporated in bills of lading as from January next. With all interests agreed, there seems, indeed, nothing to prevent their being employed then, or even earlier.

Text of the Rules

The rules, it should be emphasized, are merely recommendations, and a campaign now must be carried on to persuade shipowners generally to adopt them. The full text follows:

HAGUE RULES, 1921

Defining the Risks to Be Assumed by Sea Carriers Under a Bill of Lading

ARTICLE I—Definitions

In these Rules: (a)—"Carrier" includes the owner or the charterer, who enters into a contract of carriage with a shipper. (b)—"Contract of carriage" means a bill of lading or any similar document of title in so far as such document relates to the carriage of goods by sea. (c)—"Goods" includes goods, wares, merchandise, and articles of every kind whatsoever except live animals and cargo carried on deck. (d)—"Ship" includes any vessel used for the carriage of goods by sea. (e)—"Carriage of goods" covers the period from the time when the goods are received on the ship's tackle to the time when they are unloaded from the ship's tackle.

ARTICLE II—Risks

Subject to the provisions of Article V, under every contract of carriage of goods by sea the carrier, in regard to the handling, loading, stowage, carriage, custody, care and unloading of such goods, shall be subject to the responsibilities and liabilities, and entitled to the rights and immunities, hereinafter set forth.

ARTICLE III—Responsibilities and Liabilities

1. The carrier shall be bound before and at the beginning of the voyage to exercise due diligence to, (a)—make the ship seaworthy. (b)—Properly man, equip and supply the ship. (c)—Make the holds, refrigerating and cool chambers, and all other parts of the ship in which goods are carried, fit and safe for their reception, carriage, and preservation.

2. The carrier shall be bound to provide for the proper and careful handling, loading, stowage, carriage, custody, care, and unloading of the goods carried.

3. After receiving the goods into his charge the carrier, or the master or agent of the carrier, shall on the demand of the shipper issue a bill of lading showing, amongst other things: (a)—The leading marks necessary for identification of the goods as the same are furnished in writing by the shipper before the loading starts, provided such marks are stamped or otherwise shown clearly upon the goods if uncovered, or on the cases or coverings in which such goods are contained, in such a manner as will remain legible until the end of the voyage. (b)—The number of packages of pieces, or the quantity, or weight, as the case may be, as furnished in writing by the shipper before the loading starts. (c)—The apparent order and condition of the goods.

Provided, that no carrier, master or agent of the carrier shall be bound to issue a bill of lading showing description, marks, number, quantity, or weight which he has reasonable ground for suspecting do not accurately represent the goods actually received.

4. Such a bill of lading issued in respect of goods, other than goods carried in bulk, and whole cargoes of timber, shall be prima facie evidence of the receipt by the carrier of the goods as therein described in accordance with sections 3 (a), (b) and (c).

Upon any claim against the carrier in the case of goods carried in bulk or whole cargoes of timber the claimant shall be bound, notwithstanding the bill of lading, to prove the number, quantity, or weight actually delivered to the carrier.

5. The shipper shall be deemed to have guaranteed to the carrier the accuracy of the description, marks, number, quantity and weight, as furnished by him, and the shipper shall indemnify the carrier against all loss, damage and expenses arising or resulting from inaccuracies in such particulars.

6. Unless written notice of a claim for loss or damage and the general nature of such claim be given in writing to the carrier or his agent at the port of discharge before the removal of the goods, such removal shall be prima facie evidence of the delivery by the carrier of the goods as described in the bill of lading, and in any event the carrier and the ship shall be discharged from all liability in respect of loss or damage unless suit is brought within twelve months after the delivery of the goods.

7. After the goods are loaded the bill of lading to be issued by the carrier, master or agent of the carrier to the shipper shall, if the shipper so demands, be a "shipped" bill of lading, provided that no "received for shipment" bill of lading or other document of title shall have been previously issued in respect of the goods.

In exchange for and upon surrender of a "received for shipment" bill of lading the shipper shall be entitled when the goods have been loaded to receive a"shipped" bill of lading.

A "received for shipment" bill of lading which has subsequently been noted by the carrier, master or agent with the name or names of the ship or ships upon which the goods have been shipped and the date or dates. of shipment, shall for the purpose of these rules be deemed to constitute a "shipped" bill of lading.

8. Any clause, covenant or agreement in a contract of carriage relieving the carrier or the ship from liability for loss or damage to or in connection with goods arising from negligence, fault or failure in the duties and obligations provided in this article or lessening such liability otherwise than as provided in these rules, shall be null and void, and of no effect.

ARTICLE IV—Rights and Immunities

1. Neither the carrier nor the ship shall be liable for loss or damage arising or resulting from unseaworthiness unless caused by want of due diligence on the part of the carrier to make the ship seaworthy, and to secure that the ship is properly manned, equipped and supplied.

2. Neither the carrier nor the ship shall be responsible for loss or damage arising or resulting from: (a)—Act, neglect, or default of the master, mariner, pilot, or the servants of the carrier in the navigation or in the management of the ship. (b)—Fire. (c)—Perils, dangers and accidents of the sea or other navigable waters. (d)—Act of God. (e)—Act of war. (f)—Act of public enemies. (g)—Arrest or restraint of princes, rulers or people, or seizure under legal process. (h)—Quarantine restrictions. (i)—Act or omission of the shipper or owner of the goods, his agent or representative. (j)—Strikes or lockouts or stoppage or restraint of labor from whatever cause, whether partial or general. (k)—Riots and civil commotions. (l)—Saving or attempting to save life or property at sea. (m)—Inherent defect, quality or vice of the goods. (n)—Insufficiency of packing. (o)—Insufficiency or inadequacy of marks. (p)—Latent defects not discoverable by due diligence. (q)—Any other cause arising without the actual fault or privity of the carrier, or without the fault or neglect of the agents, servants or employes of the carrier.

3. Any deviation in saving or attempting to save life or property at sea, or any deviation authorized by the contract of carriage shall not be deemed to be an infringement or breach of these rules or of the contract of carriage, and the carrier shall not be liable for any loss or damage resulting therefrom.

4. Neither the carrier nor the ship shall be responsible in any event for loss or damage to or in connection with goods in an amount beyond £100 per package or unit, or the equivalent of that sum in other currencies unless the nature and value of such goods have been declared by the shipper before the goods are shipped and have been inserted in the bill of lading.

By agreement between the carrier, master or agent of the carrier and the shipper another maximum amount than mentioned in this paragraph may be fixed, provided that such maximum shall not be less than the figures above named.

The declaration by the shipper as to the nature and value of any goods declared shall be prima facie evidence, but shall not be binding or conclusive on the carrier.

5. Neither the carrier nor the ship shall be responsible in any event for loss or damage to or in connection with goods if the nature or value thereof has been wilfully misstated by the shipper.

6. Goods of an inflammable or explosive nature, or of a dangerous nature, unless the nature and character thereof have been declared in writing by the shipper to the carrier before shipment and the carrier, master or agent of the carrier has consented to their shipment, may at any time before delivery be destroyed or rendered innocuous by the carrier without compensation to the shipper, and the shipper of such goods shall be liable for all damages and expenses directly or indirectly arising out of or resulting from such shipment. If any such goods shipped with such consent shall become a danger to the ship or cargo they may in like manner be destroyed or rendered innocuous by the carrier without compensation to the shipper.

7. A carrier shall be at liberty to surrender in whole or in part all or any of his rights and immunities under this article, provided such surrender shall be embodied in the bill of lading issued to the shipper.

ARTICLE V—Special Conditions

Notwithstanding the provisions of the preceding articles, a carrier, master or agent of the carrier and a shipper shall in regard to any particular goods be at liberty to enter into any agreement in any terms as to the responsibility and liability of the carrier for such goods, and as to the rights and immunities of the carrier in respect of such goods, or his obligation as to seaworthiness, or the care or diligence of his servants or agent in regard to the handling, loading, stowing, custody, care and unloading of the goods carried by sea, provided that in this case no bill of lading shall be issued and that the terms agreed shall be embodied in a receipt which shall be a non-negotiable document and shall be marked as such.

Any agreement so entered into shall have full effect.

ARTICLE VI—Limitations on the Application of the Rules

Nothing herein contained shall prevent a carrier or a shipper from entering into any agreement, stipulation, condition, reservation or exemption as to the responsibility and liability of the carrier or the ship for the loss or damage to or in connection with the custody and care and handling of goods prior to the loading on and subsequent to the unloading from the ship on which the goods are carried by sea.

ARTICLE VII—Limitation of Liability

The provisions of these rules shall not affect the rights and obligations of the carrier under the convention relating to the limitation of the liability of owners of seagoing vessels.

The Cotton Reduction

In acceding to the request of the Galveston Commercial Association and the International Great Northern Railroad for a suspension of a proposed export rate on cotton from Texas and Oklahoma to the Pacific Coast, the Interstate Commerce Commission apparently has set a precedent. The consequences of this action, direct and indirect, may be of the greatest importance, said J. D. Mansfield, traffic commissioner of the transportation bureau of the Seattle Chamber of Commerce. He is quoted as follows in the Seattle Times:

This cotton rate case seems to be the first on record where the Interstate Commerce Commission has interfered to prevent a voluntary reduction in an import or export rate by a railroad. Until the transportation act of 1920 was passed the authority of the Interstate Commerce Commission was clearly limited to the fixing of maximum rates, and for that reason the commission never asserted jurisdiction over export and import rates, lower than the domestic rates and established by the carriers for the purpose of fostering foreign trade.

Jurisdiction Over Minimum Rates

We have not yet made a close examination of the provisions of the new transportation act, but it seems that a danger to the export and import rate system may lie in the fact that the new law makes it the duty of the commission to require the carriers to earn a stated return on the investment. This gives the commission jurisdiction over minimum rates as well as maximum.

The peril in the cotton rate ruling, if it stands, is that hereafter when railroads attempt to make an import or export rate reduction to establish or re-establish a rate parity, shippers having a selfish interest in favoring some particular port, or some particular steamship line, will demand a suspension and demand that the railroads prove to the commission that the proposed new rate is a compensatory rate that will not impair railroad revenue.

Bickering Without End

This would give rise to bickering and litigation without end, for each proposed export or import rate reduction might be subjected to a separate attack, making it nearly impossible for the railroads to place the various seaports on an equal basis to compete for overseas business.

Volume of Business

This case, therefore, in view of the questions involved, assumes an importance beyond the immediate volume of trade for which Galveston is fighting. But the cargo movement alone, if there were no other issue, is sufficient to arouse the Pacific to combat the Gulf. The following table shows the Southwestern-Oriental cotton movement in bales in August and September, 1921 and 1920:

	Aug. 1, 1921, to Sept. 30, 1921	Aug. 1, 1920, to Sept. 30, 1920
Total China and Japan	222,071	2026
Receipts Pacific Coast ports	42,848	407
Total exports, San Francisco	8,980	404
Total exports, other Pacific Coast ports	33,868	3
Remainder, Atlantic and Gulf	179,223	1619

Figures for 1920 are not typographical errors. They tell, briefly and strongly, how great was the depression of last year. Some of the statistics were obtained by elimination and may differ slightly from those that might be obtained directly. During the six months, January to June, 1921, the following cotton movement was recorded: to the Orient via Panama, 174,041 bales; via San Francisco, 65,333; via Seattle, 86,410.

Some Recent History

Prior to the railroad rate increases of August, 1920, the Gulf and Pacific were on a parity with an aggregate cotton rate of $1.70 to the Far East, the railroad differential being 40 cents in favor of the Gulf. Shippers recently sought a reduction of the export rate to the Pacific Coast from $1.50 to $1.25; but the railroads declined to grant $1.25 because, in view of the 95-cent Gulf rate, the old 40-cent rail differential would have been destroyed, with the probable result that the Gulf railroads would have made a 10-cent reduction, leaving the relative status of the two coasts unchanged. A reduction of 15 cents, however, or a restoration of the 40-cent rail differential, was granted. It is against this proposed rate of $1.35 that Galveston is protesting to the Interstate Commerce Commission.

Protest of Seattle

The following telegram of the Seattle Port Commission to the Interstate Commerce Commission summarizes the contention of that port:

Concerning the suspension of the $1.35 export rate on cotton via Pacific Coast ports, the Port of Seattle Commission desires to protest formally against the suspension. Besides forcing the movement of cotton through Gulf ports, causing congestion, shippers are handicapped, as they are compelled to assemble and forward shipments from interior points twenty days earlier. The long route through the Gulf ports and the Panama Canal results in loss of interest and increased insurance. Shippers stand to suffer tremendous financial loss as a result of the rate suspension. On account of discrimination against Pacific ports in favor of Gulf ports, we respectfully urge your commission to reconsider and permit immediate reinstatement of the $1.35 rate.

Page Freight Report

San Francisco, October 17, 1921.

Our last report was dated September 15. A fair amount of business has been done in grain freights to U. K. from Portland and Puget Sound. The Northern Grain and Warehouse Company chartered the steamer Begona No. 1 from Portland to U. K. on private terms, also Norwich City at 55/ for one port, 56/3 for two ports of discharge. The Portland Flouring Mills chartered steamers Polyktor at 57/6, and Erviken at 56/3, also steamer Katherine Parke reported chartered by M. H. Houser on private terms. Balfour, Guthrie & Company chartered the steamer Anglo Chilean at 55/ and the Ootmarsum at 57/6, and later the Japanese steamer China Maru at 55/, with the option of sending her to Karachi with wheat at 50/. The Gray-Rosenbaum Grain Company chartered the steamer Pilar

United States imports and exports in long tons, year ended June 30, 1921.

	Imports.	Percentage.	Exports.	Percentage.	Total imports and exports.	Percentage.
United States:						
Shipping Board....	8,220,496	22	11,451,146	19	19,671,642	20
Privately owned....	18,570,869	50	11,640,105	20	30,210,974	32
Total............	26,791,363	72	23,091,251	39	49,882,616	52
Foreign............	10,088,167	28	36,113,799	61	46,201,966	48
Grand total.......	36,879,532	100	59,205,050	100	96,084,582	100

Exports of United States ports, in long tons, year ended June 30, 1921.

Port.	Total trade.	Exports.	Percentage carried by— Foreign ships.	United States independent.	United States Shipping Board.
	Tons.	*Tons.*			
New York..................	21,140,122	11,542,143	58	22	20
New Orleans...............	9,083,851	5,481,993	65	12	23
Baltimore.................	8,866,212	5,946,733	65	9	26
Norfolk...................	8,024,271	7,805,622	63	20	17
Philadelphia..............	7,603,345	4,461,577	65	13	22
Galveston.................	5,759,446	3,501,416	76	4	20
Newport News..............	4,481,089	4,428,836	46	45	9
Port Arthur...............	3,775,333	1,564,052	80	13	7
Boston....................	3,061,071	711,708	64	9	27
San Francisco.............	2,993,144	1,626,803	37	46	17
Baton Rogue...............	1,553,901	535,472	39	53	8
Seattle...................	1,213,433	720,284	48	22	30

Imports of United States ports, in long tons, year ended June 30, 1921.

Port.	Total trade.	Imports.	Percentage carried by— Foreign ships.	United States independent.	United States Shipping Board.
	Tons.	*Tons.*			
New York..................	21,140,122	9,597,979	35	35	30
New Orleans...............	9,053,851	3,601,858	31	49	20
Baltimore.................	8,866,212	2,919,479	31	43	26
Norfolk...................	8,024,271	218,649	44	35	21
Philadelphia..............	7,606,345	3,144,768	27	42	31
Galveston.................	5,759,446	2,258,030	5	87	8
Newport News..............	4,484,089	57,253	77	14	9
Port Arthur...............	3,775,333	2,211,281	10	83	7
Boston....................	3,061,071	2,349,363	39	31	30
San Francisco.............	2,993,144	1,366,311	30	47	23
Baton Rouge...............	1,553,901	1,018,429	18	64	18
Seattle...................	1,213,133	493,110	42	46	12

Exports of United States ports, in long tons, year ended June 30, 1921.

Rank by total trade.	Port.	Total trade.	Exports.	Percentage carried by— Foreign ships.	United States independent.	United States Shipping Board.
13	Los Angeles, Calif......	1,016,476	739,284	22	42	36
14	Portland, Oreg.........	992,883	950,405	41	10	49
15	Savannah, Ga..........	986,491	578,347	61	8	31
16	Sabine, Tex............	946,315	795,968	75	24	1
17	Charleston, S. C........	943,802	550,712	51	26	23
18	Portland, Me...........	881,471	560,722	80	2	18
19	Mobile, Ala............	820,316	577,531	24	31	42
20	Perth Amboy, N. J.....	758,368	91,854	46	45	9
21	Jacksonville, Fla.......	608,883	335,134	35	12	53
22	Tampa, Fla............	601,782	287,102	85	4	11
23	Key West, Fla.........	551,308	345,443	0	100	0
24	Chester, Pa............	456,859	265,397	66	24	10
25	Pensacola, Fla..........	439,741	330,211	57	18	25
26	Houston, Tex..........	374,164	215,543	58	8	34
27	San Luis, Calif..........	343,280	343,280	6	86	8
28	Fall River, Mass........	325,539	....	....	....	....
29	Tacoma, Wash.........	303,386	174,398	47	8	45
30	Brunswick, Ga..........	241,970	159,067	61	7	29
31	Newark, N. J..........	235,463	42,286	5	85	10
32	Freeport, Tex..........	215,727	14,731	13	87	0
33	Wilmington, N. C.......	173,855	53,534	95	0	5
34	Wilmington, Del.......	155,867	....	....	....	....
35	Aransas Pass, Tex......	153,931	398	0	100	0
36	Gulfport, Miss..........	153,431	137,142	55	37	8

Imports of United States ports, in long tons, year ended June 30, 1921.

Rank by total trade.	Port.	Total trade.	Imports.	Percentage carried by— Foreign ships.	United States, independent.	United States Shipping Board.
13	Los Angeles, Calif......	1,046,476	307,192	26	49	25
14	Portland, Oreg.........	992,883	42,478	12	17	71
15	Savannah, Ga..........	986,491	408,144	35	28	37
16	Sabine, Tex............	946,315	150,347	15	87	0
17	Charleston, S. C........	943,802	393,090	26	25	49
18	Portland, Me...........	881,471	330,752	31	36	33
19	Mobile, Ala............	820,316	242,782	32	39	29
20	Perth Amboy, N. J.....	758,368	663,514	19	54	27
21	Jacksonville, Fla.......	608,883	273,749	4	87	9
22	Tampa, Fla............	601,752	314,680	4	95	1
23	Key West, Fla.........	551,308	205,865	8	90	2
24	Chester, Pa............	456,859	191,462	1	96	3
25	Pensacola, Fla..........	439,741	109,533	22	60	18
26	Houston, Tex..........	374,164	158,621	4	95	1
27	San Luis, Calif..........	343,280	....	....	....	....
28	Fall River, Mass........	325,539	325,539	7	25	68
20	Tacoma, Wash.........	303,386	128,988	65	35	....
30	Brunswick, Ga..........	241,970	82,903	83	5	91
31	Newark, N. J..........	235,463	193,177	29	40	31
32	Freeport, Tex..........	215,727	200,993	0	100	0
33	Wilmington, N. C.......	173,855	120,321	34	17	49
34	Wilmington, Del.......	155,867	155,867	28	60	12
35	Aransas Pass, Tex......	153,931	153,533	0	100	0
36	Gulfport, Miss..........	153,434	16,292	29	71	0

On the left appear the Department of Commerce's report on United States imports and exports for the fiscal year ending June 30, 1921. The first twelve ports in volume of trade are shown in order. On the right are the next twenty-four ports. The department explains the relatively high percentage of imports carried by American vessels, 72 as against 39 for exports, to large shipments of oil brought in by domestic companies. Norfolk and Newport News rank high in aggregate commerce because of coal exports and Port Arthur because of oil shipments. Most of Galveston's imports was oil.

de Larrinaga at 56/3 for a cargo of wheat in bulk, and the same firm chartered the American steamers Hanley and Abercos at a reported rate of 60/, though we have heard since that the rate was really nearer 56/3. It will be remembered that these two steamers were chartered by the Admiral Line from the United States Shipping Board at 50 cents per ton per month on the deadweight, bareboat form of charter. The Norwegian steamer Strinda was reported chartered last week at 50/, from Portland to U. K., but apparently the charter fell through. P. N. Gray & Company of New York are said to have chartered the Norwegian steamer Torrey to Calcutta and Bombay at 52/6, or one port at 50/, with the option of Shanghai at 35/ per ton free discharge. From San Francisco only one charter is reported, namely, the Vic. de Larrinaga, to U. K. or Continent by John Westrope & Company. Previous to this, though not reported, Strauss & Company chartered the Ravenrock at 61/3, also the Spanish steamer Arno Mendi at 57/6 — all three steamers for barley.

The lumber business has continued quiet, as the buying demand from foreign countries is not very good, with the exception of lumber cargoes to Japan from the North. Robert Dollar & Company are reported to have chartered four Japanese steamers at about $14 per thousand. H. R. MacMillan & Company chartered one of the Canadian government steamers some time back at $14 Canadian per thousand for ties to Taku Bar, and they have since chartered the British steamer City of Victoria in the same direction for a full cargo of ties at $16 per thousand, Canadian currency. The same firm have chartered the barkentine S. F. Tolmie at $15 Canadian for lumber to Japan, and the Pacific Export Lumber Company are reported to have chartered the Japanese steamer Yoman Maru for Japanese squares on private terms, and the American schooner Levi Ostrander for logs from Coos Bay to Japan at a lump sum said to be $26,000. Dant & Russell, Inc., are said to have chartered the steamer Clyde Maru on private terms, also for logs from Portland to Japan. The steamers West Catanace, A. L. Kent and Felix Taussig have all been chartered in New York for lumber from the Pacific Coast to a port north of Hatteras, and the rates reported are $16 for the first and $15 for the last two. The schooner Fearless was chartered by A. F. Thane & Company for lumber to Callao at $18. No charters have been reported for lumber to Australia. The regular lines are taking lumber at prices which sailing ship owners declare they cannot afford to accept.

Some little stir and interest has been excited on the street in the charter by Messrs. Dant & Russell, Inc., of Portland, of the three well-known Nielsen steamers on time charter, government form, at $1.10 per deadweight ton for one year, delivery and redelivery U. K., Continent. The above steamers have been arranged by Dant & Russell to bring three cargoes of Cardiff coal to San Francisco, the same having been bought by the King Coal Company. It is a long, long time since such cargoes have been shipped from the British Isles to this port, but it may well be that other steamers will be chartered for coal from Cardiff either to Honolulu or to this coast.

INDEX NUMBERS OF OCEAN FREIGHT RATES.

Month.	United States Atlantic to—					
	United Kingdom.	French Atlantic	Netherlands and Belgium	Scandinavia.	Mediterranean.	All Europe.
1920.						
January	100.0	100.0	100.0	100.0	100.0	100.0
February	96.5	86.9	83.3	90.1	91.1	90.3
March	91.2	78.5	78.0	84.6	79.5	83.4
April	90.2	87.2	78.9	82.7	72.2	83.5
May	96.2	85.9	87.3	82.5	75.2	87.5
June	101.2	87.1	89.5	82.1	76.5	90.0
July	96.0	85.6	82.1	82.0	75.3	86.3
August	85.7	77.9	70.4	82.1	73.2	78.5
September	86.7	73.7	66.9	82.1	71.6	76.9
October	84.9	60.9	70.9	75.3	69.6	75.4
November	77.8	51.6	59.9	59.6	59.2	63.8
December	72.3	38.5	47.0	51.6	49.2	53.6
1921.						
January	60.7	30.2	34.1	42.9	43.2	43.3
February	54.7	27.7	29.2	30.9	43.8	38.5
March	49.3	24.6	28.3	30.8	42.2	35.9
April	50.1	32.6	36.6	29.4	35.7	39.0
May	50.6	35.0	38.2	31.3	34.6	40.1
June	42.7	34.7	38.3	31.3	34.0	37.6

Index numbers of ocean freight rates, United States Atlantic ports to Europe, prepared by the division of analysis and research, Federal Reserve Board. Recent changes were regarded as of greater interest, so a recent base was chosen, and January, 1920, was preferred over 1919 because during part of the latter year government control continued. The great changes in French Atlantic rates are due to the war between the French Line and the conference.

No sailers have been fixed for Africa. The going rate is about $25 per thousand.

PAGE BROTHERS, Brokers.

Beyfuss Freight Report

San Francisco, October 24, 1921.

Since our freight report of September 22, there has been a much healthier freight market. Although this has not manifested itself in many more fixtures of full cargoes, some few fixtures have resulted and the trans-Pacific trade shows a steadier firmness.

Grain to Europe is still taking its share of tonnage, but the number of fixtures is not so heavy as last month and no barley chartering has been done. The rates for wheat from the North are lower, most of the fixtures reported being at about 50/—.

Several steamers are reported at about $14 with lumber to the Orient and four vessels are reported fixed on time charter at about 6/— for one year, and it is generally understood that these vessels will be used principally in the trans-Pacific lumber trade.

Several steamers have been reported taken for lumber for ports north of Hatteras at rates ranging from $15 to $17.

A full steamer cargo is reported to Australia at 80/—, but outside of this the Australian market has been quiet.

To West Coast South America the regular lines are taking parcels, but one full sailer cargo has been done at about $18.

Several vessels are reported for copra from the South Sea Islands to San Francisco at about $10.

C. BEYFUSS CO.,
BROKERS.

About People

Personals

Harold H. Ebey, district director of operations, Shipping Board, San Francisco, has resigned, effective October 31, to join Williams, Dimond & Company, general Pacific Coast agents of the American-Hawaiian. Mr. Ebey's scalp recently was sought by political Washington, but his record and protests of the Pacific American Steamship Association were efficacious in warding off dismissal. He will be in charge of operations of Williams-Dimond, although his familiarity with European-Pacific trade, gained during his Kosmos Line agency, would fit him equally well for the traffic department. For four years Mr. Ebey was with the Shipping Board and was San Francisco director for three years.

Walter Gompertz, general manager of the Standard Coal Company, San Francisco, a bunkering company, has resigned to enter business on his own account.

Edgar McKee has been appointed president of the Los Angeles Harbor Commission.

Captains A. A. Langkilde and K. P. T. Woods have been appointed Columbia River bar pilots.

I. Abe, Portland manager of Suzuki & Company, is transferred to Seattle and is succeeded at Portland by H. Toda.

Alexander D. Fraser is now general agent of the North Atlantic & Western in the Middle West with headquarters in Pittsburgh. He will pay particular attention to steel shipments.

J. D. Dwyer has been promoted to be assistant freight agent of the Pacific Steamship Company, Seattle, succeeding Robert W. Heinsch, resigned.

Charles Donley will represent the Pacific Mail Steamship Company in the Pittsburgh and Wheeling districts with headquarters in Pittsburgh.

Edwin C. McLaughlin, superintendent of the White Star at Pier 60, New York, retired October 1 after 33 years of service.

George B. Green and A. M. Green, general manager and assistant general manager of the East Waterway Dock & Warehouse Company, Seattle, resigned, effective October 1.

R. C. Mason, secretary of the Rice Association of California, of the South Pacific Millers' Association, and of the Green Coffee Association of the San Francisco Chamber of Commerce, has resigned to become an official of the Pasadena Milling Company.

Captain Andrew Dixon, one of the founders of Struthers & Dixon, has retired from active business. In 1904 Captain Dixon became first officer of the old Pacific Mail steamship Mongolia; later was promoted to command of the Coptic, Korea, Siberia and Manchuria, the last of which he had when the fleet was sold in 1915. In October of that year he and Harry Struthers organized their firm.

Thomas James, who has been with Frank K. Hitching, agent of the Yamashita Kisen Kaisha, has been appointed assistant to J. V. C. Comfort, manager of the Pacific Mail.

Harry Kimball, former president of the Remington Arms Company and of other corporations, has been made financial vice-president of the Shipping Board in charge of the offices of the comptroller, treasurer, auditor and collector.

Sidney Henry, recently vice-president of the Baltimore Drydocks & Shipbuilding Company, is commercial manager of the Shipping Board with jurisdiction over shipyards, Hog Island included.

J. A. Roach, special agent, marine department of the London Assurance, San Francisco, has resigned and is succeeded by W. W. Tomlinson.

Edgar H. Lion has been placed in charge of the insurance department of H. M. Newhall & Company, San Francisco, succeeding G. S. Pettis, resigned. Mr. Lion had been manager of the marine department.

R. B. Hooper, late of the adjusting department of Johnson & Higgins, Seattle, has been transferred to the San Francisco office.

Fred I. Tucker, of Boston, was appointed as manager of the plants division in the commercial manager's department of the Shipping Board October 11.

Deaths

Captain S. A. Hoyt, first port warden of Seattle, in Seattle October 6.

Robert J. Tyson, former president of the Seaboard National Bank, San Francisco, in Piedmont, California, October 13. He entered business in the marine department of the Fireman's Fund Insurance Company in 1885; became special agent in the fire insurance department; joined his brother, George H. Tyson, in the general agency of the German-American in 1891; and ten years later organized the firm of J. H. Tyson & Company. In May, 1905, he organized the Seaboard National Bank and was its vice-president until 1906, when he assumed the presidency. He is survived by his widow, two sons and a daughter; and by three brothers: George H., James, president of the Charles Nelson Company, and Mitchell, a San Francisco bar pilot.

Captain Alfred Kitts, formerly of the Pacific Mail, in Galveston October 13.

Captain William S. Daniels of the Standard Oil, in San Francisco October 15.

SUBCHASER NOW FISHERMAN

A VERY interesting addition recently made to the fishing fleets of San Diego is the converted subchaser Corona. The Corona has an over-all length of 110 feet, a beam of 15 feet 4½ inches, and a draft loaded of 5 feet forward and 6 feet aft. She was purchased in New York and was there equipped with two 100 horsepower Fairbanks-Morse crude oil semi-Diesel engines. On her trials she developed a speed of 14 knots an hour, her normal speed, however, being 12 knots.

She was brought around from New York to San Diego by Captain F. E. Davis, the actual running time being 21 days, a very good passage for such a boat, particularly as very rough weather was experienced in the Caribbean Sea. Captain Davis is very outspoken in his praise of the seaworthiness of this boat and of her capabilities in the fish carrier line.

She is being used for carrier work in connection with the fleets fishing for fresh fish for the San Diego and Los Angeles markets. Her engines have been functioning perfectly and at a fuel expense which is a small fraction of that for a gasoline-driven boat of the same dimensions.

New York Shipbuilding Corporation—A Record of Ships Built. An attractive book of 65 pages bound in green pressboard and profusely illustrated with samples of the work of the New York Shipbuilding Corporation.

The plant of this firm is without doubt the greatest single shipbuilding plant in the United States, if not in the world. This plant has a shipway capacity of 28 vessels at one time, together with ample outfitting basins and complete shop and storage facilities. At one period the yard was actively at work on 43 ships on the ways and in the outfitting basins.

This yard undoubtedly has the most complete track and crane systems for tying the various parts of the plant together that have ever been installed in any shipbuilding plant. There are 115 cranes, varying in capacity from 1½ tons to 200 tons, and over 15 miles of standard gauge railroad trackage. The ways range in capacity up to ships of 1000 feet in length, and the foundations of the large ways are capable of taking the launching weight of the heaviest superdreadnoughts.

Practically every type of steamship built is illustrated in this book. The book commemorates the twentieth anniversary of the founding of the New York Shipbuilding Corporation, and it is shown that during the twenty years up to August 1, 1921, they have been responsible for the building of 265 vessels with a total displacement tonnage of 1,035,925 tons, a total length of 88,001 feet, and a total horsepower of 1,982,835. The total length of these ships is equivalent to 16 2/3 miles. In addition to the total horsepower of these vessels, the yard has built engines for ships elsewhere totaling 19,200 H. P.

The vessels built include passenger and cargo vessels, tank steamers, colliers, general cargo ships, battleships, battle-cruisers, light cruisers, destroyers, river passenger steamers, ferry boats, car floats, oil and coal barges, lightships, lighthouse tenders, fireboats, revenue cutters, dredges, mine planters, and pontoons. Fighting ships have been built for the navies of the following countries: United States, China, Greece, Japan and Argentina.

MACHINERY AND EQUIPMENT

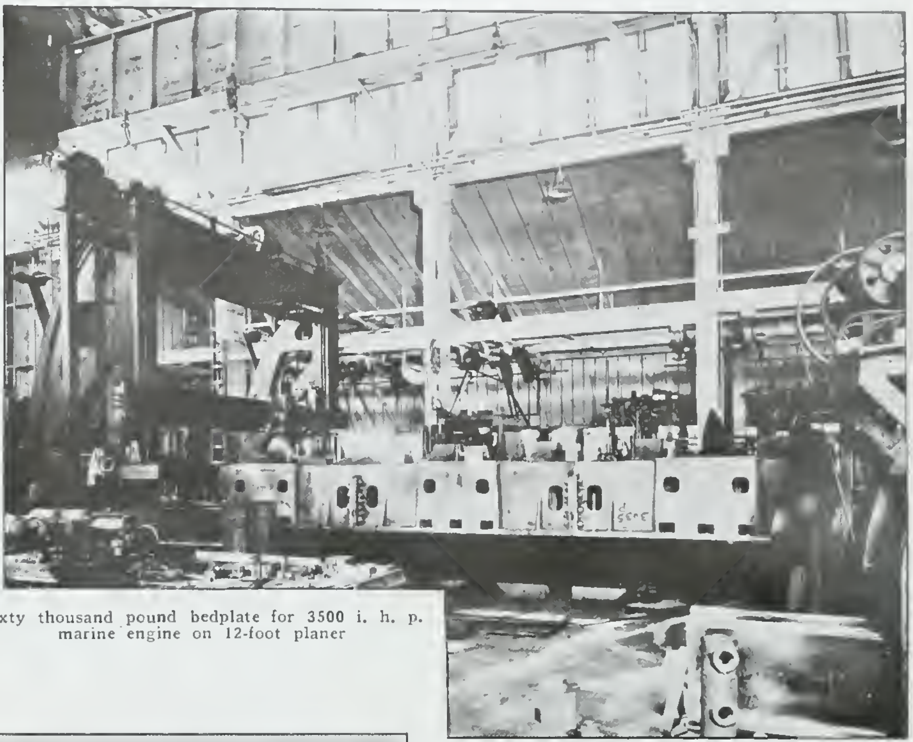
SHOP WORK ON LARGE ENGINES

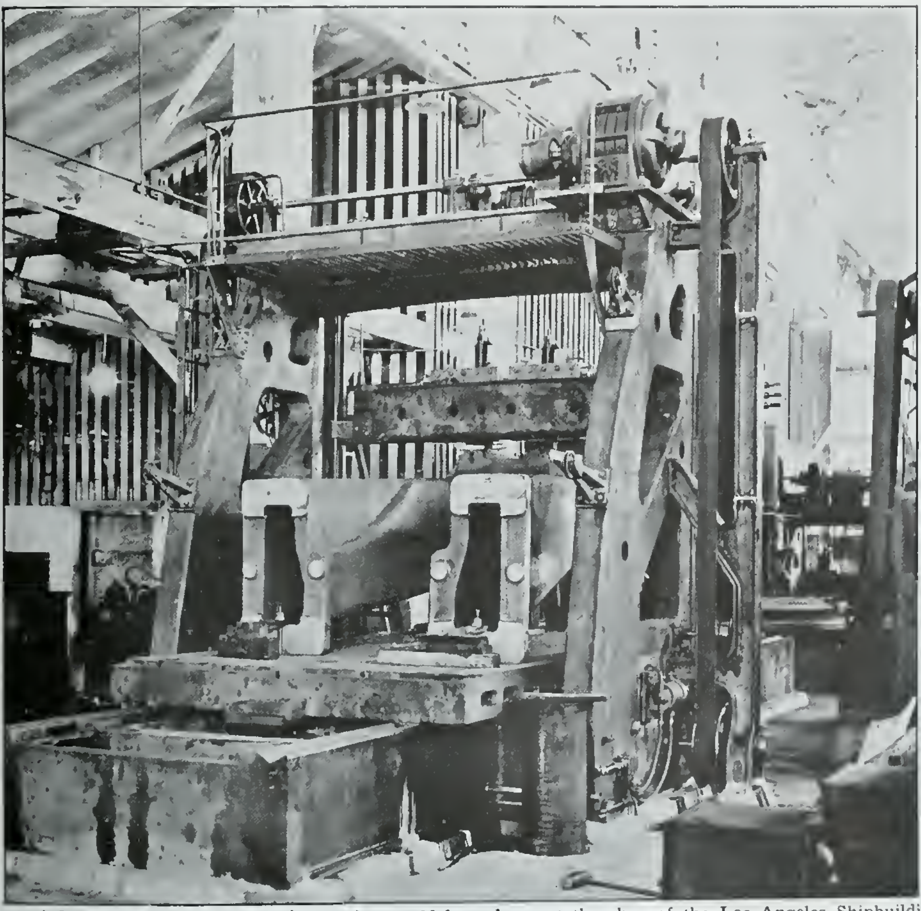
Some Notable Tools in a Southern California Shipyard

WE illustrate herewith three rather notable examples of large planer work in the building of marine triple expansion engines in the machine shop of the Los Angeles Shipbuilding and Drydock Company.

The 12-foot planer, which is shown in one illustration operating on the bedplate, has a 24-foot 2-inch table, a width between housings of 12 feet 10 inches, and a height clear of 10 feet.

The bedplate shown is for the 3500 horsepower triple expansion marine reciprocating engine used in the freighters of the West Lewark class. This bedplate is 23 feet in length, 12 feet 6 inches wide, and 3 feet 3 inches deep, with a total weight of 60,000 pounds. It will be seen in the illustration that the bedplate is made in three sections. The joints between these sections are surfaced and the flanges held by through bolts fitted into reamed holes. The entire bedplate thus assembled is planed in one operation for the faces to receive the feet of the A-frames and columns.


Sixty thousand pound bedplate for 3500 i. h. p. marine engine on 12-foot planer


A-frame of 3500 i. h. p. marine engine on 10-foot planer at the shop of the Los Angeles Shipbuilding and Drydock Company

An A-frame is shown on the 10-foot planer, the guide faces for the crosshead guides being planed simultaneously by the two tool heads on the planer. The casting for this A-frame, which forms one of the back columns of the engine, weighs 10,400 pounds, has a height of 13 feet 2 inches, a width of 6 feet 6 inches, and a depth of 4 feet 6 inches. The illustration plainly shows the method of fastening this big casting on the platen.

This 10-foot planer, which was designed by the engineering staff of the Los Angeles Shipbuilding and Drydock Company and built entirely in the plant of that firm, has a 21-foot table, 10 feet clear width between the housings, and a clear height under the tools of 7 feet 6 inches. The illustration clearly shows the individual electric drive and the clever distribution of metal in the castings to equalize stresses and produce a rigid machine tool with the minimum weight.

The low pressure cylinders for these engines have a 78-inch bore which, combined with the 48-inch stroke, makes a very massive casting weighing in the rough 40,000 pounds and having over-all dimensions of 10 feet 8 inches in length, 8 feet 1 inch in width, and a height of 8 feet 2 inches.

The planer shown working on this

cylinder was also designed and built in the shops of the Los Angeles Shipbuilding and Drydock Company, a smaller sized planer which was on hand being used as a basis for the design and reconstructed to form the larger tool.

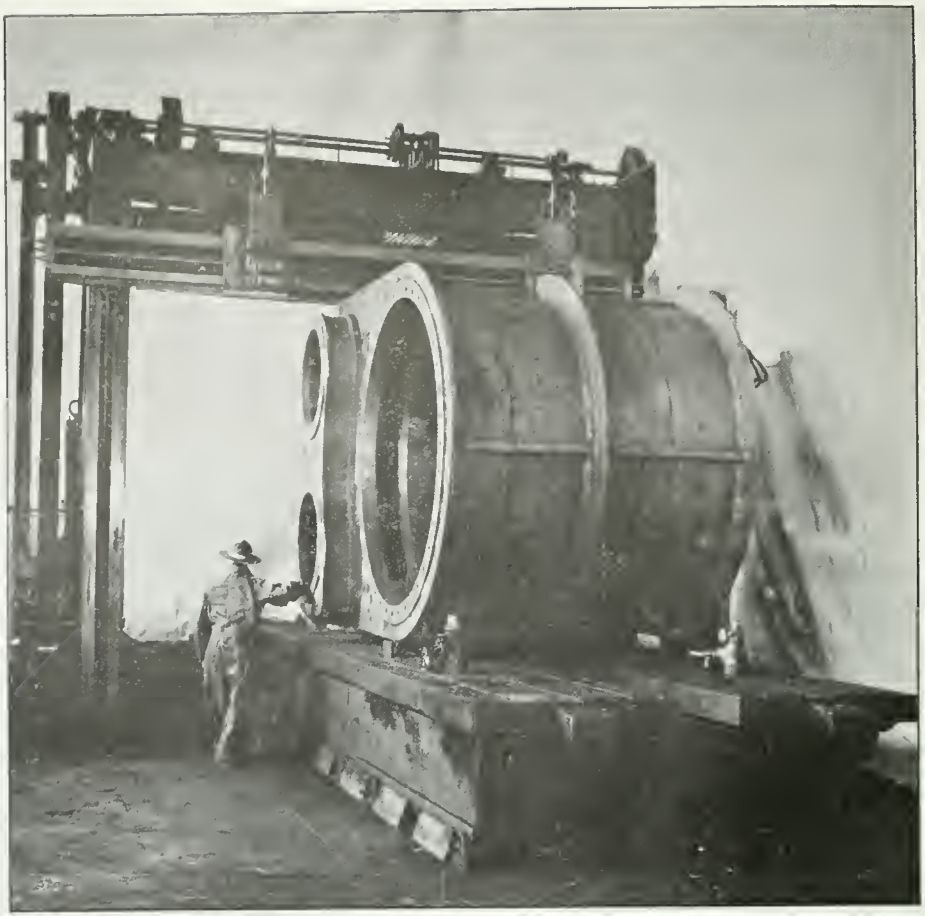
The excellent record made by the reciprocating engines built and installed by this yard in their own ships demonstrates the accurate work of these tools.

ANNOUNCEMENT

The Max Kuner Company have recently opened at Portland a branch of their Seattle firm, which will be located at 506 Spalding Building, where they will carry a full line of nautical instruments. All ship masters are invited to make this office their headquarters at Portland.

ELECTRICAL EXHIBIT

The American Engineering Company, Philadelphia, will confine its exhibit at the exposition of the Marine Equipment Association of America, to be held in New York November 14 to 19, to electrical deck and dock machinery, in view of the fact that the naval architects will specialize on electric propulsion and electric auxiliaries at their convention during the same week.

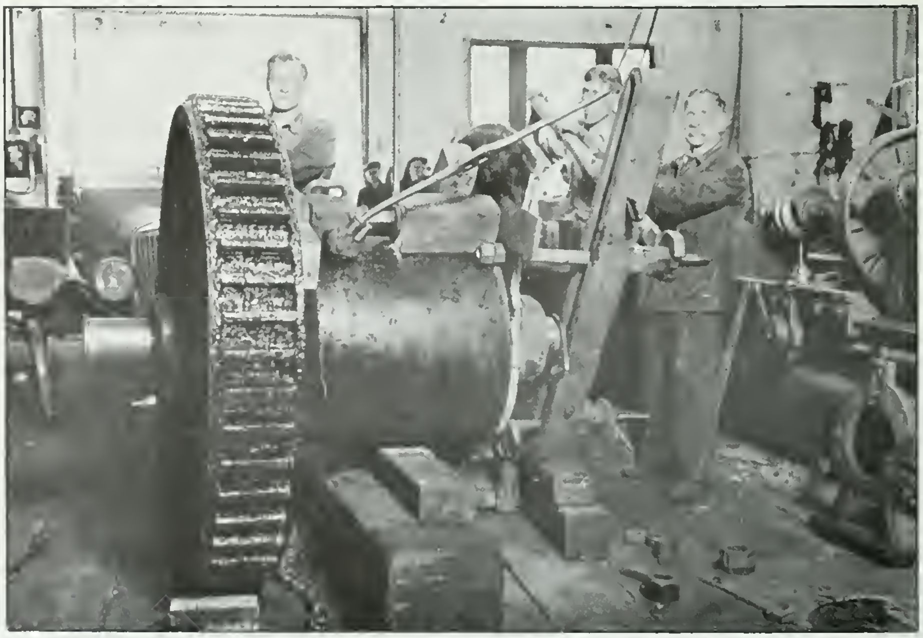

Low pressure cylinder 3500 i. h. p. triple expansion engine on 12-foot planer , Los Angeles yard

REPAIRS ON A TOWING MACHINE

THE ship repairing and engineering firm of Muir and Symon, Incorporated, has for a long time held an enviable reputation along the San Francisco waterfront in the solving of knotty shop problems. In fact, they acted as a "sheet anchor" in times of distress to many a puzzled mariner. This reputation harks back as far as the days of the old sailing ships when William Muir, Senior, was one of the best known shipsmiths on the Pacific Coast.

That Mooney and Young, who have recently purchased the shop and business of Muir and Symon, have also fallen heir to some of these problems and to much of the ingenuity with which they are solved, is evidenced by the accompanying illustration showing the methods adopted for the removal of a broken drum from the shaft of a towing machine.

A 5-foot gear wheel and a 2-foot 6-inch drum with flanges 4 feet in diameter were assembled on a 6-inch steel shaft, the drum and gear being held by two keys. Two powerful jacks were applied on the inside of the flange of the drum, the thrust being taken against the inner face of the gear. A heavy double strap was placed against the end of the shaft and through bolts carried from the flange of the drum to this strap, enabling the machinist to apply great leverage in pulling and pushing at the same time. The drum was thus quickly started from its seat on the shaft and in a very few moments the shop was ready to place a new drum casting.


Repair work on a towing machine in the shop of Mooney and Young, San Francisco. Since this photograph was taken, George A. Armes has acquired an interest in this firm, and a reorganization has been effected under the name of General Engineering Company. Details will be found elsewhere in this issue of Pacific Marine Review.

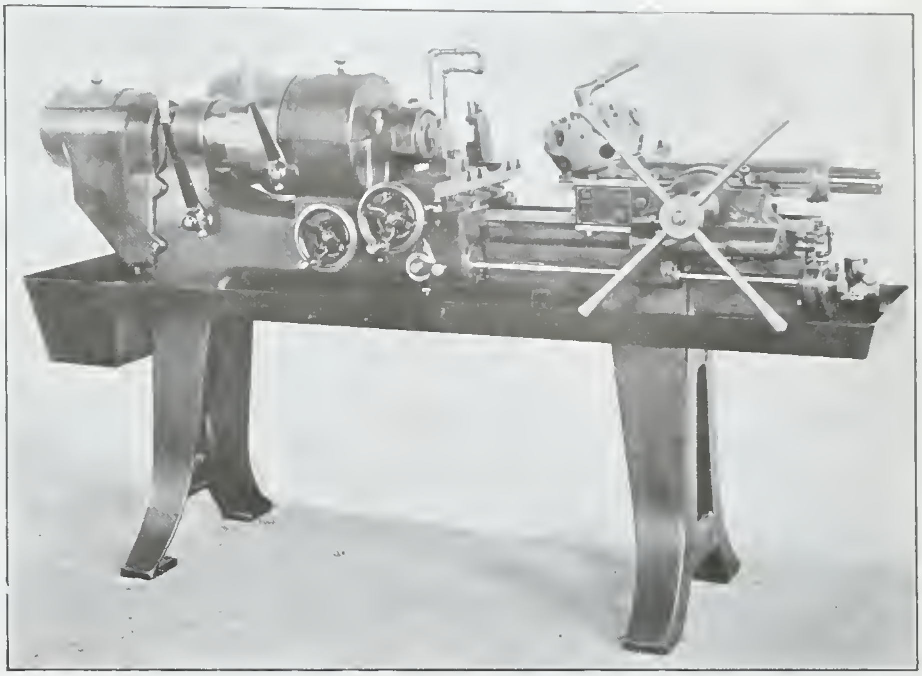
NEW POWER CROSS FEED FOR TURRET LATHE

A compact and neatly designed power cross feed to the cutoff slide, having many unique features, has recently been developed for the Nos. 2, 3, 4, 5 and 6 tilted turret lathes and screw machines manufactured by the Wood Turret Machine Company of Brazil, Indiana.

This design of power cross slide insures rigidity as well as permanent alignment of this part, as the apron or gear box is cast integral with the saddle.

The power is transmitted to the feed screw by means of two bevel gears on lower feed shaft meshing with a third gear on a vertical shaft, thence through helical gears to the feed screws.

One noteworthy feature is the single lever control which gives feed engagement in either direction by simply moving through three positions. When the lever is in a vertical position the feeds are disengaged. Throwing lever to the left engages the inward feed. Moving lever to right engages for feed outward.



The Tilted Turret Lathe equipped with New Power Cross Feed for Cut-off Slide

Six feed changes, ranging from .003 inch to .023 inch per revolution of spindle are provided, any one of which is instantly available without stopping machine.

Provision is made to safeguard the feed mechanism against overload or accident by providing a brass shear pin on the lower feed shaft. This pin is easily replaced, should it become necessary, and as the element of safety gained is quite an item, this device is certainly worth due consideration.

A large dial is fitted on hand wheel which is graduated to .001. Provision is made for clamping the dial at any point.

The feed screw is provided with two bronze bearings in the outboard end of slide, insuring stability, and a very ingenious method of taking up the back lash of feed screw is provided in a knurled adjusting nut which is locked by hand wheel.

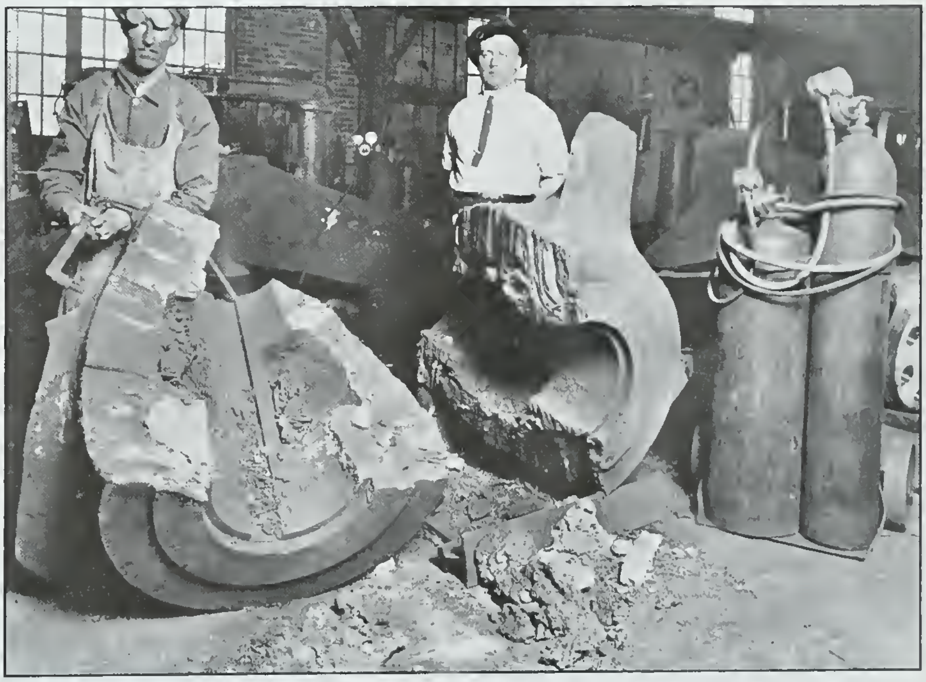
The general aim throughout has been to obtain rigidity combined with a simple compact design that would offer an efficient and easily controlled feed mechanism.

TORCH-CUTTING CAST IRON

A 5-ton cast iron propeller hub was recently successfully cut in half with an oxyacetylene torch. The thickness of this casting ranged from seven to ten inches. Two cuts were made, each 40 inches long. No attempt was made to clean the casting, although it had been lying in the open for months and was covered with rust; nor did the operator preheat the hub preparatory to cutting. The photograph reproduced herewith shows how the job looked after successful completion. The work was performed at the shop of a large manufacturer of propellers, as a test of the cast iron cutting qualities of the torch—an Airco "D."

In a shop such as this the value of the cast iron cutting torch lies in its ability to cut up heavy cumbersome castings which for various reasons have been discarded and must be gotten out of the way.

The cost of cutting cast iron with the oxyacetylene torch is about five times that of steel, and, in this connection, the following data prepared



Cast Iron Propeller Hub of 5 tons' weight cut in two with Oxyacetylene Torch by A. S. Kinsey, professor of shop practice, Stevens Institute of Technology, and advisory service engineer of the Air Reduction Sales Company, will be of interest to the man contemplating the use of an oxyacetylene torch for the cutting of cast iron:

"Steel 12 inches thick can be cut with oxygen and acetylene at the rate of about 30 square inches per minute, costing, say, 1.5 cents for labor, 10 cents for oxygen and 2 cents for acetylene, a total of 13.5 cents to cut 30 square inches per minute.

"Twelve-inch cast iron" (used in Professor Kinsey's experiments) "was cut at the rate of 7 square inches per minute, costing 1.5 cents for labor, 13 cents for oxygen and 4 cents for acetylene, a total of 18.5 cents to cut 7 square inches per minute.

"We may therefore calculate the following approximate figures on a basis of 100 square inches of metal cut:

To Cut by Hand Torch 100 Square Inches of Cast Iron and Steel with Oxygen and Acetylene

	Consumption			Cost			
Material	Time Minutes	Oxygen cu. ft.	Acetyl. cu. ft.	Operator's Time	Oxygen	Acetylene	Total
Cast iron	15	123	21	$.22	$1.84	$.56	$2.62
Steel	3.5	25	2	.06	.37	.05	.48

While the above figures show the relative cost of cutting cast iron and steel with acetylene torch to be high for cast iron, it is fair to note that the only other way to cut cast iron, i. e., by machinery, would cost at least twice as much as cutting it with the torch. For example, a slab of cast iron costing $2.62 per 100 square inches to cut off with the torch would cost if cut by machinery at least $5.00 for labor and power if the casting were of convenient size to handle. However, the cost might be double that amount for machining a big, unwieldy casting. We may therefore summarize:

Comparative Cost of Cutting 100 Square Inches of Metal

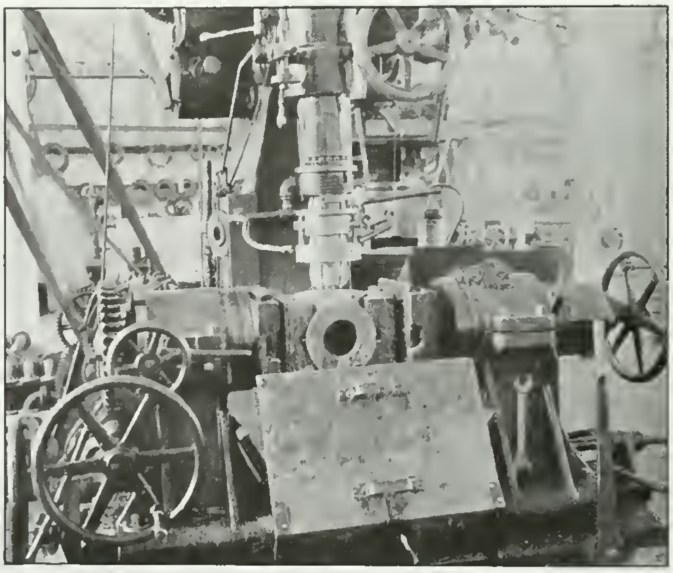
Metal Cut	Method Used	Cost per 100 sq. in.
Steel	by oxyacetylene torch	$0.48
Cast iron	by oxyacetylene torch	2.62
Cast iron	by machinery	5.00

MACHINING PIPE FITTINGS

Some Interesting Methods in San Francisco Shop

THE Pacific Foundry Company of San Francisco has adopted as one of its specialties the manufacture of pipe fittings. Its line includes standard and heavy hydraulic fittings, both flanged and threaded, in all the various sizes of elbows, flanges, crosses and tees. In order to facilitate a production of threaded fittings, this firm has installed a complete set of Murchey collapsible taps, ranging in size from 1 to 10 inches and comprising a total of 24 taps.

Our illustration shows one of these taps in use in a Baker upright drilling and tapping machine. The special trunnion fixture for holding the fitting, which will be seen in the cut, was designed and built in the shop.

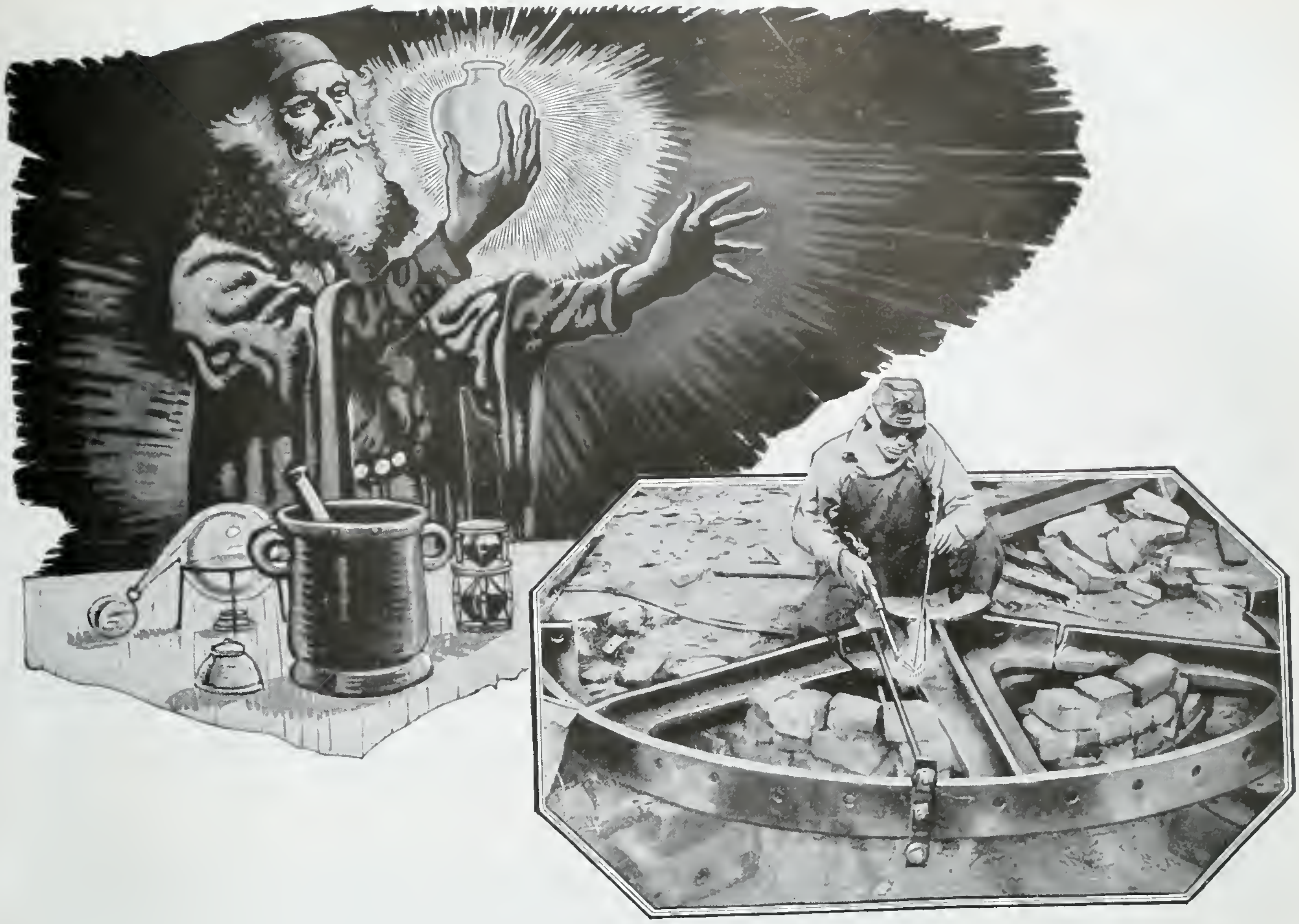


Tapping fittings in special trunnion fixture designed by staff of the Pacific Foundry Company, on a Baker upright drilling machine

In this fixture there are two heads adjustably mounted on a table and movable along a dovetailed guide by means of adjusting screws operated by hand wheels. These heads carry large spindles to receive special chuck jaws for gripping the work. One spindle can be operated longitudinally by a hand wheel to grip or release the work at will. The other spindle is fitted with a worm gear mechanism for the rotation of the spindles and work and with an index plate to indicate the angle of rotation. The chuck jaw blocks on the spindles are arranged to receive special jaws made to suit the various fittings to be held. The fixture is designed with a capacity for fittings up to 16 inches.

In order to facilitate work with this same machine the engineering staff of the Pacific Foundry Company designed a special facing head for surfacing the face of flanged fittings as they were held in the special fixture. This head consists of a rectangular body mounted directly on the vertical spindle of the machine and carrying two facing cutters which overlap each other by about three-eighths inch in the circular path around the work. A gear ring is carried on this rectangular body and connected by suitable shafting and spur gears to the longitudinal feed screw so that the revolving cutters are traversed across the face of the work at the rate of about one-quarter inch per revolution. The depth of cut is generally about 3/32 of an inch.

The table holding the special chucking fixture can be raised or lowered by four 4-inch pneumatic cylinders located under the corners, the range of lift approximating 8 inches.



The age-old dream of the alchemist is realized because of Linde

THROUGH countless centuries man dreamed of transmuting the baser metals into gold. Patiently, laboriously, often consecrating their very lives to the work, the Alchemists of old toiled on toward their elusive goal.

As late as 1873 James Price, the last of the Alchemists, sought death by his own hand rather than acknowledge the failure of his experiments.

Linde Engineers of to-day have made this dream of by-gone ages come true.

By producing uniformly pure oxygen in industrial volume, they have made it possible for oxy-acetylene welders and cutters to reclaim thousands of tons of metal machinery annually—turning base metal into gold—a saving in money far in excess of any vision of wealth dreamed of by ancient philosophers.

And Linde does more than supply oxygen of absolutely uniform purity. Thanks to a chain of twenty-nine plants and forty-six warehouses it delivers Linde Oxygen when and where it is wanted in any volume.

THE LINDE AIR PRODUCTS COMPANY
Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco

THE LARGEST PRODUCER OF OXYGEN IN THE WORLD

L-500-21

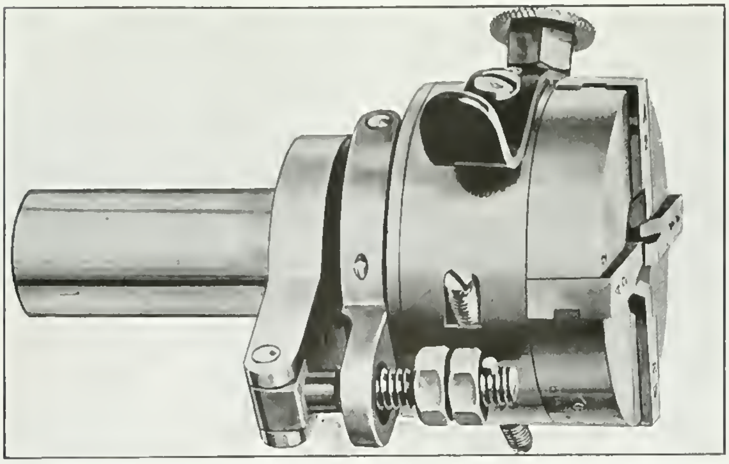
GEOMETRIC DIE HEADS

For Single Spindle Automatics

THE new style DS Geometric self-opening and adjustable die heads were designed primarily for the Brown & Sharpe automatic screw machines. They are quite as well adapted to other automatics, and where they are used, there is no reversing of the spindle to back the die head off the threaded work.

These die heads are simple and compact. They do not depend on the turret feed, but float to suit the thread being cut. This prevents stripping and shaving of the threads and makes the usual close camming of the machine unnecessary.

Note the lever trip, which reduces the force of tripping the die head and lightens accordingly the reaction on the threads being cut.



Geometric die head of a new style adapted for use with single spindle automatic screw machine

Buffer springs allow the die head to yield slightly when the chasers come in contact with the work, insuring a good smooth thread from the start.

The two check nuts at the side of the die head provide easy adjustment of the point of tripping.

Shock and wear are eliminated by the spring closing attachment. This is of special value when closing the die head rapidly.

Push buttons eliminate all trouble in inserting the chasers.

No face plate is necessary, making it possible to use projecting chasers where required for cutting close to a shoulder.

The closing attachment is located in a convenient position to strike a stop on the machine, which automatically closes the die head when the turret revolves.

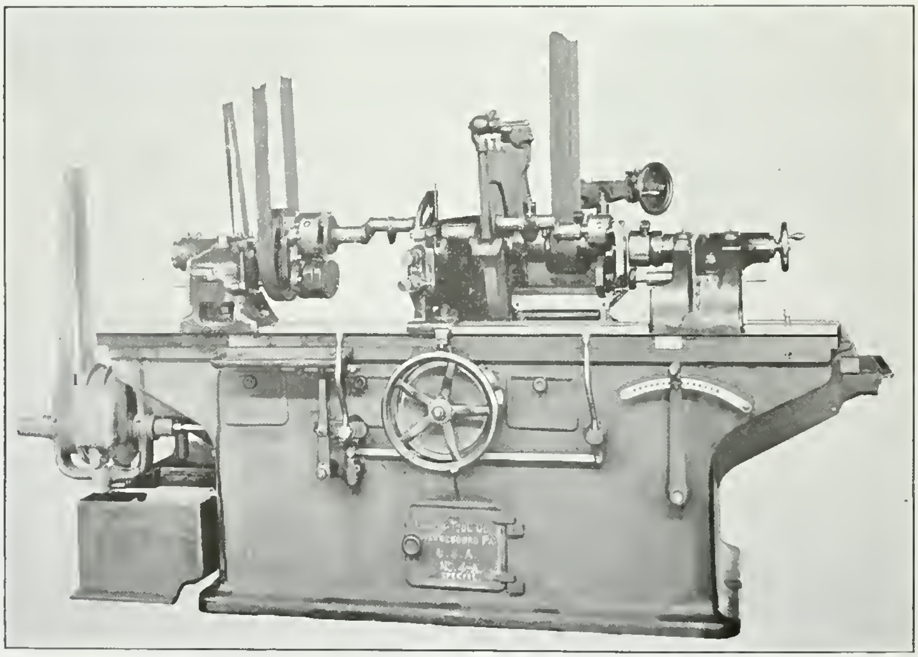
The chasers are of sturdy construction. They have long bearings in the die head skeleton and are supported by hardened keys, which prevent tilting and consequent cutting of taper threads. There are four chasers in each size die head.

The die heads are provided with shanks to fit the particular size machine on which they are to be used.

NEW LANDIS GRINDING MACHINE

THE Landis Tool Company of Waynesboro, Pennsylvania, has recently put on the market a new tool which fills a long felt need in automotive shops. This machine will grind accurately and rapidly all auto crank shafts, pistons, pins and other parts with the exception of course of the cylinder blocks.

This new machine is unique for it is a further development of a standard machine which has proven a success after satisfactory service. The feature of this machine is the rapidity with which it can be changed from crank grinding to piston and pin work. This change can be made by the average operator in approximately ten minutes. These features particularly recommend it for the garage or job shop where all kinds of grinding must be done rapidly. Before the introduction of this new machine it was necessary to purchase two or three machines to handle the same work.



Courtesy of Western Machinery World

New type of Landis grinding machine especially adapted for regrinding crank pins and pistons of automobile and motorboat gas engines

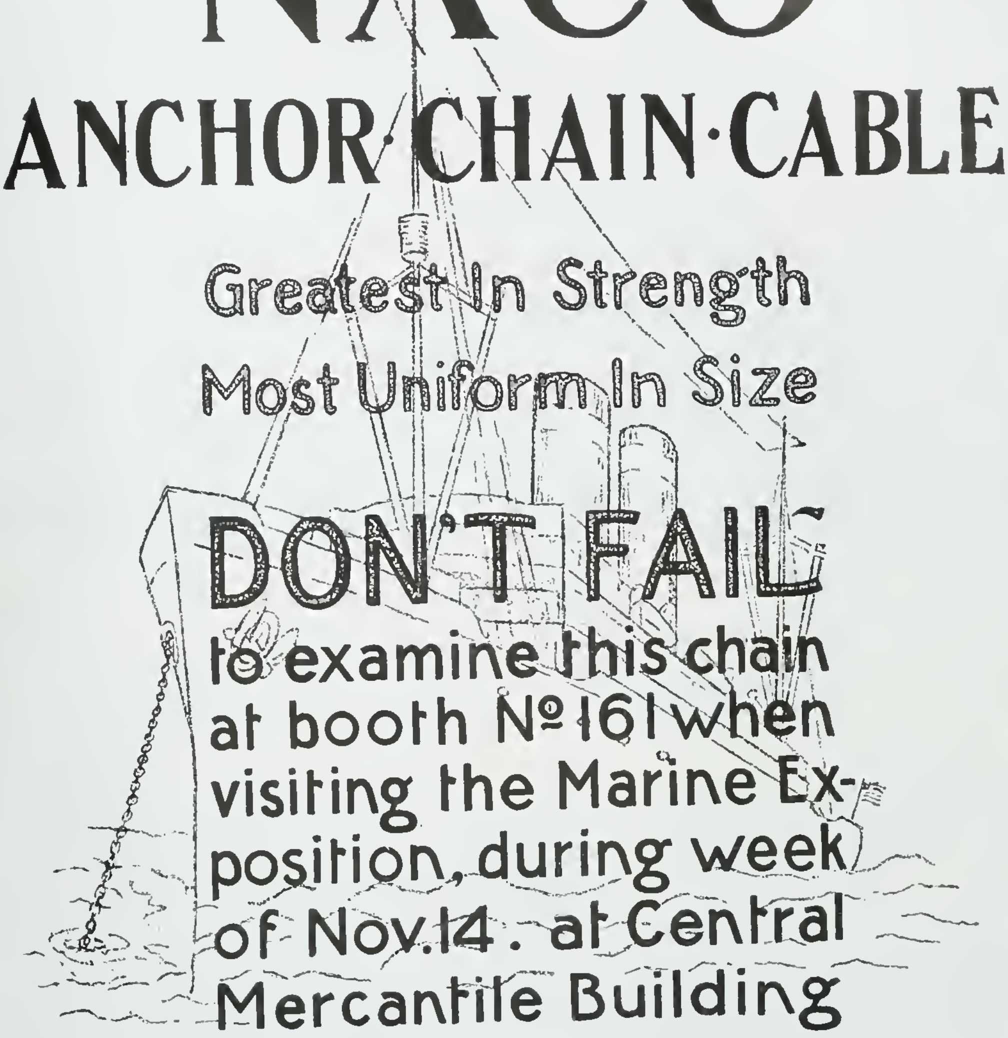
For regrinding crank pins the machine is equipped with special sliding head for getting the required throw for each shaft without the use of any throw blocks. Each head has a very accurate and easy reading graduated scale to locate the desired throw. Each head has balance weight which can be adjusted for different weights of shafts. The shafts are held by two universal chucks, one located on each head. This method eliminates the use of bushings for the different diameters of shafts.

The crank pins are centered by a special device which fits on top of back rest. This is exceedingly quick and accurate. To change machine from crankshaft to piston grinding, all that is necessary is to remove the crank fixtures from those of spindle after the fashion of removing a face plate from a lathe spindle.

Since this machine is a further development of one already on the market, there is no great engineering and pattern cost charged against it. It can therefore be offered to the trade at a very attractive price, so that the machine need not be kept in constant operation to assure returns on the investment.

The machine has capacity for handling all crankshafts used in automobile gas engines and many of those used on the tractors now in use.

Harron, Rickard & McCone of San Francisco and Los Angeles handle this machine and are ready to send those interested any additional information that may be desired.



THE N M C

"NACO"

ANCHOR·CHAIN·CABLE

Greatest In Strength

Most Uniform In Size

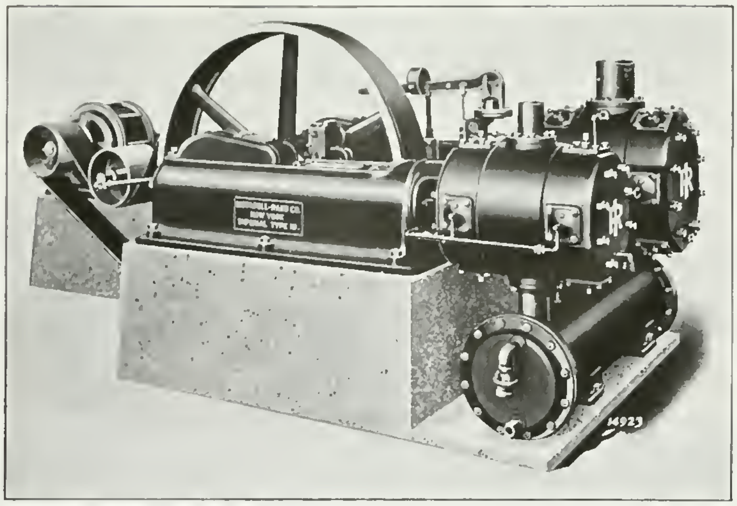
DON'T FAIL

to examine this chain
at booth Nº 161 when
visiting the Marine Exposition, during week
of Nov. 14. at Central
Mercantile Building
45 W. 18th. St. New York City

THE NATIONAL MALLEABLE CASTINGS CO.

CLEVELAND, OHIO

A NEW TYPE OF BELT-DRIVEN AIR COMPRESSORS



The Imperial type XCB Ingersoll-Rand air compressor. 15 inch by 9¼ inch cylinders by 12 inch stroke. Shown with short belt drive and electric motor

THE Ingersoll-Rand Company, 11 Broadway, New York, has announced a new line of belt-driven air compressors. This type is known as the Imperial Type XCB and has incorporated in it several noteworthy features of construction, including Ingersoll-Rand plate valves, for both the air intake and discharge, and the five-step clearance control for regulating the compressor's output.

The clearance control has been used with great success on the larger direct-connected electric motor-driven compressors manufactured by the same company and has proven itself to be the most satisfactory and efficient form of compressor regulation. Thousands of these direct-connected air compressors are installed in all parts of the world and are well known by those in charge of plants where conditions call for more than 600 cubic feet of free air a minute and where direct connected electric motor-drive is used. The use of this form of regulation is a most noteworthy development in air compressor design during recent years and should be of interest to all users of air power.

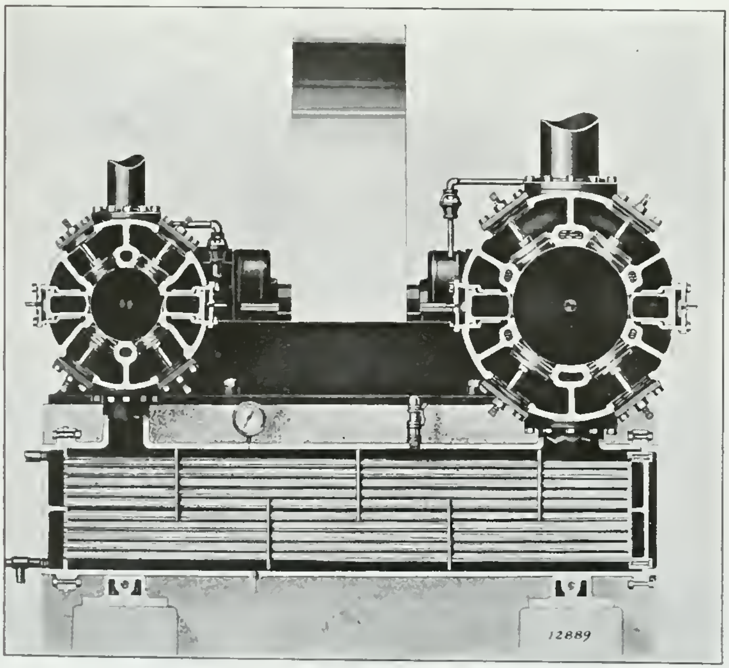
The clearance control is a method of securing extremely efficient operation at partial loads. Under average working conditions it is a well known fact that the demand for air is seldom steady throughout the working day and for this reason the performance of the compressor at underload is of primary importance.

With the clearance control the compressor is automatically loaded or unloaded in five successive steps, these steps being obtained by the reduction or addition of clearance space to the air cylinders. The compressor will operate at full, three-quarters, one-half, one-quarter and no loads and the design of the clearance control is such as to secure efficient operation at any one step, the reduction in input power required being practically in proportion to the reduction in output capacity.

An extremely valuable feature of the clearance control is the fact that the clearance pockets are made integral parts of the compressor cylinder and the entire regulation is obtained by the control of the volume of air taken in and compressed.

With this method of control there is no loss of power due to wastage of air and leakage. The clearance pockets in the cylinder are automatically thrown in communication with the ends of each cylinder in proper succession, the process being controlled by a predetermined variation in receiver pressure. With the compressor operating at partial capacity a portion of the air is compressed into an added clearance space instead of passing through the discharge valves. On the return stroke this air expands, giving up its stored energy to the pistons.

The inlet valves remain closed until the cylinder pressure equals the intake pressure. At this point the inlet valves are opened automatically and free air is taken into the cylinder for the remainder of the return stroke. Thus the inlet capacity is reduced without reducing the intake pressure. On a two-stage compressor clearance space in proper proportion is added simultaneously for both high and low cylinders, giving a constant ratio of compression and maintaining conditions necessary for the highest compression efficiency throughout the entire load range.



Section through cylinders and intercooler of Imperial type XCB Ingersoll-Rand air compressor

Another added feature of this control is the maximum demand stop which will prevent the compressor being operated at any higher maximum load than is desired. This can be adjusted so that the compressor will operate on a maximum of one-fourth, one-half, three-fourths, or full load, and under conditions where the load factor is comparatively low, it is of value in reducing the maximum demand, permitting a saving in the purchase of electric power — a feature found in no other type of control.

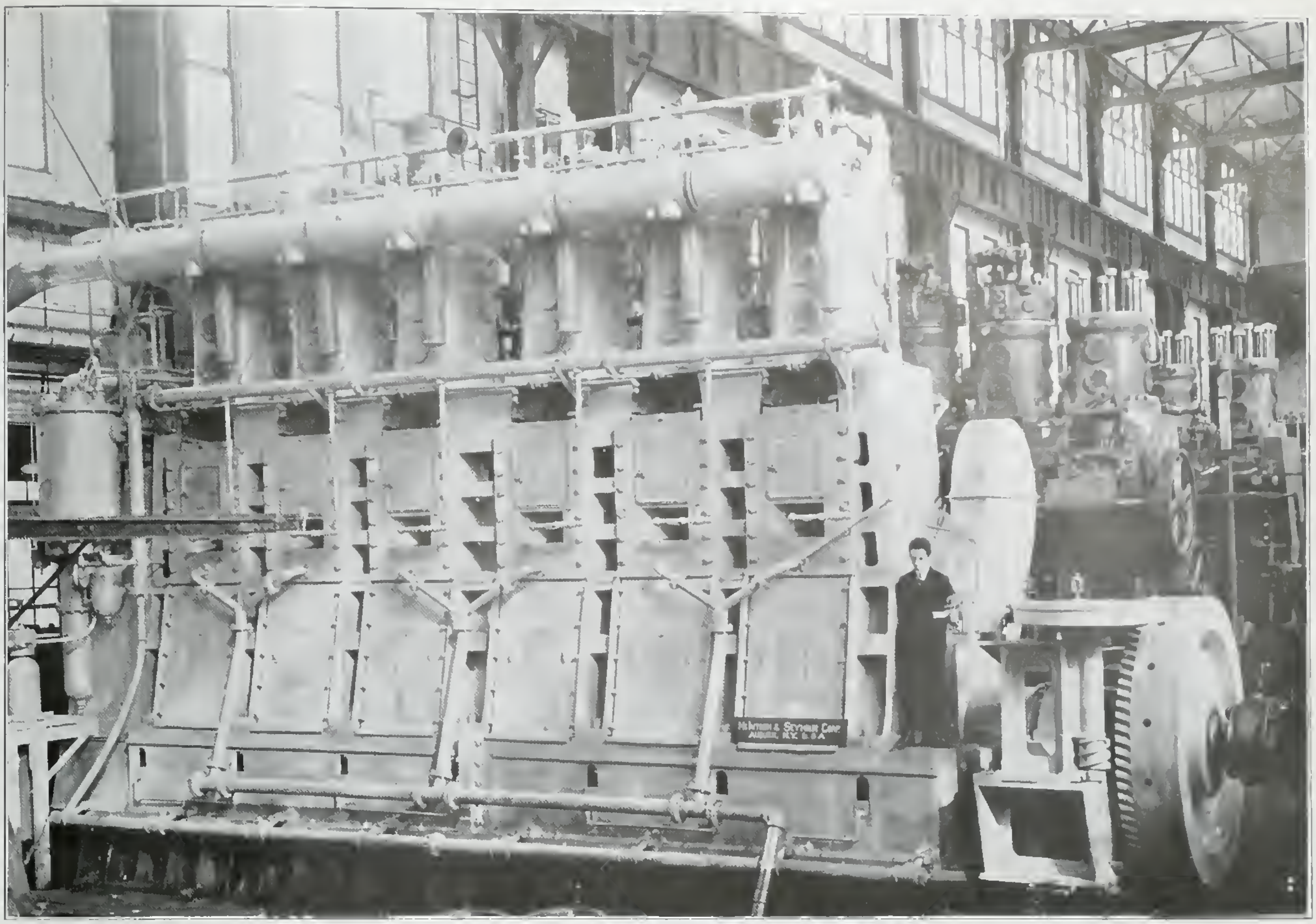
With the clearance control reduction in power required will be in proportion to reduction in output capacity. All the mechanism for regulating the compressor is independent of the compressor running gear. The loading and unloading of the compressor is automatically accomplished in steps, the difference between any two steps being small enough to prevent any undue electric current fluctuation.

It will be seen that all of these features are of extreme importance, the combination producing conditions requisite for the most efficient operation at full and partial loads.

This new type of belt driven compressor equipped with clearance control can be furnished single-stage for low pressures and two-stage for higher discharge pressure. The piston displacement capacity for 100 pounds discharge pressure ranges from 610 to 1505 cubic feet of free air per minute.

Imperial Type XCB compressors can also be furnished with the well-known short belt drive attachment with floating idler. This method of drive is now well known to all users of compressors who acknowledge its advantages in saving floor space, saving in length of belt, and permitting a greater arc of belt contact.

The Ingersoll-Rand Company also announce their new Bulletin No. 3042, in which this new type is described in detail.



The above picture shows one of our 1200 I. H. P. Directly Reversible Marine Engines on the test floor. A pair of these engines have been installed on the M/S "KENNECOTT."

Other sizes available for Marine work, 390, 640, 1550, 2000 and 3000 I. H. P. all four cycle and directly reversible.

DIESEL TYPE MARINE ENGINES
HEAVY DUTY

McINTOSH & SEYMOUR CORPORATION
AUBURN, NEW YORK

149 BROADWAY
NEW YORK

412 BISBEE BLDG.
JACKSONVILLE, FLA.

815 SHELDON BLDG.
SAN FRANCISCO, CAL.

AN EFFICIENT COALING ARRANGEMENT

By using a Barber-Greene portable belt conveyor, the Tampa Coal Company have achieved mechanical coaling of ships at their dock in Tampa at low first cost of machinery, especially as compared with other mechanical means of coaling ships now common; low upkeep cost, and very fair speed.

With this conveyor steamers are coaled at the rate of 400 tons a day. Usually the coal is taken from the storage pile on the dock in wheelbarrows having a capacity of 500 pounds each. The wheelbarrows are counted and the amount of coal taken on can be checked with the ship's weighing.

Sometimes railroad cars of coal come in on the track at the same time a ship docks to be coaled. Then the process is simplified. A second conveyor takes the coal from the car, discharges onto the inclined conveyor, and the coal is put aboard at the minimum expense in time and labor. Each carload also furnishes as accurate a check of the weight as do the wheelbarrow loads.

Barber-Greene portable belt conveyor coaling ship at a Tampa dock

The storage pile is built up, of course, by the conveyors. When cars are on the switch and there are no ships to be coaled, the conveyors take the coal from the cars and pile it on the dock to the height required.

This company also sells coal to users in the city which it hauls by means of motor trucks. The conveyors are often used in loading trucks directly from the car.

Ships can be coaled by machinery much faster than by hand method, and practically all labor charges eliminated. Then, too, no hand method has yet been employed by which the coal was not spread all over the ship. Coal dust is penetrating and entails an endless amount of drudgery before the ship can be gotten clean after coaling. Mechanical loading has everything in its favor as far as the sailor is concerned. But from the standpoint of the dock owner, the mechanical loading is a somewhat different proposition. The bunkering systems heretofore known have been expensive both as to the first cost and upkeep. They need to work constantly in order that the overhead will not destroy all the profits. It is much cheaper for the dock owner to rent barges and use the booms and other equipment on the ship for getting the coal aboard unless he can keep his mechanical equipment working every minute.

Coaling ships has therefore been either a matter of great drudgery by hand labor or a speedy process with high-priced machines. The Tampa Coal Company get coal aboard any ship at the rate of 400 tons a day, which is good speed, with a machine they can use for other purposes when it is not coaling ships. From the standpoint of any dock owner, this speedy loading, low first cost, low upkeep and general adaptability are entirely desirable.

THE McNAB SIMPLEX SALT DETECTOR

THE presence of salt in boilers is now universally admitted to be highly objectionable because of the reduced steaming capacity which results from the deposit of salt on the heating surfaces, and also because of the danger of overheating which is always present when there is scale on these surfaces. In the case of watertube boilers, now being used more extensively than in previous years, where even a small deposit of salt may have serious consequences, greater precautions are generally taken to keep the feed fresh than with the ordinary type of boiler.

The McNab simplex salt detector is designed to give a continuous indication of the amount of salt in the feed water, in grains per gallon, and will show the presence of salt there before it enters the boiler, even as small a quantity as one grain per gallon, also in the event of a sudden increase of salt—as may occur owing to a split condenser tube, or the evaporator priming—it gives warning immediately by audible alarm, i. e., the ringing of a bell, and, visually, by the increased intensity of the electric lamp contained within the instrument, and so allows the defect to be remedied before the density of the water in the boiler increases perceptibly.

The presence of salt in the feed water of marine boilers is ordinarily due to leaking condenser tubes and evaporators priming. In the ordinary course, the water is tested by the salinometer. However the salinometer test is dependent upon the human element, being taken as and when the engineer sees fit or finds it convenient, and it gives the amount of salt in the boiler after the salt has entered.

The McNab simplex salt detector, on the other hand, automatically detects and gives warning of the presence of salt in the feed line, before its entrance into the boiler.

The apparatus is a very simple one, and its working is based on the well-known fact that pure water has a high electrical resistance, which, however, falls very quickly if certain compounds —of which ordinary salt is one—are added to the water.

The essential part of the apparatus is a glass vessel fitted with two electrodes by which a current is passed through a sample of the feed water.

The electrodes are made of a special grade of platinum iridio, and are so arranged that no metal part of the connections is in contact with the water. This is essential to avoid the excessive corrosion which would otherwise take place. The electrodes are adjustable so that the sensitiveness of the instrument can be varied.

The instrument gives a continuous indication of the saltness of the feed, and this is done by having a small supply of feed water flowing continuously through the glass vessel. The resistance of water falls very rapidly for a small increase in the amount of salt present, and this tends to make the simplest arrangement too sensitive. To obviate this, in the Simplex apparatus, a resistance is introduced which is in the form of an incandescent 105 volt carbon lamp, contained within a brass dome on top of instrument.

S. L. KREIDER

SHIPPING

Gen'l Agent
TOYO KISEN KAISHA
WILLIAMS S. S. CO., INC.

At Los Angeles
375 Pacific Electric Building
At San Diego
239 Spreckels Building

The lamp shows no light when the water is fresh, but as soon as salt is present will begin to glow a dull red, which gradually increases to full brightness as the salt increases. This enables the officer on watch to see at a glance whether there is salt in the feed, and if so, whether it is in sufficient quantity to require immediate attention.

A meter gives a quantitative indication of the amount of salt present in grains per gallon at 100 degrees Fahrenheit.

Definite warning is given immediately the salt exceeds a fixed percentage, by a bell, which is operated by a relay connected in series with the instrument. The relay is very easily adjusted so as to operate at the desired density.

The whole apparatus is self-contained in a brass case with a plate-glass door.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of Pacific Marine Review, published monthly at 576 Sacramento street, San Francisco, Calif., for October 1, 1921.

State of California,
City and County of San Francisco—ss.

Before me, a notary public, in and for the State and county aforesaid, personally appeared B. N. De Rochie, who, having been duly sworn according to law, deposes and says that he is the business manager of the Pacific Marine Review, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of Congress of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—J. S. Hines, No. 9 Scenic Way, San Francisco.

Editor—A. J. Dickie, 1036 Mariposa Ave., Berkeley.

Managing editor—None.

Business manager—B. N. De Rochie, 943 Fresno Ave., Berkeley.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

J. S. Hines

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

B. N. DE ROCHIE.
(Signature of business manager.)

Sworn to and subscribed before me this 30th day of September, 1921.

(Seal) E. M. CLARK,
Notary public in and for the city and county of San Francisco, State of California

My commission expires April 22, 1924.

TIME AND TIDE
WAIT FOR NO INSURANCE
TO BE PLACED
• DO IT NOW •

- DRIVEN ASHORE -
WHEN THIS HAPPENS, YOU
WILL FEEL NO WORRY
IF YOUR INSURANCE
IS IN THE HANDS OF
C.H.WILLIAMSON Co
322 CALIFORNIA ST. SAN FRANCISCO.

COMMERCIAL IRON WORKS
Portland, Oregon
ENGINEERS, FOUNDERS, MACHINISTS
GENERAL MARINE REPAIRS

CAM, CRANK
STEAMSHIP
SHAFTING, SHOES
AND DIES, PULVERIZING BALLS

Forrest FORGINGS

OIL AND WATER
WELL MACHINERY
TOOLS AND
SUPPLIES

OAKLAND EDWIN FORREST FORGE COMPANY SAN FRANCISCO

MARINE WELDING COMPANY
SAN PEDRO CALIFORNIA
Barge on Call Beside Your Ship Day and Night
ACETYLENE AND ELECTRIC WELDING
MARINE BOILER WORK A SPECIALTY

LIGHTWEIGHT MARINE GENERATOR SETS

THERE has been placed upon the market recently a Westinghouse-Sturtevant marine lighting set which is especially adapted for lighting and power on shipboard. These outfits have absoute reliability, light weight, compactness and economy of operation. Both the engine and generator making up these sets embody the results of considerable engineering and manufacturing experience. Perfect automatic lubrication, elimination of vibration, low piston speed, sparkless commutation, and excellent voltage regulation are features of the design.

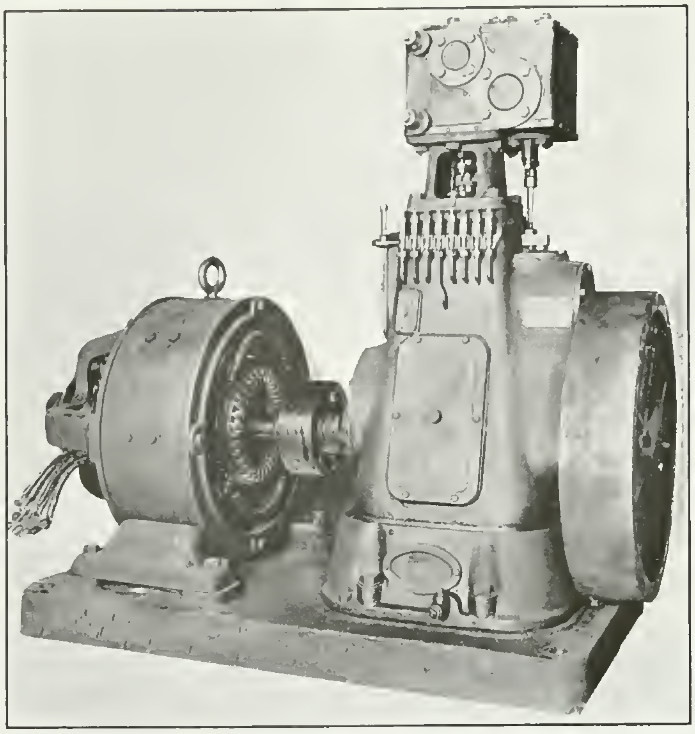
The frame is made oil and dust proof and provided with large openings having cast iron covers in such a position as to give ready access to all parts subject to wear. In the top of the frame is cast an oil reservoir for the lubricating system.

An ample distance piece separates the cylinder and frame in which are enclosed a watershed partition and stuffing box, together with the piston rod stuffing box. The watershed partition prevents the water from the cylinder leaking into the frame and the oil in the frame from being carried into the cylinder.

The cylinder is of close grained iron, of a special mixture insuring absolutely homogeneous castings, cast in one piece with the valve chest. Both are thoroughly insulated with non-heat conducting material and covered with a lagging of planished steel. The cylinder is equipped with relief valves of large diameter, which may be adjusted to open at any desired pressure. These guard against damage due to water coming over with the steam.

The valve is of the piston type and operates in a renewable bushing, which forms the valve ports. The valve is connected by means of the valve stem, slide eccentric rod and eccentric strap to the eccentric attached directly to the governor. All pins and rods are of open hearth steel and the bearing pins are hardened and ground.

The engine is equipped with an inertia governor of the well known Rites type. This governor is placed in a heavy fly wheel and is capable of very close regulation, keeping the variation between no load and full load as low as one and one-half per cent.



Lightweight Westinghouse-Sturtevant steam driven marine type generating set

The piston is of cast iron, cored for lightness and fitted with cast iron snap packing rings, turned to perfect contact. It is pressed to a taper fit on the piston rod, and is further secured by a nut pinned to the rod. Both the connecting rod and the piston rod are of open hearth forged steel, each in a single forging. The crank pin end of the connecting rod is provided with malleable iron, marine type boxes, and the cross-head end is fitted with brass boxes of the same design.

The crank shaft is of open hearth steel made in a single forging, machined all over and carefully fitted with balancing counter weights secured to the webs, the crank pin being hardened and accurately ground to size.

The lubricating system is automatic, continuous and self-contained, requiring no independent tank or reservoir. In engines having gravity type lubrication the oil is pumped from the reservoir in the base by a chain driven rotary pump which is entirely submerged in the oil, to the upper reservoir cast in the top of the frame. From here it flows by gravity through brass pipes to the various bearing surfaces requiring oil, then back to the reservoir in the base, where it is strained and pumped again. Where a forced feed system of lubrication is furnished, the submerged pump forces the oil under pressure through brass pipes direct to all parts requiring lubrication. The oil then drains back to the base, where it is strained and again forced through the system. An oil well level gauge is supplied, attached to the outside of the base.

With every engine there is regularly furnished an automatic hydrostatic type lubricator, a set of wrenches and anchor bolts with plates when required.

The Westinghouse type "SK" generators forming part of these sets, have all the good features that have made the "SK" line of motors and generators so successful in general utility service and in numerous special applications. In addition the generator is especially constructed to meet the requirements of marine service.

The frame is forged from open hearth steel, eliminating the possibility of blowholes as in cast material and resulting in a light compact but strong construction.

The bearing on the generator is a solid steel shell, babbitt lined and so constructed that no leakage of oil will occur with listing of the ship.

The armature coils are so constructed that no crossovers on edge occur, thus eliminating a prominent cause of armature insulation breakdown. Both armature and field windings are impregnated with a special compound for resisting the moisture and salt atmosphere found in marine service.

One of the fundamental ideas of the design is the open, well ventilated construction. The air can circulate freely through the generator, coming in through contact with all internal parts and thus eliminating the possibility of internal hot spots which in time could not fail to have a damaging effect on the insulation.

Sparkless commutation results from the application of commutating poles and consequently the wear of commutator and brushes is reduced to a minimum. This is especially so since the speed of these sets is relatively low. The brush position is fixed before the set leaves the factory and never requires any adjustment.

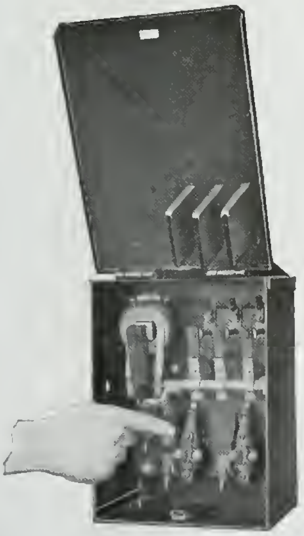
Non-corrosive material is used for brush holders and all parts which might be effected by moisture.

New Automatic Starter For Squirrel Cage Motors

Provides for Generous Starting Current and Protects Motors Against Burnouts

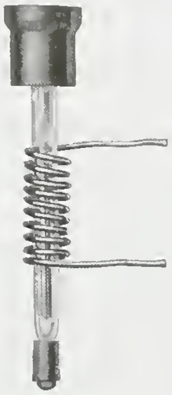
THE new 9604 automatic starter developed by the Cutler - Hammer Manufacturing Company for small squirrel cage motors allows a large starting inrush for several seconds but at the same time gives positive protection against burnout troubles. The two unique mercury overload relays mounted below the contact fingers eliminate all fuse troubles and the attendant expense, while they allow momentary overloads and overloads as high as 25 per cent for a limited period. They absolutely prevent harmful overloading of the motor.

The new C-H overload relay consists of a glass tube carrying a mercury column which forms a part of pilot circuit of the magnetic switch coil. A portion of this column is surrounded by a heating coil or thermal element. This element is in series with the motor circuit and is heated in the same proportion as the motor windings. Excessive current passing for too long a period heats the coil, causes the mercury to boil and the vapor to pass up into a chamber at the top of the tube. This action breaks the liquid mercury column and opens the circuit to the magnet coil. As this coil is deenergized, the contact fingers drop away and disconnect the motor from the line. After such an interruption, the mercury cools down, becomes liquid again, drops back into the tube so that the pilot circuit to the magnet coil is complete when the control button is depressed



Automatic starter with cover open, finger indicating position of mercury overload relay.
Cut by Courtesy W. M. W.

As the functioning of these overload relays depends upon the temperature at which mercury will boil, it is evident that the current required to operate the relay increases with the decrease in the temperature of the surrounding air. In other words, if the motor and the starter are installed in a cool location, the relay permits a greater starting current or a higher overload than if the temperature of the surrounding air were higher.



The Cutler-Hammer mercury tube overload relay
Cut by Courtesy W. M. W.

The push button station which is supplied with C-H 9604 starters can be installed in any position that is most convenient for the operator. The time saved by using an automatic starter in place of a manually operated starter depends of course upon the frequency with which the motor operated machine is started and stopped, but even with comparatively few starts and stops, the time saved is surprising. The new starters are being used in connection with all kinds of machinery which is driven by squirrel cage motors of comparatively small horse power—7½ horse power and less.

REINFORCED by wide experience covering many important marine operations, the Willamette plant is well prepared to undertake and complete your work with satisfaction, economy and dispatch.

MARINE MACHINERY
MARINE AND STATIONARY BOILERS
DECK MACHINERY AND AUXILIARIES
MARINE REPAIRS OF ANY CHARACTER

Willamette
IRON & STEEL WORKS
Portland, Oregon, U. S. A.

1043 Monadnock Bldg.,
San Francisco, Cal.
1920 L. C. Smith Bldg.,
Seattle, Wash.
Canadian Office
916 Rogers Bldg.,
Vancouver, B. C.

NOTABLE PNEUMERCATOR INSTALLATION

Control of Oil Fuel Tanks on S. S. Paris

THE Technical Bulletin of the Bureau Veritas for July, 1921, features a very interesting article on the pneumercator as installed on the new liner Paris of the Campagnie Generale Transatlantique. The Paris is propelled by quadruple screws driven by Parsons type turbines, steam being supplied by fifteen double end boilers burning fuel oil. She is 765 feet long and on her maiden voyage averaged better than twenty-one knots at sea, her turbines developing 32,000 horsepower. She carries 6161 tons of fuel oil, which is ample for the return voyage from Havre to New York.

The oil is stored in forty-eight compartments*; all the tanks and ballast tanks are provided with steam heating pipes, allowing the use of even the thickest oils which, when heated to a temperature of 70 or 95 degrees Fahrenheit, are made sufficiently fluid to run through the feed pipes.

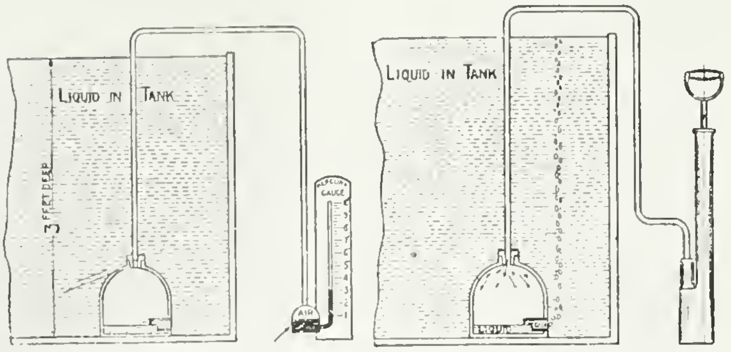
All the tanks are connected to a double feeding system, enabling either the burner pumps to be fed direct, without passing the oil through the settling tanks, or to feed these pumps with oil from the settling tanks, or to feed the oil from the lower parts of the lateral tanks or ballast tanks to the settling tanks, to have the water drained off; the latter operation is carried out by means of special transfer pumps, three in number, and can be carried out at all times on account of the double feed system.

All the various oil tanks of the SS. Paris have been fitted with "pneumercator" gauges.

The pneumercator system is an application of the pneumatic transmission of hydrostatic pressure due to a column of liquid to a distant observing station whether the liquid column be the height of a tide, the level of a river or reservoir, the depth of liquid in a storage tank employed in some industrial process, the fuel oil in a ship's bunker or otherwise.

Essential Features

An inverted hollow hemispherical vessel is fixed at or near the bottom of the tank. In its side a sharp edged orifice is cut which forms the datum or zero line from which measurements are made.



Diagrammatic representation of the principle of the Pneumercator tank gauge

To this balance chamber, as it is styled, a small air pipe is connected and led away to the distant indicating gauge. This pneumercator gauge is a mercury column pressure indicator.

Near the gauge is located a hand operated air pump connected up to the system by means of the control cock which is an important feature of the system.

Principle of Operation

Imagine the tank empty and that liquid is pumped in; as soon as it covers the sharp edged orifice air is trapped in the balance chamber. As the level of liquid rises in the tank the head of liquid above the orifice impresses a corresponding pressure on the imprisoned air, which pressure is transmitted by the small air tube to the mercury indicating gauge.

The control cock allows of this pressure being applied to or cut off from the gauge, or again allows of the gauge being isolated and vented to atmosphere. It further allows of the air pump being connected directly to the balance chamber by way of the air piping.

Since, as the head of liquid and consequently the pressure on the imprisoned air, is increased, its volume will decrease, liquid will enter the balance chamber and thus cause a false datum of measurement by raising the liquid level in the balance chamber slightly above the orifice or datum level.

This is overcome by the provision of a simple hand air pump, which, used in conjunction with the gauge control cock, allows of air being pumped into the system so that the liquid in the balance chamber is depressed to the sharp edged orifice and thus the datum of measurement is maintained.

A few strokes of the pump are made before each reading so that all readings are made with a perfectly definite datum of measurement.

During the use of the air pump any excess air pumped in freely bubbles out at the balance chamber orifice and does not affect the datum level.

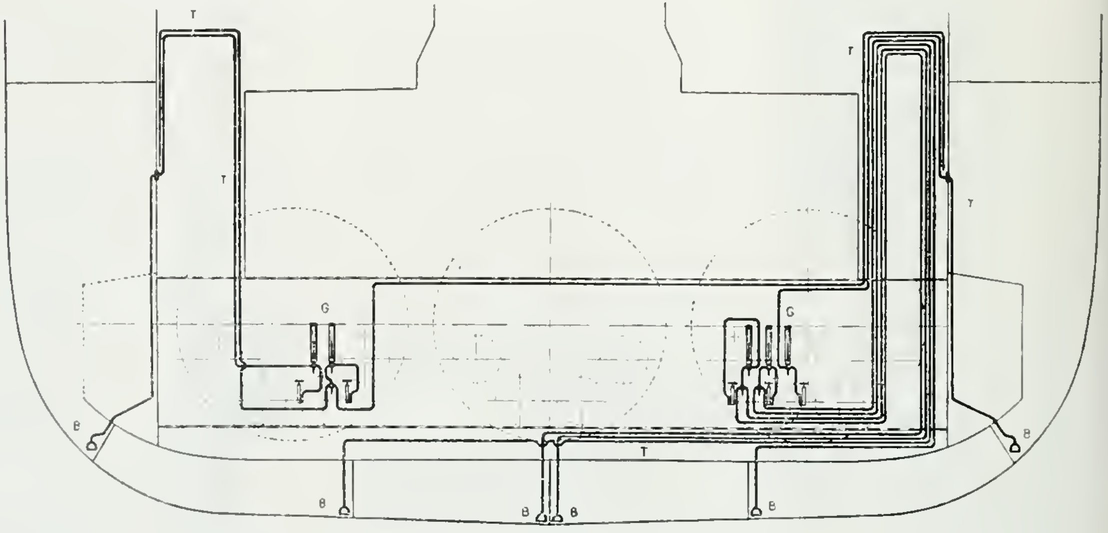
By means of the control valve the air pumped into the system is deflected past the gauge, so that no air flow through or over the indicating mercury which would tend to oxidize the mercury and render it sluggish in the gauge indicating tube, is allowed.

The control valve is now turned to connect the balance chamber to the gauge so that the pneumatic pressure in the balance chamber due to the head of liquid above its orifice (and datum level) is transmitted through the air tubing to the mercury gauge and the mercury column rises to a height equivalent to the head of liquid in the tank.

By putting the control cock to "vent" the mercury chamber as well as the upper end of the indicating gauge tube are opened to atmosphere and the mercury falls to the datum level zero on the gauge scale. Thus the gauge zero can be checked at any time.

The operation of the air pump before taking a reading insures the correct maintenance of the datum level in the balance chamber. If insufficient air had been pumped in, the fact is disclosed by repeating the operation when a higher reading on the gauge will be obtained, thus, the gauge is self-checking.

(Continued on next page)



Diagrammatic representation of the Pneumercator installation in the fuel oil tanks on the transatlantic liner Paris

NEW MOTOR TUG FOR HARBOR BOARD

THE Board of State Harbor Commissioners for the harbor of San Francisco have let the contract for the engine for their new inspection and tug boat to the Enterprise Engine Co.

The boat is being designed by D. W. & R. Z. Dickie and is of the following dimensions:

Length over all	57′ 0″
Length from the rabbet of the stem to the back of the sternpost at the shaft	48′ 6″
Length from the rabbet of the stem to the inside of the guard at the stern	56′ 0″
Length from the rabbet of the stem to the center of the rudder stock	52′ 6″
Displacement length	50′ 0″
Beam molded at the waterline	14′ 0″
Beam over plank at the waterline	14′ 4″
Beam over guards	16′ 0″
Beam molded at the deck	14′ 8″
Beam over plank at the deck	15′ 0″
Crown of beam	2″ in 15′
Draft forward at the forefoot	4′ 6″
Draft at the sternpost	6′ 3″
Mean draft keel	5′ 4½″
Freeboard at the lowest point of sheer	2′ 9″
Sheer forward	3′ 2″
Sheer aft	12″
Depth of hold	6′ 2″
Depth from the top of the deck at the side to the rabbet line amidships	7′ 10″

The harbor board desired an engine for this boat which could successfully use ordinary fuel oil as stored in their tanks from which they furnish fuel for the steam boilers of their tugs and dredges. Certain tests carried out by the writer had shown the suitability of the Enterprise Diesel engine for burning this fuel; further tests, as hereinafter described, fully justified the selection of this very efficient San Francisco built engine.

In the Enterprise engine the fuel is supplied by what is known as solid injection into a cup when the piston is at the bottom of the stroke at 10 pounds pressure or less. Compression takes place up to 480 pounds plus or minus, sufficient air being forced back through the holes into the cup to cause partial ignition therein, whereupon the unignited part of the fuel is forced out into the cylinder where combustion takes place. The expansion of the fuel delivers the power to the piston on the down stroke.

The up stroke is the scavenging stroke and the next downward stroke draws fresh air (oxygen) into the cylinder for the next cycle, making a four-cycle engine.

The fuel used is what is known commercially as fuel oil, and for starting in cold weather a lighter oil known as Diesel oil of 24 degrees Baume is used, the characteristics being as follows:

Sixty Degrees Fahrenheit	Fuel Oil	Diesel Oil
Baume (usually sold as 14), degrees	18.37	24
Specific gravity	.9436	.9091
Pounds per U. S. gallon	7.858	7.571
Ash (passes 200 mesh), per cent	.024	.037
Asphalt (residue steam distillation by weight), per cent	35.49	3.41
Sulphur, per cent	.65	.45
British thermal units, per pound	18,689	18,916
British thermal units, per gallon	146,858	143,213

The Diesel oil is used at 60 degrees Fahrenheit and has a viscosity of 122 seconds Saybolt meter.

The fuel oil has the following viscosities in seconds Saybolt at the temperatures given, it being necessary to heat this fuel in order to get it to flow through the pumps and small holes of the injection nozzles: (time for 60 cubic centimeters to pass.)

60 deg. Fahr.,	1329 sec.
70 deg. Fahr.,	880 sec.
80 deg. Fahr.,	600 sec.
86 deg. Fahr.,	488 sec.
90 deg. Fahr.,	428 sec.
100 deg. Fahr.,	312 sec.
110 deg. Fahr.,	233 sec.
120 deg. Fahr.,	179 sec.
130 deg. Fahr.,	140 sec.
135 deg. Fahr.,	122 sec.
140 deg. Fahr.,	110 sec.

The Enterprise Diesel Engine Company is running on the fuel oil at 86 degrees Fahrenheit, the viscosity at this point being 488 seconds Saybolt, or 36.7 per cent of the viscosity of the fuel oil at 60 degrees Fahrenheit, but on the other hand four times the viscosity in seconds of the 24 degree Baume Diesel oil.

This heating is accomplished by means of a heating element placed in a coil through which the fuel oil is passed from the tank to the pumps, the heating of the oil to 86 degrees Fahrenheit giving a viscosity suitable for handling nicely by the small fuel pumps.

A rather curious condition was found in the fuel oil market, it being discovered that the fuel oil usually sold as 14 degrees Baume tested 18.37 degrees and no oil could be found commercially which would test as low as 14.

Test Results

Horsepower rated, 100.
Horsepower by test, 109.59 to 121.2.
Good average h. p., 112.6.
Brake mean effective pressure, 74.8.
Bore of cylinder, 9¼ inches.
Stroke, 14 inches.
Number of cylinders, 4.
Revolutions per minute, 318.
Weight in pounds, 21,950.
Average fuel per h. p. hour, .405 pound.
Horsepower per gallon, 19.61.
Fuel used, 18.37 deg. Baume.
Pounds per gallon, 7.858.

This test showed conclusively that the Enterprise engine would run satisfactorily on the fuel oil, and specifications were written covering the installation of a 100 horsepower Diesel engine, as no gas engine had any chance to compete in cost of operation. In fact, the boat had only to operate 1 hour and 12 minutes per day for 300 days a year for the gas engine to cancel out, as the fuel cost of the gas engine was 349 per cent that of the Diesel engine.

Pneumeracator Installation

(Continued from page 56)

Changes of temperature of the air line system have no effect on the accuracy of the gauge. If, for example, the air line is heated up, the air in it expands and the excess volume bubbles out at the balance chamber orifice. If the air line is cooled and the air in it contracts, the tank liquid rises very slightly in the balance chamber, but when the air pump is operated for the next reading the air volume is restored and the datum level regained.

Since the transmitting medium is air only, the gauge may be above or below the tank or at any reasonable distance from it.

On board SS. Paris there are 20 deep bunker tanks, 24 double bottom tanks, 2 expansion tanks and 2 settling tanks, making 48 in all, fitted with pneumercator tank gauges.

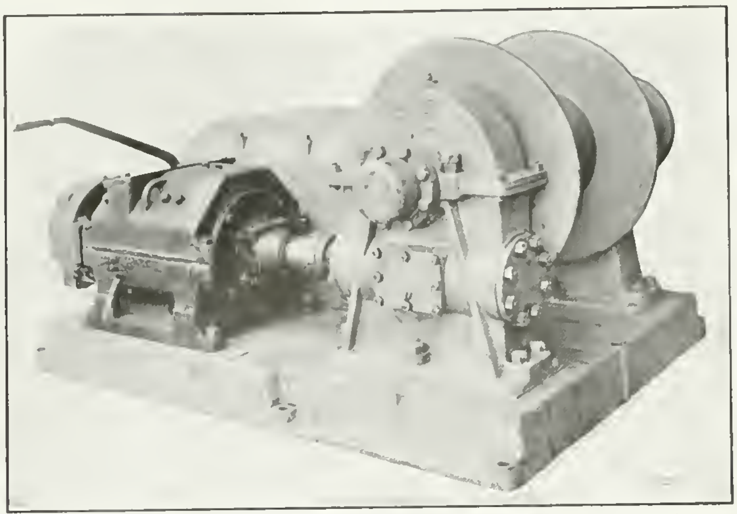
The deep bunker tanks and the double bottom tanks are divided into pairs, one gauge being arranged to measure the contents of both tanks forming a pair, being connected to either tank at will by means of valves fitted near the gauge.

Each of the expansion tanks is supplied with a separate gauge fitted with electical alarm gear to give signals when these tanks are 25 per cent full and when 95 per cent full. The settling tanks are also fitted with a separate gauge, each with alarm gear to operate when the tanks become 95 per cent full.

The pneumercator gauges are grouped at convenient observing stations in the various boiler rooms.

The gauges are scaled to show the weight of oil in the tanks. Such scales are found to be specially convenient in connection with the settling tanks, as they permit of consumption tests over given periods being made by direct weight observation.

MARKEY ELECTRIC AUXILIARIES



Compact electric worm drive cargo winch as manufactured by the Markey Machinery Company of Seattle

FOURTEEN years ago, the Markey Machinery Company of Seattle started operations building deck machinery mostly for local business in the Pacific Northwest and Alaska, but during the war the demand for their products became more general and such that it was necessary to enlarge their plant and capacity to turn out deck equipment and steering machines for both steam and motor vessels and to take care of the demand for the installation of oil engines.

In connection with the various motorship installations a demand arose for high-grade electrical deck machinery, such as cargo winches, anchor windlasses, deck capstans and steerers, and through such demand a line of high-grade machines has been developed, of which the latest is the worm drive cargo winch which is a machine of refinement to a degree not generally found among deck machinery.

Worm Gear Winch

High grade steel is used for the worm and after cutting it is thoroughly heat-treated and hardened and the surface of the threads ground and polished to reduce friction to a minimum. The worm wheel is a phosphor bronze rim with the teeth accurately cut, mounted upon a steel spider. An efficiency as high as 95 per cent has been obtained with this combination. To obtain these results from the worm drive it is necessary that the parts be mounted in proper bearings so that little power is absorbed at these points, and with this in mind ball bearings of the highest grade were selected which are self-aligning in nature so that even comparatively great distortions in the shafts do not affect the running of the bearings.

Controller and resistance are totally enclosed within a ventilated housing on the base-plate beside the motor and the hand control is such that it is operated vertically much in the same manner as the control for a reversing valve steam winch. The winches may be set in pairs in such position that two machines can be operated by one man.

A magnetic disk brake attached to the motor and braking on the motor shaft is so connected through the controller that the use of current by the motor releases the brake, but as soon as the current is shut off the brake is applied. Dynamic braking is used in lowering the load so it is always under perfect control and may be stopped without sudden shock.

Electric Steerer

In the electric steerer care has been taken to follow a well-tried system which has proven satisfactory. The non-follow-up method of control which eliminates numerous parts and which has proven so satisfactory in use in the United States Navy has been adopted. There are no mechanical connections between the steerer and the control stand; telemotors are eliminated and all connections are strictly electrical.

The motor is in operation only when it is desired to move the tiller from one position to another. By means of the master control on the bridge through the panel upon which the automatic switches are mounted, the motor is in control of the steersman and the rudder can be moved to any angle.

If it is desired at any time to operate the steerer by hand, it is only necessary to loosen the clutch, which is incorporated within the worm wheel, by a few turns of the nut on the end of the screw shaft. This disengages the electric drive and leaves the machine free to be turned by hand.

An electric helm indicator is placed in the stand which supports the control at the bridge and regardless of electric or hand steering the indicator at all times shows the position of the rudder as the source of current is independent of the ship's electrical set.

Many of these electric steering gears have been installed and have proved satisfactory in every particular. With a few minutes of handling a steerer of this nature one will immediately grasp the advantages due to the simplicity of the entire equipment. Both initial and maintenance costs are claimed to be lower than with other systems.

Electric Deck Capstan

In the electric deck capstan the design of a neat, compact machine with clear-cut lines has been accomplished. The drive from the motor to the capstan head is by means of a combination of worm gear and spur gear reductions. This mechanism with the motor, controller and resistance are mounted upon a bed plate over which is placed a housing completely covering all of the working parts and protecting them from the weather and water which might come aboard, provision being made for ventilation of the housing when the machine is in use.

The capstan is so designed that by arranging with the builders at the time of order it can be made to set on the deck, or with flanges so placed that the machine can be set with the top of the housing flush with the deck or the machine proper placed on the deck below the capstan head with an extended shaft driving the head.

New Method of Repairing Canvas Covered Boats

CUT strips of cotton cloth about an inch wider and longer than your tear, then lift up the edges of the tear, melt some Jeffery's special marine canoe glue and paint on the wood. Lay the cotton on the glue and iron it out smooth with a hot flat iron. Give the cotton a coat of glue, lay the canvas in position and iron as before. If the edges are badly frayed give them a special coat of glue, after which give it a coat of shellac and paint any desired color.

By this method you will see that the patch is on the under side of the canvas and all that shows is the cut. After painting, however, the cut will be hardly discernible.

Method No. 2

Melt the glue until it is about the consistency of thick paint. Turn back the edges of the cut and paint the glue on the wood about an inch back all around the cut, then lay the canvas back over the glue and iron with a hot flat iron.

If the edges are badly frayed or far apart, and if it is a bad tear, paint on another coat of glue and lay over this a piece of canvas, cotton or silk about an inch larger than the tear, then iron with a hot flat iron. After this is done give it a heavy coat of shellac and paint any desired color. Jeffery's special marine canoe glue is distributed in the United States by L. W. Ferdinand and Company of 125 Kneeland street, Boston, Massachusetts.

Trade Literature

Tobin Bronze—The American Brass Company, Ansonia Branch, Ansonia, Connecticut.

Tobin bronze is manufactured solely by the American Brass Company, and its exact composition has been kept a trade secret with that firm.

It is claimed, however, that this composition falls within the following limits: copper, not less than 59 per cent nor more than 63 per cent; tin, not less than one-half of one per cent nor more than one and one-half per cent; zinc completes the composition, with small quantities of ingredients to improve the quality. No aluminum, lead or iron is used. The result is an alloy of bright golden color remarkable for its tensile strength, high yield point, toughness and uniformity of texture, and resistance to corrosion.

These properties make Tobin bronze adaptable for a number of marine uses, such as pins for blocks, davits, deck bolts and ship fastenings, disk valves for marine purposes, center boards, rudders, hull plates for yachts, marine instruments, motorboat, torpedo boat, and yacht shafting, propeller blade bolts, and any other use which requires high resistance to corrosion combined with high tensile strength.

The booklet gives specifications for the various standard and special bronze rods, tubes, sheets and plates, and contains a number of interesting facts about the use of bronze and a very convenient selection of tables for conversion from metric to English measure. It is very attractively gotten up, bound in brown pressboard with black and gold stampings.

Wheeler Condensers — Catalog 112 C — Wheeler Condenser & Engineering Company, Carteret, New Jersey.

The name "Wheeler Condenser & Engineering Company" has become synonymous with the highest type of mechanical equipment combined with a service cheerfully rendered and backed by a guarantee of good faith.

This catalog of 57 pages, attractively bound in black pressboard with red stampings, illustrates and describes a complete line of condensers and accessories for stationary and marine service, including Wheeler condensers, vacuum pumps, centrifugal pumps, cooling towers, condenser tubes, feed water heaters, etc. Many of the designs described are of special interest to power plant engineers, since they represent most recent engineering improvement. Among them are: a new design of a 26-inch vacuum surface condensing equipment adapted for engine work and dispensing with combined auxiliary pumps; the Wheeler steam jet air pump with combined inter-condenser and heater operating at maximum efficiency without complicated and expensive accessories; the Wheeler jet condenser with expansion joint between condenser body and a turbine and a centrifugal removal pump having a special vertically split casing. In a section devoted to Crescent brand condenser tubes, the precision that enters into each step of the manufacture of the highest quality tubes is explained. A condenser data sheet is included with each copy.

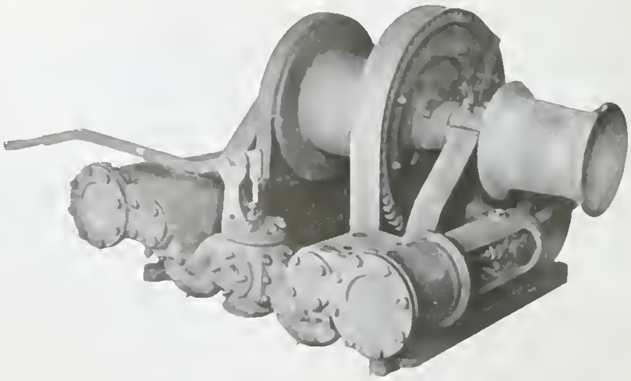
Rego Welding and Cutting Apparatus—Catalog No. 23—The Bastian-Blessing Company, 125 West Austin Avenue, Chicago, Illinois.

An attractive 40-page book with three-color cover describing in detail the various types of Rego welding and cutting torch equipment, the Rego welding and cutting regulators, and special combinations of this apparatus in outfits for various purposes.

A number of special fittings and tools are also listed and considerable data on torch pressures and consumption of gas.

He Is Safe. A mail folder published by the Westinghouse Electric and Manufacturing Company.

This attractive folder describes the Krantz safety auto lock switch of the various types manufactured by Westinghouse, the Krantz safety panels, safety motor starting switches, and floor boxes.



FOR SALE
Specially Priced
HELSER MARINE WINCHES
Three 8¼ x 8
One 9 x 9 Standard
Two 9 x 9 Heavy Duty
1—9x9 Compound Geared Throttle Reverse Warping Winch with extended shafts
1—7x9 Enclosed Type Hesse-Martin Steam Capstan

Lifting capacity on single line, 8¼x8, 10,000 pounds; on straight line, 9x9, 12,500 pounds, on straight line. All throttle reverse. Piston valves. Gear ratio 5 to 1.

Wire or Write

Helser Machine Works, Inc.
PORTLAND :: :: OREGON

Ship Repairs by Experts

Builders of Seventeen steel vessels, including their engines, windlasses and condensers.

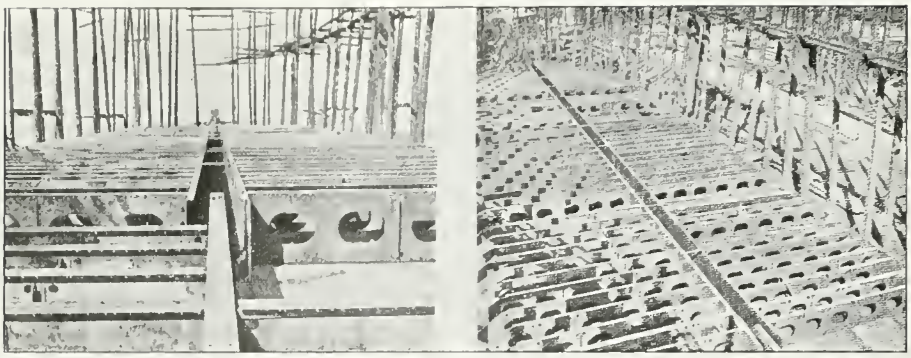
GENERAL MARINE REPAIR WORK
HULL AND ENGINE

Contractors for some of the largest Repair Jobs Ever Done at the Port of Portland.

Drydock Facilities Ample for Vessels up to 15,000 Tons.

Albina Engine and Machine Works
PORTLAND OREGON

THE DUCT KEEL



Views of ship framing in a British shipyard showing the application of the duct keel principle

FOR a number of years past there has been a constant increase in the piping installations on board ship. The number and size of pipes necessary to handle increased services in the way of sanitary, heating and circulating work, and in the carrying of the supply of fuel oil from the tanks to the boiler room or service tanks on motorships has led naval architects into many attempts to do away with the piercing of watertight bulkheads by these numerous pipe lines.

Not a few designs have been brought out during the past twenty years incorporating into the structure of the ship tunnels for pipe service, these tunnels being worked with structural watertight joints at all watertight bulkheads, having vertical access trunks leading to the first deck above the water line, and giving ready accessibility to all pipes installed in the tunnel and at the same time preserving the watertight integrity of all divisional bulkheads.

During the war there was developed in England a very simple solution of this problem called the duct keel. This consisted in a keel of box girder construction which could very readily be incorporated in the design of any existing vessel without detracting in any way from the cargo space and with very little subtraction from the capacity of the double bottom tanks as fuel oil carriers. The construction is so simple that it can readily be incorporated either in the full length of the vessel's structure or in any part thereof.

As will be seen from the accompanying illustration, the duct keel is in reality two keels spaced three feet apart and running free of any cross bulkhead between the keels for the entire, or any part of the, length of the ship. This form of keel construction gives a very great number of advantages. The cargo holds, bilges and tanks are kept clear of piping. The divisional watertight bulkheads are kept absolutely intact. All piping is protected from damage by cargo without the aid of protective coverings such as are necessary in all hold bilges. The piping is always accessible for overhaul and repair work without moving cargo or waiting in port for cargo to be cleared. The cargo is isolated from all piping and is, therefore, protected from damage due to leaky pipes.

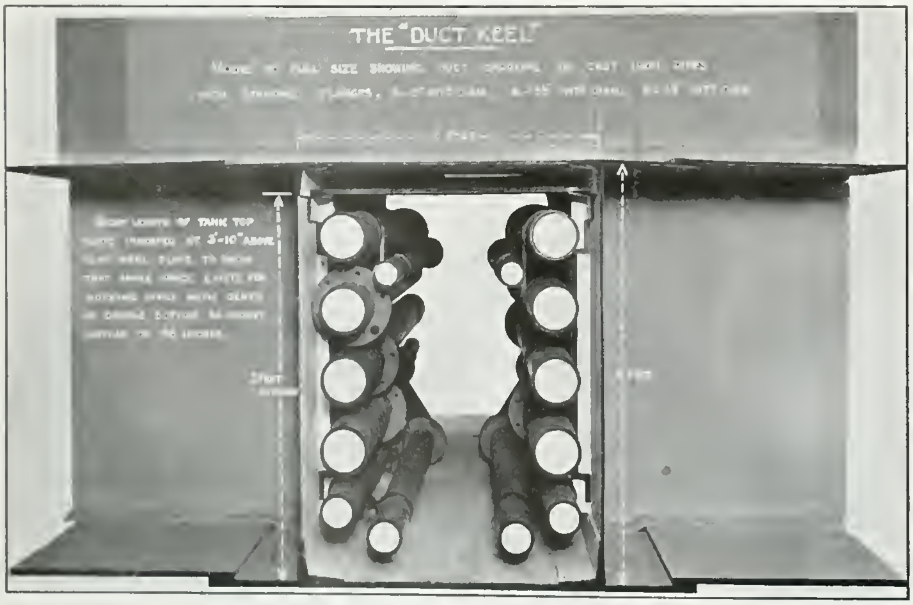
The double vertical keel plates make the ship stronger longitudinally, while at the same time weight is saved in the structure, in piping and in ceiling. The piping can be used in longer lengths with fewer flanges, and no ceiling is necessary for its protection. For this reason the ship is cheaper to build and cheaper to operate, the upkeep of piping being much less and the delays due to damaged pipes being minimized.

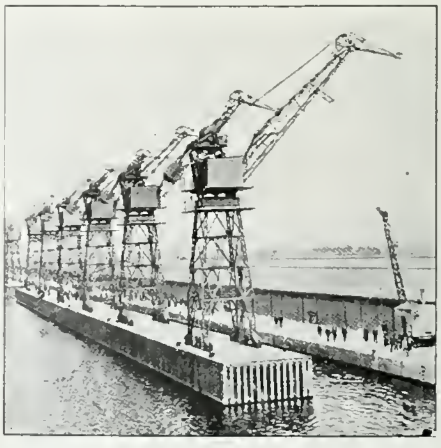
Over 150,000 tons deadweight of shipping now on order have the duct keel specified, and undoubtedly many other vessels will be designed for the use of this simple and eminently practicable construction.

In vessels with machinery amidships such as the eight fast cargo steamers now under construction at the Haverton yard of the Furness Shipbuilding Company, Ltd., the duct keel is used for the accommodation of all bilge and ballast suction pipes and tank heating pipes forward of the boiler room compartment, while those to the after compartments are led along the shaft tunnel. In vessels with the machinery aft the duct keel would be advantageously used for all of the piping to the cargo holds and the tanks in the entire ship.

Structural designs and scantlings for practically all standard cargo vessels incorporating the duct keel idea have received the unqualified approval of the classification societies for the highest rating.

The McNab Company of Bridgeport, Connecticut, U. S. A., are distributing agents for the duct keel in the United States and Canada.





Traveling electric tower cranes installed on the jetties in the new George V dock, London, England, showing the new Babcock and Wilcox luffing gear which is attracting a great deal of attention in European ports and has been found to be very expeditious and economical in handling heavy slingloads of general cargo.

MARINE UNSINKABLE SAFE DEPOSIT VAULT

COMPARATIVELY recently there was developed and patented a cylindrical burglar-proof, fire-proof and non-sinkable vault for installation on board ship. The experimental work which resulted in this fully developed device was performed under the stimulus to the inventor's imagination lent by the numerous sinkings of ocean-going vessels and especially by the Titanic disaster, when the loss of valuables was estimated at millions of dollars.

The vault is called an ocean-floating safe, and the Ocean Floating Safe Company in Chicago is its manufacturer. This well established firm is installing these safes on ocean liners, either on a rental or a percentage basis, in much the same way that many of the great safety devices at sea, such as the Marconi wireless telegraph, were first introduced into the merchant marine service.

This unsinkable safe is cylindrical in shape. Made of double steel walls, it is stronger, more modern and more secure than any ordinary safe. The space between these walls is filled with a secret composition hard as cement and as light as cork. It has no air chamber of any kind, and is so constructed that it is absolutely impossible to sink it. This cylinder is secured in a tube or well built into the vessel in such a manner that, in the case of accident to the vessel, as soon as the tube is submerged its cover is automatically released by the water pressure and the safes float out of the tube and remain on the surface until picked up. The tube and its safe may be so installed and so located on either a new or old vessel that in forty-eight hours, without interfering with schedules, it is ready to operate. It takes up no space which would be needed for any other purpose and requires no alterations in the construction of the vessel.

In large passenger vessels the complete system is so constructed that a separate compartment with a separate safe opens on each deck, each compartment being entirely separated from the others, but still a part of the entire system, permitting easy access in much the same manner as if each deck were equipped with a safety deposit vault.

A substantial amount of personal valuables, jewelry, mail, papers and express matter may be thus carried with perfect assurance that in the event of accident to the ship these safes will be recovered with their contents.

The service plan of the Ocean Floating Safe Company is designed to introduce these ocean-floating safes to steamship companies in a manner that will insure to the steamship company a steady source of income without any initial expense. The company pays for all the initial equipment necessary, makes the complete installation on the vessel and furnishes the personnel to maintain and operate it continuously, dividing the profits with the vessel. This service may, in the advertising matter of the steamship company, be made to recommend itself very highly to passengers and, therefore, be considerable of an advertising asset to the steamship company itself. The safety deposit features offer the greatest source of income; but the service is also intended to cover mail and valuable express packages in such a manner that a substantial increase in tariffs may be made.

The ocean-floating safe has been subjected to a very great number of very searching tests and has proven its ability to remain afloat under the most adverse conditions and to withstand all of the ordinary attempts to which standard burglarproof safes are subjected by the safe-cracker.

Certainly steamship operators should avail themselves of this opportunity to demonstrate their willingness to give every assurance to their patrons of safety to their valuables at sea, especially when the service is offered to them on such a generous basis as this, which guarantees to them an income at no initial expense.

Conditioning the SS. St. Louis for World Trade Cruise

FIVE hundred men are at work reconditioning the steamship St. Louis in readiness for her world trade cruise, beginning in January, 1922, and ending the following December. On this cruise the St. Louis will carry the exhibits of 300 to 350 American manufacturers to the four points of the compass.

The contract for the conditioning of the famous liner was awarded to the Todd Shipyards Corporation by the Anderson Overseas Corporation, owners of the St. Louis. The work will be performed at the Robins Drydock and Repair Company's plant in Erie Basin and will provide employment for hundreds of shipworkers until after Christmas. The actual cost of conditioning the St. Louis has not been stated, but it is believed that it will run into many thousands of dollars. The contract calls for the ship to be complete and ready for sea in the early part of January.

According to the specifications, the St. Louis will be converted into an oil-burner by the installation of Todd burners and will be equipped with every known modern device for the comfort and safety of her passengers. The arrangement of the ship will differ to some extent from what it was at the time when she was the crack ship of the American Line. Because of the climatic conditions to be met with during the eleven months' cruise, a ventilation system which will serve all the inner and lower rooms in hot countries, and a heating system which will make the same rooms and quarters comfortable in cold countries, have been fully arranged for.

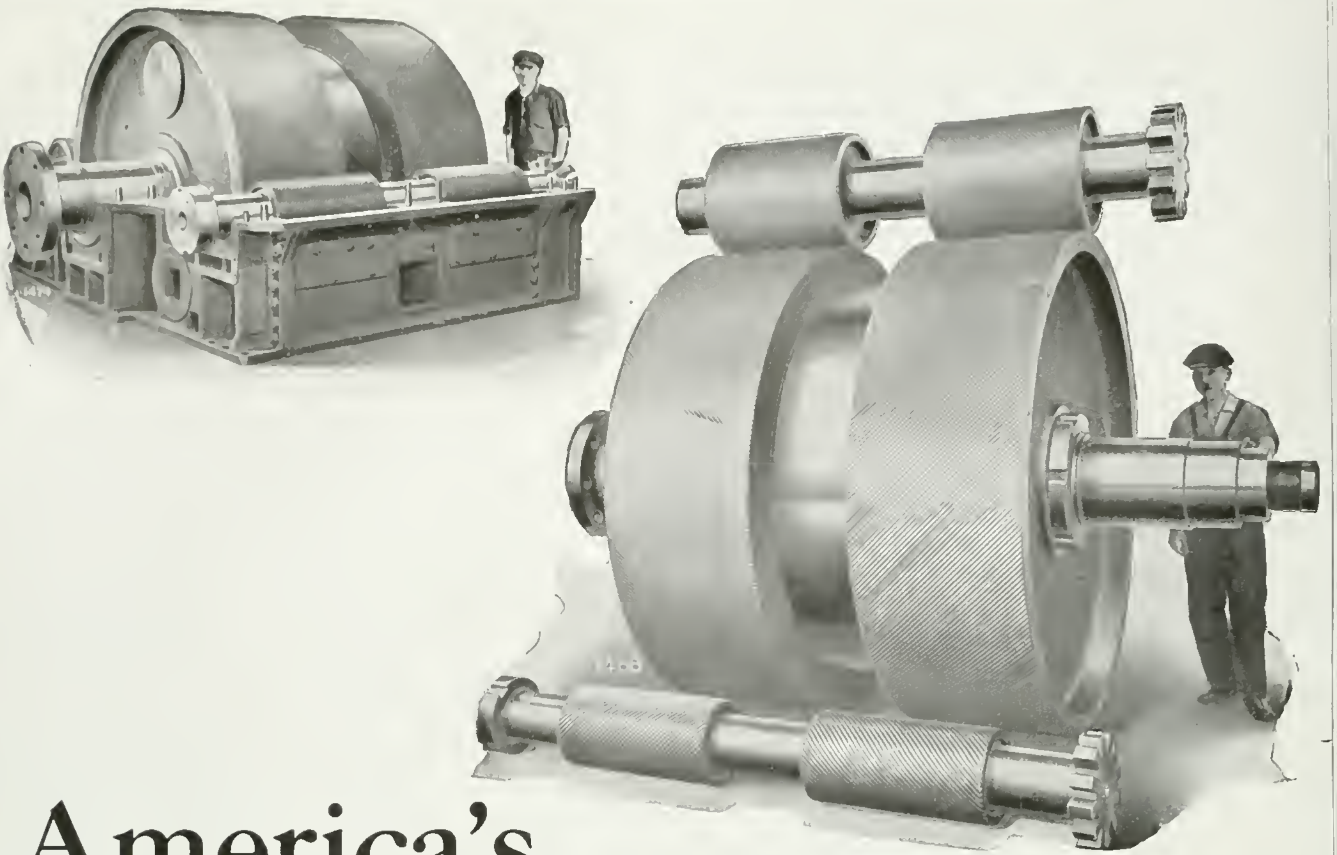
A fully equipped hospital, with isolation ward, operating room, etc., is also included in the plan. On account of one entire deck having been reserved for exhibition purposes, as well as portions of three other decks, great care had to be exercised so that the comfort and safety of the passengers would not be interfered with. One exhibition deck, however, will have uninterrupted space for exhibits of about 550 feet long. This does not include the automobile section, which will carry practically a New York autmobile show around the world.

At the offices of the Anderson Overseas Corporation it was stated that strict instructions were given the Todd Shipyards Corporation that the St. Louis when finished must be as modern as any ship afloat, as comfortable as the most comfortable, and as safe as it is possible to make her—the pride of the American nation, whose manufacturers' products she will carry to the four quarters of the globe.

The Anderson Overseas Corporation states that accommodation and space on the St. Louis for the world trade cruise will probably be over-sold by October 15, most of the large cities in the United States having taken an active interest in the project with the aim of having their industries well represented and their cities advertised.

The St. Louis was the first 100 per cent all-steel American steamer ever built, and at the time was the fastest and most modern and the finest ship afloat. She was a product of the famous Philadelphia yard of the William Cramp & Sons Ship & Engine Building Company. She was christened by the former Mrs. Grover Cleveland, President Cleveland and his cabinet attending.

Over a measured course she averaged 22 knots an hour. The term "Ocean Greyhound" was coined to describe her. In 1898 the St. Louis rescued the passengers and crew of the Dutch steamer Veendam 640 miles from Southampton.



America's
Most Powerful High-Speed Gears

The De Laval double-helical speed-reducing gears shown herewith are the most powerful ever built in this country for high-speed turbine service. They are driven by compound turbines and transmit 22,500 hp. at a propeller speed of 360 r. p. m.

Such gears have been made possible and successful only by the De Laval policy of liberal design and precision in manufacture, combined with 25 years of turbine and gear experience.

Over 2,000,000 of De Laval marine gears are now in service. Many of them have traveled over 200,000 miles, and are giving perfect satisfaction. De Laval gears are unique in this respect.

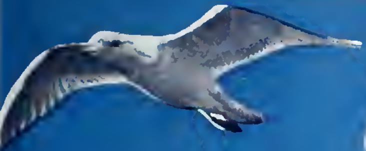
De Laval reduction gears are exceedingly quiet in operation and are highly efficient as demonstrated by their record in service. Noisy reduction gears greatly reduce the efficiency and morale of engine room crews who depend upon their hearing more than upon any other sense to locate trouble.

Ask for our special marine catalog M 57

De Laval

STEAM TURBINE CO.
Trenton, N. J.

166



Pacific Marine Review
The National Magazine of Shipping

The Greatest Enterprise of Its Kind Ever Attempted in the History of Industrial Trade

World Trade Cruise of the S. S. St. Louis

Foreign trade beckons American industry today as never before. In every country there are wealthy and responsible merchants willing and ready to buy American products. Aggressive sales efforts by American manufacturers are demanded; individual action is futile and expensive; a great concerted effort is necessary.

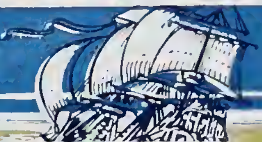
The World Trade Cruise of the S. S. St. Louis

offers American Manufacturers the opportunity to accomplish in a year, by exhibiting their goods backed by aggressive salesmanship, what would otherwise take years to accomplish.

ARE YOU ONE OF THE EXHIBITORS?

FOR FULL INFORMATION ADDRESS

WORLD TRADE CRUISE (Organized by the Anderson Overseas Corporation)
165 Broadway, New York City



Pacific Marine Review, Vol. 18, No. 12. Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.

γεννάω–I Produce!

ONE hundred and forty-four years ago Lavoisier coined the name *Oxygen.*

In choosing the Greek word Γεννάω "I produce," as his main root he had in mind a chemical reaction commonly associated with the gas.

Had Lavoisier been able to foresee the tremendous part that Linde Oxygen is playing in modern industrial development, he would have realized the vast significance of that word Γεννάω "I produce!"

The country over, Linde Oxygen is daily making possible greater production—everywhere it is saving time and cutting costs.

A chain of seventy-five Linde plants and warehouses assures American welders and cutters of a prompt supply of highly pure oxygen—wherever they are, whatever their requirements.

THE LINDE AIR PRODUCTS COMPANY
Carbide and Carbon Building, 30 East 42nd Street, N. Y.
Kohl Building, San Francisco

The Largest Producer of Oxygen in the World

L-502-21

Pacific Marine Review

CONTENTS

DECEMBER, 1921

The Edward Sewall . . . . *Frontispiece*

How Can American Ships Compete? by Winthrop L. Marvin 701

The Clipper Ship Great Republic 707

Knowing the Rules of the Road, by R. F. Farwell 711

Editorial 714
American Shipbuilding; The Naval Architects and Marine Engineers; New Motorships; The Leviathan; Marine Week; In Recognition of Achievement.

A Great American Legal Navigator 717

Oil Engines and Motorships 718
The Motorships Californian and Missouran; Deck Machinery of the William Penn; Progress in Motorship Building.

European Marine Notes 722

Marine Engineering 725
Warping of Gear Cases, by John L. Bogert; Steam Superheaters, by H. B. Oatley.

The Blow-off Cock 730
One Hundred Years Behind the Times; High Operating Costs.

Full Speed Ahead 733
Steamship Operations, 733; With the Exporters and Importers, 742; Shipbuilding, 747; Marine Insurance, 755; Personals, 758.

Diesel Ship Maneuvering, by Alexander McNab, M. I. M. E. 760

Work Boats and Yachting 761
The Preliminary to a Premise, by H. A. B. Sneve; The Yacht Louise; A New Era in Yachting; Diesel Power for Fish Boats; An Interesting Salvage; An Unusual Shipment.

Industrial Section 45

48-10 AIR HOSE

In Constant Service Where Ships Are Built

A tough rubber cover built to withstand abrasion and offering the greatest resistance to wear—

An oil-proof inner tube which cannot separate from the braid—

An extreme strength resulting in unusual length of service, yet so flexible that it will easily bend around any obstruction without kinking—

All characteristic of 48-10—the most dependable air hose that it is possible to produce.

United States Rubber Company

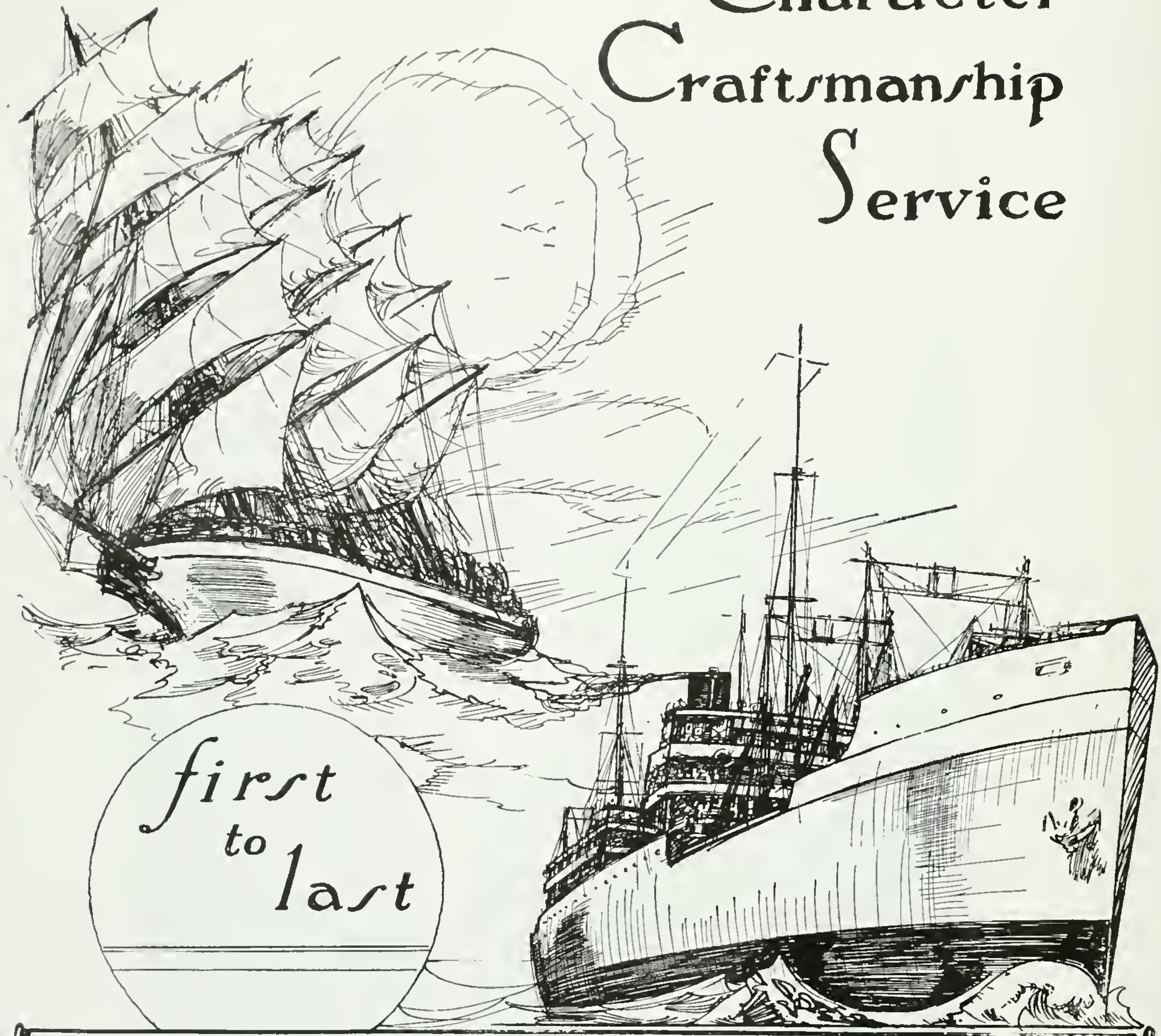
1790 Broadway, New York
Branches in Every Industrial Center

MAKING THE GOLDEN GATE

This reproduction from a photograph by Gabriel Moulin of a painting by William Coulter, both of San Francisco, shows the four-masted American sailing ship Edward Sewall running into San Francisco harbor before a northwest trade wind.

This fine steel sailing ship was built in Bath, Maine, in 1899 by Arthur Sewall & Company. She is 332 feet long, 45.3 feet beam, and 28.3 molded depth. Her gross registered tonnage is 3206.

Character Craftsmanship Service



From the sailing ship of earlier days to the specialized, oil-burning, steel cargo-carrier of today; through all its ups and downs to its present outstanding position, the American Merchant Marine has fostered and will maintain those traditions which enrich the history of sea transportation.

For nearly a quarter century, the New York Shipbuilding Corporation has contributed of its skill and its ideals to the upbuilding of that which is best in our merchant and naval fleets of today. The largest single unit in America's shipbuilding capacity, New York Ship started unhampered by limitations of physical layout or inherited practices. Its founders had the vision and the ability to pioneer in the adoption and development of many shipbuilding methods now accepted as standard by all.

These ideals have been steadfastly maintained; and upon the foundation of complete plant facilities and modern steel-working practice there has grown up a tradition of accomplishment in the building of good ships—ships that proudly take leadership in the greater American Merchant Marine that reflect New York Ship's

"Character—Craftsmanship—Service"

NEW YORK SHIPBUILDING CORPORATION

Pacific Marine Review

The National Magazine of Shipping

December, 1921

Copyright, 1921, by J. S. Hines

HOW CAN AMERICAN SHIPS COMPETE?

An Expert Analysis of the Problems Facing Our Merchant Marine in Foreign Trade

By WINTHROP L. MARVIN*

HOW can American ships compete successfully with foreign ships? It is a far-reaching question that is stated in these words, a question that goes right to the root of the life of our present-day merchant marine. For unless American ships can compete successfully with the ships of foreign nations, which still manage to dominate our own overseas carrying, there can be no future for ocean shipbuilding and navigation under the American flag.

Therefore this question is one of as direct personal interest to naval architects and marine engineers of all grades and ratings in their profession as it is to the shipowners and managers themselves. . The future livelihood and success of thousands of energetic and ambitious Americans hang upon a right solution of the problem of the ship in service.

Three main causes well known to men of our maritime industry were responsible for the inability of successful competition under the American flag with foreign ocean shipping previous to the great war.

Early Protective War Policy

For more than a hundred years the privilege of wearing American colors had as a general policy been reserved to ships of American construction. Coupled with this reservation, in the earlier years of our national life, was a vigorous national policy of encouragement to American ships—the discriminating duty policy, so called—which absolutely guaranteed to these ships a strong preference in employment. Under this policy, not completely abandoned until 1850 against our chief competitor, Great Britain, the requirement that American ships must be built solely in American yards was by no means an actual handicap. The building of wooden-hulled sail ships for a hundred and fifty years before the founding of our Federal government had been a firmly established and successful industry in North America. Materials were abundant and relatively cheap, and the skill of our builders was unsurpassed—indeed unequalled. No American merchants of that era desired to purchase or use foreign-built ships, for there was generally no advantage in securing vessels from abroad.

While wooden sail ships were carrying the commerce of the world, this requirement that vessels of the United States should be American-built was a just and prudent policy for the republic. This policy was not substantially weakened or abandoned until the Panama Canal Act of August 24, 1912, which for the first time in a general measure permitted the registry of foreign-built vessels for the purpose of engaging in the overseas but not in the coastwise trade.

Sail to Steam

Because of the absolute lack from 1860 onward of any comprehensive encouragement for the employment of American vessels in other than our coastwise commerce, there was only scant, precarious demand for the construction of such vessels, and American ocean shipbuilding became a weakened industry. I have long been convinced that in past discussion of the decline of the American overseas marine altogether too much emphasis has been placed upon the change from sail to steam and from wood to iron and then to steel. It is true that, in the period from 1840 to 1860, the British iron industry was greater than our own. British machine shops and steam shipyards were mightily encouraged and strengthened by the generous British policy of mail shipping subsidies, initiated in 1840 and maintained with vigor and persistence until competing American steam services were driven from the seas.

But American shipowners and builders were by no means so unmindful of the advantages of steam propulsion and iron hulls as some of the commentators upon the fate of our ocean shipping have contended. The iron propeller steamer Bangor was built on the Delaware in 1845, a thoroughly efficient vessel for that period. In the years between 1850 and 1861 good iron steamers were built on the Delaware, at New York, and at Boston. Indeed, good American iron was found to be superior for shipyard purposes. The United States possessed admirable iron works and a substantial body of highly skilled mechanics, as was to be demonstrated later by the rapid and successful building of a fleet of monitors that proved a decisive factor in the Civil War. Not only monitors but broadside armorclads and iron cruisers were constructed in this country in the Civil War period, and a vast impetus was given to boiler and engine-making establishments at the Northern seaports by the swift creation of a new fleet of the six hundred war steamers that constituted in 1865 the most modern and formidable navy in the world.

All these facilities for the building of steam, iron, seagoing merchant ships could readily have been turned to the construction of a new merchant tonnage in 1865 and after if there had been any positive aid and encouragement to the successful operation of these American ships after they were completed. But though the dominant Republican administrations of that period wrought a gigantic success in the protection and development of the manufacturing industries of the country, the overseas shipping trade of the United States was left wholly without any equivalent encouragement. What was more natural and inevitable, therefore, than that manufacturing should flourish and ocean shipping still further decline through those years when Great Britain, thanks to the depredations of Anglo-Confederate cruisers, had dealt a terrible blow to our sail tonnage and had possessed herself of that lion's share of our overseas carrying which she retained up to the outbreak of the great world war?

---

* Read at the twenty-ninth general meeting of the Society of Naval Architects and Marine Engineers, held in New York, November 17 and 18, 1921.

American Iron Shipbuilding

Without protection to the operation of American ships, the continued protection to the building of such ships of course proved wholly ineffective. Though iron ship construction, particularly in the Delaware district, made respectable progress in the years following the Civil War, these new iron steamships were designed for the protected coastwise trade, except for a few large passenger and mail steamers for the Pacific Mail, four excellent trans-Atlantic liners for the Philadelphia and Liverpool service of the old American Line, and other good but smaller steamers for the nearby West India services.

Under the sharply contrasting conditions wherein British yards were building in swift succession twenty iron steamers while our yards were building one—that is to say, while British yards were steadily manufacturing ships and our yards were producing irregularly a slender tonnage—what was more natural than that we should be seriously handicapped by a wide difference in the relative costs of construction? When in 1904-5 the Congressional Merchant Marine Commission under President Roosevelt made a careful survey of shipbuilding prices in this country and in Europe, the commission was constrained to report that steel steamships of the passenger and cargo type were costing from 40 to 45 per cent more on this side than on the other side of the Atlantic. Under the circumstances, with no aid or protection whatsoever for American shipowners and operators, it was hopeless to dream of employing any considerable numbers of American-built ships in overseas commerce.

Construction Cost Handicap

How heavy was that handicap can be demonstrated by a comparison of the capital charges of a British-built ship produced at a price of $500,000 and an American-built ship produced at a price greater by 40 per cent, or of $700,000:

	British ship $500,000	American ship $700,000
Interest, 5 per cent	$ 25,000	$ 35,000
Insurance, 4 per cent	20,000	28,000
Depreciation, 5 per cent	25,000	35,000
Total	$ 70,000	$ 98,000

Here, without any allowance whatever for the higher American wage costs of operation, is a difference in the main capital or carrying charges of $28,000 a year, or in itself a fair rate of dividend upon the total cost of the British-built vessel. This fact alone would suffice to bar the American ship from competition.

Wages and Maintenance

Moreover, the wages and maintenance of the officers and men of the American steamer were at least 50 per cent greater than the wages and maintenance of the officers and men of the British steamer—a factor important of itself though of far less consequence than the handicap due to the higher cost of building as outlined above. It is not at all strange that from the building of the Ohio and her sisters for the Philadelphia American Line in 1873 the Stars and Stripes flew above no new American-built steamers exclusively employed in trans-Atlantic trade until the keels of the St. Louis and St. Paul were laid by the power of a special mail subsidy in 1894 and 1895. Between far higher costs of original construction and higher costs of crew wages and maintenance, rivalry with European ships, often state-aided as they were, was accepted by American shipowners as impossible.

When the shrewd diplomacy of Europe from 1815 onward had succeeded in enmeshing our government in treaties that gradually prevented us from encouraging our ships through the historic policy of discriminating customs duties and tonnage dues, our competitors overseas lost no time in launching out on a new and effective expedient of their own—mail and admiralty subsidies and subventions. The first sustained British trans-Atlantic steam service was created in 1839 by the grant of a mail subsidy of $425,000 a year to what is now world famous as the Cunard Company of England. Other subsidies, even larger in amounts, called into being the Peninsular & Oriental Line to India, the Royal Mail Line to the West Indies and South America, and other British concerns, until finally thirty national steamship services reached all quarters of the world. France quickly followed suit. Germany put the powers of state aid, though in other forms than subsidy, behind the North German Lloyd and the Hamburg American. Our own Congress, in a fitful way, beginning with 1847, granted liberal mail pay to especial new American ocean steam lines, the best remembered of which are the Collins Line to Europe and the Pacific Mail to the Isthmus of Panama and on the Pacific Ocean. But while other nations were united in loyal zeal for the national interests, it happened, unfortunately for us, that this new and crucial steamship competition fell in a period that saw America rent by the sectional quarrels immediately preceding the Civil War. Southern statesmen, who at first had borne a full share in urging encouragement to our own national mail lines, turned against them when they saw how swiftly these new lines were upbuilding the sea power of the North. In the very crisis of the struggle between our American lines and their European competitors, a hostile Congress, dominated by sectional prejudices, struck down the American mail subventions and thereby destroyed every one of the American steamship services in the trans-Atlantic trade.

At this time the American Collins Line, with the largest and swiftest ships, was receiving a subsidy of $858,000 a year, and the rival Cunard Line $856,871 for smaller and inferior steamers. Soon after the Collins Line was killed by the act of our national lawmakers the Cunard mail pay was reduced by Parliament, demonstrating clearly that it was an aggressive fighting subsidy and nothing else.

But the British and other European policies of generous aid to national shipping lines, and thereby to steamship building and navigation, continued steadily without a break. It is sometimes urged that these governmental aids were not applied to "tramp" steamers. Directly they were not until France and Italy began to subsidize their entire shipping forty years ago. But, as a matter of fact, in a broad, true sense these European subventions and other assistances in those earlier years did quicken and strengthen the then new arts of iron steam shipbuilding and boiler and engine building in such a way that even the tramp steamers that came afterwards were indirectly the beneficiaries of the system. Moreover, the subsidized national mail lines pioneered and created commerce, a part of which the tramps subsequently carried.

Until the United States, in the Ocean Mail Act of 1891, tardily renewed the subsidy system in America, the decline of our own shipping remained constant. This ocean mail law, though sadly crippled by western agricultural opposition in its passage through the House of Representatives, did set the American flag again afloat on the great route across the western ocean and did permanently strengthen our steamship communications with the West Indies, nearby South America and Australasia. Services subsidized under the ocean mail law owned almost all the steam tonnage we had in ocean commerce when the great world war broke upon us in midsummer of 1914.

Present Condition

Turning from this survey of the past to the new present, what do we discover? Is there no more hope for successful American competition with foreign shipping than there was before the late great war?

For one thing, America has now what before the war it did not have—a large, actual, seagoing merchant tonnage available for immediate employment in overseas carrying. It has the ships and it also has the managers, the operators, the officers and the men. It is now conveying about one-third of our imports and exports, or three times the proportion of before the war. Moreover, the American people, even to a degree the long-indifferent half-Teutonized Middle West, have been shocked by the war into a realization that, for peace or war, a strong merchant shipping is absolutely indispensable to America.

The nation has 8,000,000 gross tons of newly acquired merchant vessels on its hands, ships in which all the American people are stockholders. These stockholders are unitedly determined that our ships worth having shall not pass out from under the American flag. Any political clique or party that consented to haul down the flag would be committing instant suicide.

So the general outlook of the present is immensely more favorable than that of before the war for the development of a great ocean shipping and shipbuilding industry. But the obstacles in the way are substantially the same obstacles—the higher cost of operation and perhaps of construction of American vessels, the fact that even now our foreign competitors are in possession of two-thirds of the field, and the further fact that these foreign competitors in some way or to some degree are all powerfully upheld by the active aid of their own governments.

Comparative Building Costs

It is not now possible to speak definitely and with authority as to the comparative cost of building ocean ships in America and in Europe. But it is true that shipowners who have made inquiry on the other side within recent months have found that British shipyard prices were lower than American prices by at least a margin due to the abnormal state of sterling exchange. On the other hand, the American yards could offer quicker completion and delivery, which in normal times is of itself a marked advantage. Altogether it will probably be found, when conditions in America and in Europe have again settled down, particularly with "tramp" cargo vessels, that foreign ship prices remain lower than our own, though by a narrower margin than before.

As to the costs of operation involved in at least the wages and maintenance of the crews, Europe retains an undeniable advantage as contrasted with America. The La Follette Seamen's Law, whatever else it may have done, has conspicuously failed to equalize sea-wage conditions around the world. Individual foreign seamen have quit foreign vessels in our ports and have reshipped on other vessels at the American wage scale. But this process, though not without significance, has not of itself brought foreign wage scales, as a whole, up to American wage scales, as is demonstrated by the following comparative payrolls of American, British, Japanese and Norwegian cargo steamers of like character and tonnage previous to May 1, 1921:

On May 1 last the pay of engineers, sailors, firemen and stewards on American merchant vessels, government owned and privately owned, was reduced by an average of about 15 per cent. The ensuing strike was quickly and easily won by the Shipping Board and private shipping companies. On August 1, 1921, the pay of the deck officers of American merchant vessels was reduced about 15 per cent, so far as mates were concerned. The pay of masters, with their greater responsibility, was reduced less, or not at all. Early in May a reduction in the wage scale of British officers and men became effective without a general strike.

Reductions in an equal or greater ratio have since become operative among officers and men of the Norwegian and Japanese merchant services, but the data for exact comparison with American schedules have

Crew List and Monthly Wages, Single-Screw Coal-Burning Cargo Ship, Atlantic and Gulf Coasts, 8,800 Tons Deadweight. Class "C"

American

	No	Wages	Amount	Total
Deck Department				
Master	1	$357 50	$357 50	
First officer	1	228 75	228 75	
Second officer	1	200 00	200 00	
Third officer	1	176 25	176 25	
Carpenter	1	100 00	100 00	
Boatswain	1	95 00	95 00	
Able seamen	7	85 00	595 00	
Ordinary seamen	3	65 00	195 00	$1,947 50
Engine Department				
Chief engineer	1	332 50	332 50	
First assistant	1	228 75	228 75	
Second assistant	1	200 00	200 00	
Third assistant	1	176 25	176 25	
Deck engineer	1	100 00	100 00	
Storekeeper	1	95 00	95 00	
Oilers	3	95 00	285 00	
Firemen	9	90 00	810 00	
Coal-passers	6	75 00	450 00	2,677 50
Steward Department				
Chief steward	1	135 00	135 00	
Chief cook	1	115 00	115 00	
Second cook and baker	1	100 00	100 00	
Utility man	1	70 00	70 00	
Mess men	2	70 00	140 00	
Mess boys	2	65 00	130 00	690 00
Total crew	48	Total wages per month		$5,315 00

British

	No	Wages	Amount	Total
Deck Department				
Master	1	*$258	*$258	
First mate	1	165	165	
Second mate	1	129	129	
Third mate	1	109	109	
Carpenter	1	83	83	
Boatswain	1	78	78	
Able seamen	10	70	700	
Ordinary seamen	2	44	88	$1,610
Engine Department				
First engineer	1	233	233	
Second engineer	1	165	165	
Third engineer	1	124	124	
Fourth engineer	1	109	109	
Donkeyman	1	78	78	
Storekeeper	1	78	78	
Greasers	3	75	225	
Firemen	8	73	584	
Trimmers	4	70	280	1,876
Steward Department				
Chief steward	1	97	97	
Second steward	1	68	68	
Cook	1	92	92	
Baker	1	73	73	
Bedroom and mess steward	1	67	67	
Steward's boy	1	41	41	438
Total crew	45	Total wages per month		$3,924

Basis of Compilation of Above Figures
Exchange rate used to convert to American money—Pound $4 86
Per cent of American scale 74
* Estimated

Japanese

	No.	Wages	Amount	Total
Deck Department				
Master	1	$255 00	$255 00	
First mate	1	148 00	148 00	
Second mate	1	110 00	110 00	
Third mate	1	98 00	98 00	
Boatswain	1	60 00	60 00	
Quartermasters	3	38 00	114 00	
Carpenter	1	35 00	35 00	
Able seamen	6	31 00	186 00	
Ordinary seamen	6	30 50	183 00	$1,179 00
Engine Department				
Chief engineer	1	220 00	220 00	
First engineer	1	138 00	138 00	
Second engineer	1	105 00	105 00	
Third engineer	1	98 00	98 00	
Storekeeper	1	58 00	58 00	
First oiler	1	58 00	58 00	
Oilers	6	48 00	288 00	
Firemen	12	32 00	384 00	
Coal passers	8	25 00	200 00	1,549 00
Steward Department				
Steward	1	35 00	35 00	
Cook	1	26 00	26 00	
Rice cook	1	20 00	20 00	
Messmen	3	20 00	60 00	141 00
Total crew	59	Total wages per month		$2,869 00

Basis of Compilation of Above Figures
These are minimum wages paid by three largest Japanese steamship companies. There are higher wages and a bonus system in addition.
Exchange rate used to convert to American money—Yen, 50
Per cent of American scale 54

These three tables, when compared, show very graphically the wage handicap of the American ship operator

Grade	American	British		
		£	£ at $4.86	£ at $4.00
First officer	$195.00	26/10	$128.79	$106.00
Second officer	170.00	21/10	104.49	86.00
Third officer	150.00	17/10	85.05	70.00
Carpenter	85.00	14/10	70.47	58.00
Boatswain	80.00	13/10	65.61	54.00
Able seamen	72.50	11/-	53.46	44.00
Ordinary seamen	52.50	7/10	36.45	30.00
Chief engineer	285.00	35/10	172.53	142.00
First assistant engineer	195.00	26/10	128.79	106.00
Second assistant engineer	170.00	21/10	104.49	86.00
Third assistant engineer	150.00	17/10	85.05	70.00
Donkeyman	80.00	13/10	65.61	54.00
Oiler	80.00	13/-	63.18	52.00
Water tender	80.00	13/-	63.18	52.00
Fireman	75.00	12/10	60.75	50.00
Coal-passer and wiper	65.00	12/-	58.32	48.00

*Class C, from 7,501 to 12,000 power tonnage—gross tonnage plus indicated horsepower.

Comparison of American and British wage scale at present exchange and at par

not yet reached the United States. It can be said, however, that America is now paying wages far higher than those granted by any competing nations, and that the cost of food or maintenance is also markedly higher, so that in this respect there is no important change whatsoever from the economic conditions that prevailed before the great war. Sea pay, which rose during the war in Europe as well as in America, has since been somewhat reduced in Europe as well as in America, so that the difference between American ships and foreign ships in wage cost and operation remains substantially the same as it was before.

In fact, allowing for abnormal conditions of international exchange, the wage handicap against American ships is greater than ever. Foreign steamers plying in American trade demand their freight or charter hire in American money, but buy their supplies as far as possible and pay the wages of their crews in their own depreciated currency. The result is astonishing. A case just reported to the American Steamship Owners' Association is that of a Norwegian steamer of a deadweight capacity of 11,000 tons. Her total cost of crew, including officers as well as men, per month, taking the kroner at 12.65 cents, is $1613 a month, while the total cost of crew of a submarine boat type steamer, with a deadweight capacity of 5350 tons, is $3302 a month.

Of course the abnormal difference in cost of operation, due to the present state of international exchange, is temporary; it will not last forever. But for the time being it has the practical effect of a profound discouragement to American shipping and of an actual subsidy to foreign shipping which will have to be met in some thoroughly effective way if American shipping is to live through the crucial ordeal of the three or four years to come.

Wages and maintenance together make up about 15 per cent of the total operating costs of a modern freight steamer. The present cost of wages and maintenance to our British and Norwegian competitors, largely because of upset rates of exchange, is nearly or substantially one-half our own cost. This exceptional difference, of course, will tend to decrease as financial conditions are restored, but for the present this extra cost of wages and maintenance is a grave handicap to American shipping in a period of unprecedented intensity of competition. The difference in wages and maintenance is all the heavier a handicap on the new American merchant marine because America still lacks the well-coordinated mercantile and maritime organization all over the world which enables British shipowners to meet the competition of continental nations having wage rates still lower than the British scale. The effect of this close British co-operation in every country, in every trade and in every port, of British agents, merchants and bankers in enforcing preference for British ships, makes that shipping in effect one of the most thoroughly protected industries of which there is any record in commercial history.

Egyptian Cotton

An excellent case in point has just been afforded in the effort of the United States Shipping Board to secure for American ships the carrying of Egyptian cotton from Alexandria to this country. American cotton mills are liberal users of the Egyptian fiber, practically every pound of which has for years been brought to the United States, either directly from Egypt or via the United Kingdom, in British steamers, through a close working agreement between cotton merchants in Egypt and the Liverpool conference lines.

When American steamship companies a year ago sought for their own vessels a share of the carrying of Egyptian cotton destined for the United States, their officials were told that this had been and would continue to be a British monopoly, and American vessels could not hope to have any share in it. For the time being the effort had to be abandoned, but last spring the Shipping Board forced the issue by offering a freight rate of 40 shillings a ton for Egyptian cotton brought to the United States and of 25 shillings a ton to the United Kingdom, while the bid of the Liverpool conference lines was respectively 60 shillings and 40 shillings per ton.

British Methods

Yet so hard and fast was the combination which British merchants and shipowners had effected to monopolize the Egyptian cotton trade that the lower bids of the Shipping Board were immediately rejected, and rejected with the approval of the Liverpool and Manchester cotton exchanges. The characteristic intensity of the devotion of British merchants to their own country's shipping is shown in the insistence of these British business men in handling Egyptian cotton in their own country's ships, though it cost them a far greater price than if carried in American vessels. At last accounts the United States Shipping Board had been unable to obtain any concession whatsoever of any share of this American carrying trade, and the case was being transferred to the Department of State for diplomatic action.

From instances like these Americans can gather something of the exclusive, arbitrary methods by which Great Britain has developed her immense merchant marine, and something of the difficulties beyond mere wage scales which we must meet if we are to wrest from British carriers any part of the transportation to the United States of imports which American merchants and manufacturers have purchased.

All over the world British manufacturers and merchants and their representatives will be found demanding that British ships must secure all the cargoes which they can manage to control. There must be similar tenacious organization and co-operation of

American manufacturers and merchants in the interest of their own country's ships and their own country's flag if our new merchant marine is to have the even chance to which it is honestly entitled.

Foreign Subsidies

Another important factor in the maritime situation, beyond the lower wage and maintenance cost of foreign ships and the disciplined activity of our competitors, is the generous direct or indirect national aid extended by all governments, particularly to their regular line steamship services. Just before the great war the United States Commissioner of Navigation published an analysis of the subsidies, subventions and bounties then being paid to the steamship interests of the world's chief maritime nations. These sums aggregated about $46,000,000 a year, of which Great Britain's own share was approximately $10,000,000. While the British and the Germans at that time gave direct state aid only for mail, passenger and fast freight services, it was significant that other governments, notably France, Italy and Japan, were subsidizing virtually their entire merchant marines and even giving direct bounties to shipbuilding.

As rapidly as possible, these subsidies, subventions and bounties are now being re-established—they were not necessary during the continuance of the war. It is probable that when the total sums of these state expenditures are again recorded they will be found amounting to a great deal more than $46,000,000 a year, for the war itself most vividly emphasized to all governments and all peoples the tremendous value, indeed the imperative necessity, of a strong commercial shipping for defensive and commercial purposes.

The Necessary Factors for Successful Competition

What the American people must, therefore, prepare to do to enable American merchant ships to compete successfully with the ships of foreign nations is: (1) To find the most practicable form of equalizing American sea wages and costs of maintenance with the wages and costs of maintenance of foreign ships, by a system of preferential duties or subsidies and subventions, or some other still more effective method, if that can be found; (2) of organizing American manufacturers, merchants and bankers into a league as disciplined and powerful as the similar British league, for example, for securing the carriage of a greater share of our imports and exports to American ships; (3) of offsetting foreign subsidies, subventions, bounties and like national assistance given to the ships of our competitors. In addition, if it is discovered that the first cost of American-built ships is greater than the first cost of foreign-built ships, there must be full compensation for this factor also. In other words, the American merchant marine must be made what it has not been for more than sixty years, a nationally protected industry, as for most of the life of this republic manufacturing and agriculture have been protected industries. These things must all be done, or the new American merchant fleet, which is even now being beaten off the ocean by its competitors, will inevitably again decline and disappear exactly as the old merchant marine was declining from 1855 onward.

Moreover, it is essential that the classification and survey of American merchant shipping in the years to come be controlled by interests 100 per cent American. The success of the American Bureau of Shipping is absolutely essential to the prosperity and security of the new American merchant marine which must also find in American hands the resources for a major part of the underwriting of the ships themselves and of their cargoes. Only the other day British marine insurance companies were assisting the Liverpool conference lines to retain complete control of the Egyptian cotton trade by allowing British ships much lower insurance rates on cotton cargoes than were being granted to American ships. The protective value of classification, survey and insurance of our own is a point that cannot possibly be over-estimated in any study of the future of the American merchant marine.

American shipowners must develop, as rapidly as possible, what their fathers possessed before them, a corps of the most efficient seagoing officers in the world, every one an American citizen, and the largest possible number of citizen seamen. The American people will never consent to protect and encourage American shipping as it must be protected and encouraged so long as any substantial proportion of that shipping is officered and manned by alien subjects of foreign countries, our rivals in trade and possible enemies in war. Who can justify a merchant marine as a naval reserve unless it is securely held in loyal hands, and not in the hands of those who in an hour of need might betray it to the enemy?

OUR GREATEST WOODEN SHIP

The clipper ship Great Republic, whose history is recorded in the accompanying article by F. C. Matthews, was considered by Donald McKay to be his great masterpiece. Below are given some comparisons as to her size and carrying capacity.

McKay was a great exponent of the hollow wave line and made of the underwater bodies of his clipper model ships poems in wood which have been beautifully described by Longfellow.

> "Broad in the beam. That the stinging blast
> Sweeping down upon sail and mast
> Might not the sharp bows overwhelm.
> Broad in the beam. Yet sloping aft
> With a graceful curve and slow degrees
> That she might be docile to the helm,
> And that the currents of parting seas,
> Meeting behind with a mighty force,
> Might and not impede her course."

We of today design and build beautifully modeled racing yachts with which we go into international regattas and reel off lively races, making speeds as high as 8 knots an hour sometimes for a few minutes. Here was a ship that with 5000 tons (weight and measurement) in her ample hold reeled off 19 knots an hour for nineteen hours at a stretch. Are we not right in saying that she was in deed and in truth a masterpiece in wooden shipbuilding?

THE following table gives some of the principal dimensions of hull and rigging of the Great Republic (as she was before being burned) and the four-masted wooden ship Shenandoah, built by Arthur Sewall & Company at Bath, Maine. The first four-master to appear after the launch of the Great Republic was the Ocean King, a Kennebunkport ship; the next was the Frederick Billings from the Rockport yard of Carleton, Norwood & Company, and then followed the Rapahannock and Shenandoah:

Name	Great Republic	Shenandoah
Launched	Oct., 1853	Nov., 1890
Tonnage	4555	3258
Capacity	6000	5000
Dimensions	335x53x38	299x49x28
Length mainmast	131	89
Length main top mast	76	56
Length main topgallant mast, etc.	81	69
Length spanker mast	110	96
Length spanker top mast	40	82
Mainyard	120 ft. x 28 in.	92 ft. x 22 in.
Lower maintopsail yard	92 ft. long	84 ft. long
Length main skysail yard	40 ft.	46 ft.
Length spankerboom	40 ft.	56 ft.
Bowsprit, etc., outside of knight-head	*30 ft. x 44 in.	†43 ft. x 30 in.
Spread of sail	15,653 yards	11,000 yards

---

* Jibboom, 18 ft. x 23 in.; flying jibboom, 14 ft. long.
† No jibboom.

The following table covers details of all passages made by sailing vessels via Cape Horn from any North Atlantic port, American or European, to San Francisco or any other California or North Pacific port, in less than 95 days. It will be seen that all were from New York to San Francisco. The record passage from a North Atlantic port other than New York was made by the extreme clipper Romance of the Seas, arriving here March 23, 1854, 96 days 13 hours from Boston:

The time made by the Great Republic from Sandy Hook, of 15 days 18 hours to the equator, and of 52 days to 50 degrees south in the Pacific, are the best on record. The runs of the Flying Cloud, 48 days (1851), and the Swordfish, 49 days (1851), from the equator in the Atlantic to a similar crossing in the Pacific, stand as best and second best and effectually disprove the claim that the Andrew Jackson's 53½ days (1860) ever was the record. Records for other portions of the Cape Horn voyage are: Equator to 50 degrees south in the Atlantic, Samuel Russell, 18 days; 50 to 50, Young America, 6 days; 50 degrees in the Pacific to the equator, Live Yankee and Mary L. Sutton, 16 days; equator to San Francisco, White Squall, 14 days. The Russell and the Sutton were sharp models; the others, clippers. It is not very wonderful that these vessels made great runs at times, but modern full-built ships could also show some speed under favorable conditions, as in the case of the Florence, Captain Kelley, arriving here August 4, 1878, 106 days from New York and reporting that on her ninety-first day out she was 671 miles from this port.

Name	Sailed from New York	Days to equator	Days equator to 50 degrees south	Total days to 50 degrees south	Days 50 degrees to 50 degrees in Pacific	Total days to 50 degrees in Pacific	50 degrees south to equator	Total days to equator in Pacific	Equator to San Francisco	Total passage
Flying Cloud	Jan. 21, 1854	17	25	42	12	54	20	74	15	89-1/3
Flying Cloud	June 3, 1851	23	24	47	7	54	17	71	19	89-7/8
Andrew Jackson	Dec. 25, 1859	20	23	43	10	53	20	73	17	90-1/2
Sword Fish	Nov. 11, 1851	23	22	45	8	53	19	72	19	90-2/3
Great Republic	Dec. 6, 1856	16	26	42	10	52	21	73	19	91-5/6
Flying Fish	Nov. 1, 1852	21	27	48	7	55	19	74	18	92
John Gilpin	Oct. 29, 1852	24	23	47	11	58	20	78	16	94
Sweepstakes	Feb. 20, 1856	18	23	41	15	56	17	73	21	94

THE CLIPPER SHIP GREAT REPUBLIC

By F. C. MATTHEWS

THIS extreme clipper ship, the peer of all clippers, was to have been christened King of Clippers, but the great master-builder, Donald McKay, finally decided on using a grander name, one symbolical of the greatness of his adopted country, which was at that time the mistress of the seas. As the Great Republic she carried herself with all honor, but met her fate under a foreign flag and bearing a prosaic name, a worn-out, unseaworthy hulk. She was then the Denmark, of Liverpool.

She was launched at East Boston at noon on October 4, 1853, in the presence of a large and enthusiastic audience, said by authorities to have numbered over 70,000 people, many of whom had come from distant points.

One thrilling incident of the occasion was the near destruction of the little paddle-steamer Arago, which was passing by just as the ship was clearing the stocks and which had such a close call that her flagstaff was carried away. Aside from this near tragedy, the affair of the launching was a perfect success, and admiration was freely expressed as the noble hull rode majestically at her anchors.

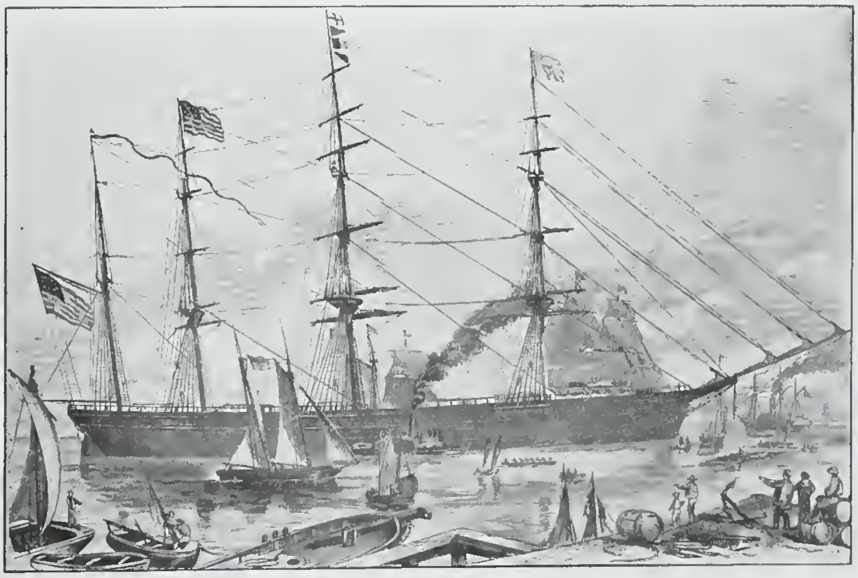
That the clipper ship series creates considerable interest among readers of Pacific Marine Review is evidence by the following excerpt from a letter to our circulation manager renewing a subscription:

"Starboard your helm a little and luff. Clew up your weather tack and take observations from your mailing list, and am sure you will find that my subscription expires February 1, 1923. Have been on the manifest the last four years.

"The series of articles on the old clipper ships are sure to make a thoughtful old stiff like me sit up and pray God for some more of the old days when they had men and ships—not cabin dusters and cockleshells, like this generation.

"To have been alow and aloft on nearly every old ship that entered 'Frisco' from the early '70s to the early '90s sure is my great delight—and read them with eager delight."

She had been constructed by McKay for his own account, and it was reported that he had refused an offer of $300,000 for her when fully completed. She was originally intended for the California trade, but because of a depression in that business and the low freight rates then prevailing, she in company with such clippers as the Kathay, Panama, Pride of America, Defiance, Tornado, and Comet was diverted to the trans-Atlantic run.



The Great Republic as she originally appeared; 4555 tons; spar deck; no mizzen skysail; the spanker topmast, 40 feet long, was divided at 15 feet and at 25 feet above the cap for gaff topsail and gaff topgallant sail.

Her Destruction by Fire

The Great Republic was towed from Boston to New York and was loaded with grain and food supplies for Liverpool by Grinnell, Minturn & Company. When practically ready for sea on December 26, 1853, with most of her sails bent, sparks blown from a fire a block distant from her berth lodged in her foresail and, in spite of heroic effort on the part of crew and firemen to prevent the flames from spreading, her whole top-hamper was soon one mass of fire. The masts were then cut away and ultimately the firemen succeeded in getting control of the burning wreckage on deck, and when they left the scene it was believed that both hull and cargo were safe. Later, however, it was found that the blazing fore-topmast had in falling crashed end-on through three decks and ignited the cargo. This fire could not be controlled, and the ship had to be scuttled and was sunk alongside the dock, being burned down to the water's edge.

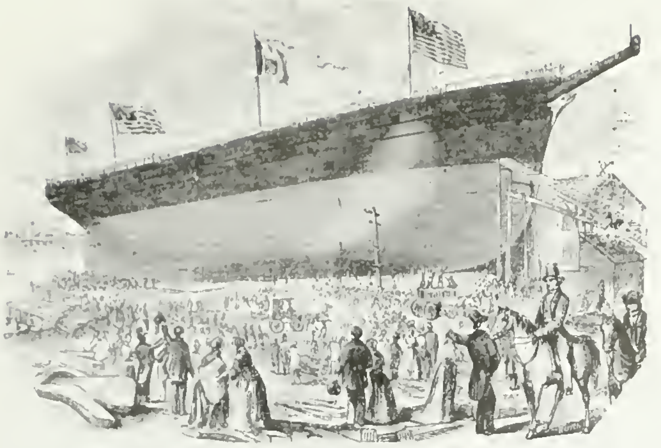
It was found that her grain cargo in swelling had seriously racked and strained the hull. The wreck was sold by the underwriters, who had written $180,000 on the vessel. The cargo valued at $300,000 was insured for $275,000.

An incident of the loss which was made public at the time was a suit brought by the Union Mutual Insurance Company of New York against the Commercial Marine Insurance Company of Boston to recover $10,000 on a policy which had been arranged by telegraph through Boston brokers on December 24 and perfected in the usual manner. Defendant company later disclaimed liability and refused to issue a policy, claiming the contract was incomplete, being made on Christmas day. Judgment, however was entered against them.

In this fire the well-known California clipper ship White Squall was very seriously damaged, and the packet ship Joseph Walker was destroyed.

Her Reconstruction

The wreck became the property of A. A. Low and Brother of New York and was floated and rebuilt at Greenpoint, Long Island, by Sneeden and Whitlock under the superintendence of Captain N. B. Palmer. The work took upward of a year.



Launch of the clipper ship Great Republic at Boston, Massachusetts, October 4, 1853. From an old print. "The most magnificent and most remarkable vessel, as well as the largest wooden ship, ever built. The occasion was made a holiday; schools were closed, business suspended, and an audience estimated at 70,000 people ashore, on the wharves, in the shipping, and aboard steamboats, witnessed this stirring event."

The upper or spar deck which had been burned was was not replaced, leaving her now with but three complete decks, and bulwarks took the place of the rail originally protecting the spar deck. The sheer remained the same, and while the general appearance of the hull was not greatly altered, yet all her spars were considerably reduced. Instead of swinging a 110-foot foreyard and a 120-foot mainyard, these spars were now 90 feet and 100 feet, respectively. The foremast, originally 130 feet long and mainmast 131 feet, were each 17 feet shorter, and all other spars were trimmed in proportion. From keelson to truck her mainmast was now 220 feet long. It has been stated that she had originally the Forbes rig, which called for elongated lower mast-heads with topmasts fidded abaft; but Captain Forbes, who was present at the launching and who kept in close touch with the great ship, denies this and says that her rig was that patented by Frederic Howes, and which was first used on the Boston clipper Climax in 1853. The Howes rig was an offshoot of that of Forbes.

One of our illustrations shows the ship under all plain sail and rigged to carry royal stun'sails. This picture, of course, is her appearance after reconstruction and shows the original eagle's head replaced by a carved billet head and scrollwork.

Description—Capacity—Crew

Published descriptions of the Great Republic as originally built gave her dimensions as 335 feet, by 53 feet, by 38 feet; registered tonnage 4555. It was stated that her capacity was 6000 stowed tons. According to American Lloyd's Register of 1869, the figures were then 320 by 48$\frac{1}{3}$ by 29$\frac{1}{6}$ feet; 3356 tons. Her draft loaded was 24 feet.

On her first voyage to San Francisco she brought 5000 tons New York cargo, weight and measurement. In 1857 she took 4500 tons guano from the Chincha Islands to London. In 1860 she had from San Francisco to Cork 57,246 sacks of wheat and 2992 barrels of flour, said to be about 4100 tons weight. As a United States Army transport in 1862 she took from New York to New Orleans 500 troops, 500 horses, and 1000 tons coal, besides stores and equipment. On one occasion the clipper ship Thatcher Magoun, lying on the opposite side of Pacific Street wharf in the harbor of San Francisco, was described as being dwarfed to the size of a mere coasting schooner by the proportions of the Republic.

Her crew consisted of 50 A. B.'s, 15 ordinaries, and some boys, besides the ship's officers, which included a surgeon; and in this connection it is noted that in 1865 this officer, Dr. O. L. Cook, was drowned by falling into San Francisco Bay from the railroad wharf at Oakland. The bulletin of April 14, 1860, said: "The Great Republic is not off yet. It takes a town, almost, to man her, and the lack of a township of able-bodied seamen has alone detained her for several days."

Becomes a Transport for the French Army

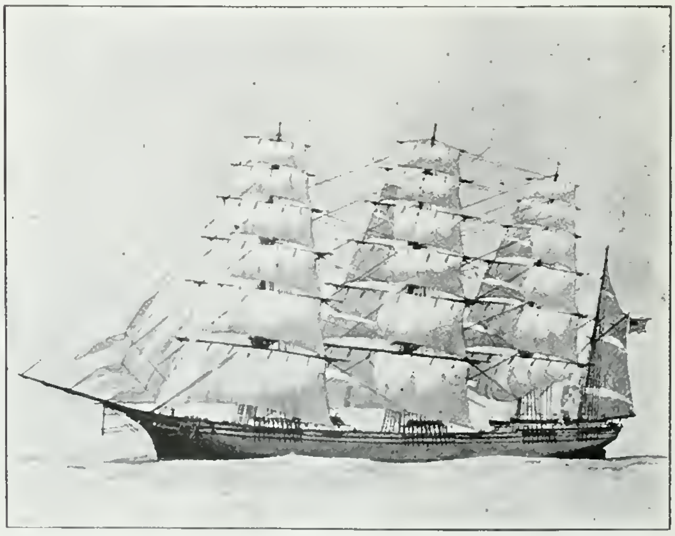
After her reconstruction the Great Republic loaded at New York and made the passage to London in 16 days; her time from Sandy Hook to Land's End was 13 days. She was then chartered by the French government for transport service in the Mediterranean at the rate of 17 shillings per ton per month. It was said that her owners refused a charter of $100,000 for a service of nine months. In January, 1856, she was loading stores at Marseilles for the Crimea in company with the American ships Monarch of the Sea, Ocean Herald, White Falcon, Queen of Clippers, Astoria, and Titan. In this connection it is noted that France had no outsiders other than American vessels in this service, while Great Britain's list of chartered foreign transports showed none under our flag.

The Great Republic's performances challenged the admiration of our English and French friends, as well as the attention of the people of all the ports she visited. On one voyage from Marseilles to the Crimea with a heavy and valuable cargo and a large number of soldiers she was ordered to be taken in tow by a steamer; but a breeze springing up, Captain Limeburner loosed his topsails and topgallants and ran completely away from the steamship, putting her hull down in a few hours. A prominent Boston shipping merchant traveling in the Crimea at the time wrote: "Prouder than the 120-gun ship of the French, the Napoleon III; more dignified even than the Agamemnon of the English, the proud clipper of the Americans looks in her unassuming greatness the commander of the fleet."

Returns to Peaceful Pursuits

After several successful voyages in the Mediterranean, her services being no longer required, the Great Republic crossed over to New York and loaded for San Francisco. The following memorandum of the passage is from her log-book:

"Left New York dock December 5, 1856; dropped anchor in North River; weighed anchor 6th with aid of steam tug W. H. Webb, but in consequence of the



Great Republic under all plain sail as reconstructed; 3357 tons. A mizzen skysail was added and the spanker-topsail-gaff dispensed with low tides could not pass the bar at Sandy Hook; anchored at the quarantine; and discharged pilot December 7 outside of the lightship at 3 p. m. Position at noon, December 7, sea time, 39° 18′ N., 69° 01′ W.; with fresh winds and a little snow, continuing the following day with snow and hail squalls." The fourth day out covered 1° 25′ of latitude and 7° 6′ of longitude; "with strong gales and heavy squalls; under skysails; wind a point free, giving 16 and 17 knots in the squalls." The following day made 413 knots, covering 3° 58′ of latitude and 5° 16′ of longitude; "strong gales and heavy squalls; made 360 knots in 19 hours, an average of 19 knots, and at the rate of 456 in twenty-four hours." December 13, one of the sailors, named William Stevens, died in convulsions very suddenly. He was a naturalized American seaman, formerly of Wales. December 16 carried away jibboom. December 21 at noon "are in 05′ north latitude and will cross the equator with this breeze in 15 days 19 hours from Sandy Hook, the best on record." December 22, tacked to the east, then to the south. December 24, tacked four times. December 25, tacked to east northeast. At 7 a. m. passed Cape St. Roque, 19 days 14 hours from Sandy Hook, having had to beat for two days. January 4, "John Nicholson, seaman, of New York, fell from the upper foretopsail yard while securing the topgallant studding-sail boom and died in a few hours from the injuries. The distance he fell was 80 feet." January 17, was in 50° 45′ south, 63° 46′ west, 40 days out. January 19, 57° south, 64° west; "light airs under the lee of Staten Land, increasing to strong breezes as we got out in the open sea." January 21, passed longitude of Cape Horn in 45 days 7 hours from Sandy Hook and came around with skysails set. January 25, 55° 24′ south, 78° 55′ west; passed the latitude of Cape Horn at midnight, 49 days 9 hours from Sandy Hook. Crossed the equator on February 17 in 118° west, 21 days from 50° south, and 73 days out. Arrived off the Farallones March 8 in a thick fog; hove to for daylight; took pilot 11:30 a. m. Passage, 92 days. Was within 500 miles of the Heads for 5 days, being baffled with light airs, calms and fogs.

At the port of San Francisco the Great Republic was the center of interest and was inspected by thousands. To stand on her decks and survey her magnificent proportions was the only way to appreciate her immense size, as her model and lines were so perfect that she did not seem so large from a broadside or angular view. A lithographic view published at the time showed her being discharged at Greenwich dock with trams of horses doing the hoisting work, the clipper ship Hurricane being similarly employed at North Point dock.

This manner of handling cargo prevailed generally at that time, although the Placer Times noted on May 16, 1853, the commencement of a changing system as follows: "The old style of discharging ships by a bevy of hoisting, singing sailors has given way to the more expeditious method of horse power. Yesterday, however, we noticed a vessel at Broadway wharf discharging by steam power."

From this port the Republic proceeded to Callao in ballast; passage 54 days. Loaded guano at Chincha Islands for London. Put into the Falkland Islands September 8, 1857, 17 days out from Callao, in distress, having shipped a tremendous sea near the Cape which stove in the deck between the fore and main masts; had also lost sails and spars, and a schooner had to be sent from the Falklands to Montevideo for materials to complete repairs. She finally arrived out at London on January 11, 1858.

Model of the Great Republic on exhibition in the Musee de Marine at the Louvre, Paris. Note the fine hollow lines of the under-water body

Continues in California Trade Until the Civil War

The Republic's following three voyages were: New York to San Francisco, 1858-59, 120 days; return to New York in ballast in 100 days. In 1859-60, same voyage; 110 days out; 98 days home, in ballast. In 1860-61, New York to San Francisco, 104 days; hence to Liverpool with grain, 96 days; Liverpool to New York, 32 days, in ballast.

Her outward trip in 1858 was prolonged by unfavorable winds in the North Atlantic, she having the long passage of 41 days to the equator. Left New York in company with the Adelaide, a fast sailer. They were in company for ten days and again for two days off Cape St. Roque. Adelaide arrived at San Francisco 13 days after the Republic.

On the following voyage she left New York, November 23, 1859; was 23 days to the equator; 51 days to the Horn; 18 days from 50° to 50° in strong northwest gales; crossed the line in 110° and was thence 19 days to the port of San Francisco. Took pilot 7 p. m., March 13, 1860. The extreme clipper Ocean Telegraph, arriving there the same day from New York, beat the Republic one day. The latter, however, reported a most delightful series of calms and light winds from the River Plate, for days together not making over four knots per hour. At San Francisco her cargo was mostly discharged into lighters in the stream and she took aboard 900 tons of stone ballast for the homeward run.

On the succeeding voyage she sailed from New York October 24, 1860; crossed the equator November 17; passed Cape Horn December 18; had a very heavy gale lasting from the 20th to the 23rd; was 11 days from 50° to 50°; crossed the equator January 16, 1861; for the last few days of the passage had light north-northwesterly winds.

While in San Francisco harbor on this voyage and in tow of a tug, the Republic stuck on a reef off Rincon Point, which was subsequently known as Great Republic Rock. The tug got the big ship off, however, and filed claim for $6000 salvage. The amount awarded was $300 and costs.

The Republic as a Transport During the Civil War

On her arrival at New York on September 26, 1861, from Liverpool, the big ship was seized by the surveyor of the port on account of the majority of the shares being owned in the South; five-sixteenths were held by Virginia parties and the same amount by citizens of South Carolina. These interests were sold, the Messrs. Low, co-owners, taking them over. She was immediately chartered by the United States government for transport purposes and made a voyage to Port Royal and return to New York. In February, 1862, she was fitted up for the Butler Expedition and went to Ship's Island via Portland, Maine, returning to New York toward the end of June. About August 1 she went on the Great Balance Dock at the foot of Pike street, East River, to have her bottom overhauled and to be gotten into condition to resume her place in the California trade.

Back in the California Trade

Two additional round voyages to San Francisco complete the record of our world-famed ship under the American flag. In 1862-63 she was 102 days from New York; hence 43 days to Callao; loaded a cargo of guano at Chincha Islands; sailed from Callao August 24, 1863, but details of passage thence to London are not at hand. Loaded at London and sailed April 7, 1864; passed the Isle of Wight 13th and arrived at New York May 4.

In 1864-65 she was 114 days from New York, returning thence in 120 days.

On the first voyage of the present series the Republic left New York November 24, 1862; was 23 days to the equator; 50 days to 50° south; thence 12 days to 50° south in the Pacific; crossed the equator February 16, 1863, in 117° west; on March 1 was in 38° north, 134° west. Had it not been for unfavorable weather during the last week of the passage this would have proved a rapid one, well under 100 days.

On her last voyage to San Francisco she sailed from New York on October 24, 1864; was 27 days to the equator; thence 30 days to the Cape, off which was 9 days in strong westerly gales; had 29 days from the Horn to the Line; thence 19 days to San Francisco; the last 10 days of the passage had mostly light winds and calms.

On this voyage the Republic was in command of Captain Josiah Paul as successor to Captain Joseph Limeburner, who had had the ship from the commencement of her career. The crew were represented as insubordinate and inefficient, and there was trouble aboard all the passage. Warrants were issued on arrival for the arrest of Mate Walls and Second Mate Coe for cruelty to seamen, but they went into hiding. While in port one of the sailors was beaten to death in the Sacramento street deadfall of one Bagnello, and later the ship's surgeon was accidentally drowned in San Francisco Bay. Altogether the voyage was an unfortunate one.

On her last passage as an American ship she sailed from San Francisco June 24, 1865, and arrived at New York October 22. Reported having very light winds the entire passage, but particularly in the Pacific; was 28 days to the equator; 54 days to the Cape; crossed the Line in the Atlantic 85 days out and had the long run of 35 days thence to port; total 120 days. Was off the Horn 12 days in easterly winds.

Great Republic Goes Under Foreign Flag

Our big ship was laid up after her return to New York in 1865, and in 1867 was sold to parties in Yarmouth, Nova Scotia. Her managing owner was Captain Hatfield. In 1868 she ran from St. Johns to Liverpool in 14 days.

In 1869 she was purchased by the Merchants Trading Company of Liverpool and renamed Denmark. The following from an article by Charles Nordhoff on "The Rights and Wrongs of Seamen," which appeared in Harper's Magazine of March, 1874, will be of interest:

"There was cited before an English investigating committee in 1873 a Mr. Fernie, the leading partner in a Liverpool company 'which owns ships and sails them,' and which it appeared had lost nineteen ships in ten years."

Included in the list of vessels lost was the Denmark, and the following facts were brought to light from the testimony:

"Mr. Fernie: 'She made water and was abandoned. No lives were lost. Her outward cargo of coals was insured.' Question by Mr. Cohen: 'Was she not well known to be a very rotten ship?' Witness: 'With all ships fifteen years old you would not find every timber sound in them. I have every assurance that the vessel was perfectly fitted for the work she undertook.' Captain Edgell, one of the commissioners, read a report he made on the vessel in 1870 showing that she was then in very bad condition. 'She was trussed with bars of iron screwed up amidships, like an old barn or church, before she started on this last voyage—that is to say, that the whole of the fastenings at the beam ends and knees were so rotten that there was no junction on the sides of the ship, and the only way of fastening the ship together was to introduce these enormous amounts of iron.' Mr. Fernie at first said she was surveyed by an American surveyor, whose name he did not know, but afterwards stated that the only surveyor was Captain Rudolf, one of his own partners. The Denmark was purchased for £3500, or about one pound a ton."

The Loss of the Famous Clipper

She had taken a cargo of coal to Rio and had sailed from that port on January 18, 1872, in ballast for St. Johns, New Brunswick, to load lumber for Great Britain. She had good weather until March 2 in 32° north latitude, when a fierce nor'wester set in and continued until next day. The ship began to leak alarmingly, the water gaining steadily on two double-action pumps. On March 5 the storm lulled, but the carpenters reported twelve feet of water in the hold and the captain ordered three boats to be provisioned and launched. The captain and eighteen sailors embarked in an iron lifeboat 40 feet long with airtight compartments; the first mate with ten men pushed off in the launch; and the second mate and seven men went in the cutter. The little fleet headed for Bermuda, but was scattered by the storm; all, however, arrived safely at Bermuda on March 6. The shipwrecked mariners were hospitably received, and the officers were highly praised for their noble and unselfish conduct.

Such was the end of the greatest wooden vessel ever constructed and the first American four-masted ship. She proved what her famous builder intended her to be, the fastest sailing vessel that man's skill has ever been able to produce. After her 92-day passage to San Francisco in 1857, Lieutenant Maury wrote: "She didn't have the luck to get a wind that could keep her to her mettle for twenty-four consecutive hours. . . The friends of this noble specimen of naval architecture can scarcely hope for a fair trial and proper display of her prowess until she shall be sent on a voyage to Australia. The brave westerly winds of the southerly hemisphere which she will then encounter will enable her to show herself; elsewhere she can scarcely find a sea wide enough with belts of winds broad enough for the full display of her qualities and capabilities."

KNOWING THE RULES OF THE ROAD

By R. F. FARWELL
Associate Professor, Maritime Commerce, University of Washington.

Professor Farwell in this article, written expressly for Pacific Marine Review, calls attention to the need of better training in the knowledge and interpretation of local, national, and international rules of the road at sea and to the advisability of more frequent tests applied to the deck officers of our merchant marine.

INTERNATIONAL rules for the prevention of collisions at sea have been in effect since 1889, and inland rules, with slight changes, since 1897; but we continue to have collisions with more or less frequency. They occur not only in thick fog, but in broad daylight, with the sun shining, and on clear nights, with all lights burning brightly. An examination of the records of several thousand cases of collision that have come before the Federal courts since the present rules were adopted discloses the surprising fact that less than three per cent of these collisions were due to what the courts call inevitable accident, and that the other ninety-seven per cent were due to faulty navigation: that is, one or both vessels violated some rule of the road designed to prevent collision under the particular circumstances of the case. We cannot legislate away all the errors in navigation any more than we can legislate away all the other frailties of human conduct. There will always be accidents due to mistakes in judgment. But there is one prolific cause of collisions which can and should be eliminated, and that is ignorance of the rules of the road.

Clear Knowledge Necessary

By ignorance of the rules, I do not mean total ignorance, but rather a lack of a clear understanding of them. To really know the rules of the road entails more than the memorizing of a number of facts: you must be able to analyze any situation you find yourself in at sea, and take action on the rules that apply. The average quartermaster knows the compass card. He can name all the points forward or backward, and can head the ship on any given course. But suppose you give him a blank piece of paper and tell him to draw from memory the compass card he has looked at for four hours every day. Only a very exceptional seaman could properly space and reproduce the marking of his points, half points, and quarter points, and make the design at north. This is a homely illustration of the difference between knowledge that is hazy and knowledge that is clear.

We get along in the world very well with a hazy knowledge of most things, but in order to be successful we must have a highly specialized knowledge of a few things; and to the navigator surely there is nothing more vital than the rules of the game he plays, a proper understanding of which may involve the lives and property in his charge many times every day. If you are acquainted with the rules of the road to the extent of knowing the usual passing signals in inland waters, the lights you are suposed to carry, and fifty per cent of the sound signals for fog, your knowledge of the subject is probably as good as the average master mariner's, though somewhat hazy. If, on the other hand, you can visualize any given nautical situation, call to mind all the rules that govern, and properly apply them—then you are one of those exceptional navigators whose knowledge of the rules is clear.

Some Examples

A few years ago a collision occurred in a thick fog off the California coast between the Selja, a Norwegian tramp, and the coastwise steamship Beaver, in which both vessels were seriously damaged. The Selja was making half speed, about six knots, when she first heard the fog signal of the Beaver, and five minutes later her speed was cut down to three knots. The vessels continued to approach each other for five minutes more, and the Selja's engines were then stopped. She drifted for another five minutes, and then, on sighting the Beaver ahead, her engines were put at full speed astern for one minute, when the collision came. The Selja was practically dead in the water when struck, while the evidence showed that the Beaver was maintaining excessive speed. It would seem that here was a case of extreme negligence on the one hand and of extreme caution on the other; but the Supreme Court held both vessels equally liable, the Beaver for excessive speed and the Selja for failure to stop her engines on first hearing the signal of the Beaver. Evidently the master of the Selja, who was obviously trying to be careful, did not have clearly in mind that part of Article 16 which says: "A steam vessel hearing, apparently forward of the beam, the fog signal of a vessel the position of which is not ascertained, shall, so far as the circumstances of the case admit, stop her engines, and then navigate with caution until danger of collision is over."

The writer was recently bound up the coast in a destroyer which was making seventeen knots in a thick fog when the whistle of a steamer was heard two or three points on the bow. The commanding officer stopped his engines in obedience to Article 16 and immediately began to blow the two-blast signal, although the ship was forging ahead with the momentum given by a seventeen-knot speed. Apparently he was actuated by a hazy knowledge of Article 15-b, which provides the signal of two prolonged blasts in a fog for a "steam vessel under way, but stopped, and having no way upon her." Had the other vessel, maneuvering on the assumption given by the signal that we were standing still, collided with us, it is obvious that the fault and the liability would have been ours.

In a recent collision now pending in the courts between two vessels crossing in inland waters, the master of the vessel having the right of way sounded one blast, as provided in Pilot Rule 7, and held his course and speed as provided in Article 21 until collision was imminent, when he tried to avoid collision in accordance with Article 27 by reversing his engines. He followed every rule applying to the case but one: but the fact that he failed to sound the four-blast warning when in doubt as to the other vessel's intention as provided in both the inland and pilot rules, whether or not it contributed to the collision, has cost him his license for a considerable period of time. The mistakes were made in all these cases by masters with excellent records and years of experience, and are therefore typical illustrations of the point I am trying to bring out: namely, that many of our ablest and most trusted navigators are lacking in the comprehensive grasp of the rules which is necessary to safe navigation.

A Test for Officers

If you are a licensed officer and feel satisfied that your daily experience is sufficient to keep the rules fresh in your mind, and to prepare you to act properly in any situation that may arise, it is suggested that you try yourself on the following questions:

1. Under what circumstances is a vessel required to hold her course and speed?
2. Under what rules would you operate in making a voyage from San Francisco to Seattle?
3. You are on a steamer at sea in a fog and your engines break down. What fog signal will you use?
4. Under what circumstances does a tug carry three white lights in a vertical line?
5. What rule makes it necessary to have a lookout?
6. When would you blow three short blasts in a fog?
7. When must you keep a lookout astern?
8. You are on a steamer being towed from one dock to another in inland waters at night. What lights will you carry?
9. At sea you meet another steamer in the crossing situation and you have the right of way. What sound signal can you give?
10. What is the difference between a signal of two blasts under international rules and the same signal under inland rules?

If you can answer the above questions offhand, you are probably one of the few navigators who have a clear knowledge of the rules of the road. The correct answers follow:

1. (a) A steamer in the crossing situation having the right of way over the other steamer; (b) any vessel overtaken by another vessel; (c) a sailing vessel meeting a steamer; (d) a sailing vessel closehauled meeting a sailing vessel running free; (e) a sailing vessel closehauled on the starboard tack meeting a sailing vessel closehauled on the port tack; (f) a sailing vessel running free with the wind on the starboard side meeting a sailing vessel running free with the wind on the port side; (g) the leeward vessel when two sailing vessels running free with the wind on the same side approach each other; (h) a sailing vessel with the wind anywhere but aft meeting a sailing vessel with the wind aft.
2. From San Francisco to sea under inland and pilot rules; thence to the limits of inland waters on the Strait of Juan de Fuca under international rules; thence to Seattle under inland and pilot rules.
3. One long and two short blasts of the whistle at intervals not exceeding two minutes.
4. When she is towing more than one vessel and the length of the tow from the stern of the tug to the stern of the last vessel in the tow exceeds 600 feet.
5. Article 29: Nothing in these rules shall exonerate any vessel, or the owner or master or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper lookout, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.
6. When another vessel is in sight and your engines are going full speed astern.
7. (a) When leaving anchorage or moorings; (b) when going astern; (c) at night when no fixed stern light is carried; (d) at all times when changing course.
8. All running lights.
9. A detonating signal.
10. (a) Under international rules signifies change of course to port; (b) under inland rules signifies a starboard to starboard passing, whether or not a change of course is required.

Memory Test Inadequate

It is a fact that most licensed officers honestly believe themselves thoroughly posted on the rules of the road. They have passed the inspectors' examinations and therefore have documentary evidence of their proficiency. What more could be required? There are at least two good reasons why the average master mariner has only a passing acquaintance with the rules. In the first place, that is all that is required to obtain a license. The inspectors' examination on the rules is usually nothing more than a memory test of lights and sound signals rather than a test of the candidate's ability to apply the rules in difficult situations. This is pretty generally known, and consequently the candidate devotes most of his preparation to the mysteries of the time sight and the meridian altitude. The rules of the road are crammed into the last day or two before the examination and the various sound signals and the regular and special lights are memorized parrot fashion. Naturally, facts learned in this way do not stay long in the memory. How many of the special lights could you name two weeks after you got your last license? You are in no way to blame, for if you got the license you have prima facie evidence that you did all that was required of you. When you have run the gauntlet of all the mates' examinations and successfully passed for master, you are through with studying so far as the inspectors are concerned; and it is usually true that the longer a master has his license the less he can tell you about the rules of the road. This is not an attempt to be facetious, but an honestly expressed opinion based upon considerable experience in instructing classes of masters and mates.

The second reason why officers are not more familiar with the rules is that the importance of knowing them thoroughly has never been brought home to them. Unless you have actually been in a collision that resulted in a law suit for your owners, you probably have not realized what a departure from the rules might cost in dollars and cents. Most seafaring men will scout the idea of attempting to become familiar with the interpretations put on the rules of the road by the Federal courts; yet it is just those interpretations, as expressed in decisions of other collision cases, that nine times out of ten determine whether or not your vessel is liable for the collision. The important point is not what you think a rule means, but what the Supreme Court says that it means. There is hardly a rule that has not been clearly interpreted and explained by the courts, and unless you are familiar with the ruling decisions, all the information you can get merely by reading the rules themselves will be of little value.

Liability

If you have a collision and the case is brought into court, there are four possibilities as to the decision: (1) both vessels may be at fault, in which case the damages will be shared equally; (2) your vessel may be solely at fault and sustain all the damages; (3) the other vessel may be solely at fault and sustain all the damages; (4) both vessels may be free from fault, and the collision held due to inevitable accident. The importance of knowing exactly what is required by the rules lies in the fact that the violation of any rule, however slight, is held by the courts to be a presumption of fault unless it is proved that the violation could not have caused or in any way contributed to the collision. When a collision follows this is almost impossible to do, and unless you have acted entirely in accordance with the rules as interpreted by the courts, your owner pays at least half the damages. Though the other vessel be culpably negligent, a seemingly trivial error on your part may put fifty per cent of the costs on your vessel.

It is a simple matter for every licensed officer to know the rules of the road clearly and thoroughly. Various books have been published in the United States and in England which set forth the rules as interpreted by the admiralty courts of both countries. One such book should be a part of every navigator's library just as much as an epitome of navigation is now. Pamphlets containing the international, inland and pilot rules are given by the inspectors to every officer at the time he receives his license. It should be borne in mind that it is important to read the rules at frequent intervals in order to keep posted. General principles can be permanently memorized, but it is not safe to trust the memory for all the details. Admiral Knight recommended that young officers always read the rules of the road through before getting under way. This may not be practical in the merchant service, but it certainly is an excellent precept. It should be a matter of professional pride to the navigator to know the rules as well as he knows the day's work.

Suggestions for Improved Tests

There are various ways in which this very desirable result might be brought about. In the first place, the inspectors' examinations should be made as rigid as possible. They should be more than the memory tests that with few exceptions they now are. They should be of such a character as to test a man's ability to analyze a situation quickly and to apply the rules in the way the courts expect them to be applied. "Given a set of conditions and a situation, what would you do?" should be the type of question asked. Moreover, every officer should be examined on the rules at frequent intervals, regardless of the license he holds. We require an annual inspection of the vessel to determine her seaworthiness. Why not at the same time require her officers to satisfy the inspectors that they know the rights and duties of their own vessel with respect to other vessels, those who fail having their license suspended until their deficiency is made up? A navigator frequently loses his license for ignorance of the rules; this arrangement would cause it to be taken from him before a collision instead of afterwards. Such a system would work no hardship on the conscientious officer who keeps posted as he should; it would weed out some of those who persist in deriving their knowledge of the rules of the road by the collision method.

Until the inspectors devise some such scheme of keeping check on the officers, any improvement along the lines suggested must come from the operating companies and the officers themselves. The operators should satisfy themselves as to the qualifications of the masters in this regard, and the masters in turn check up on the mates of their respective vessels. The company's legal adviser should notify navigating officers of any important legal decision involving the rules so that they may keep up to date in their information. Every master should not only keep very well posted himself, but should feel free to question his mates on the rules at any time, and when necessary instruct them. Great benefit might be derived from frequent discussions among the officers of a ship; in fact, mess room arguments furnish excellent schooling, provided the question is not left hanging in the air, but is finally settled by proper authority.

Educational Campaign Needed

It is time that we have a campaign of education in this very vital, but generally neglected, phase of ship operation. If you are an operator, see to it that the importance of knowing the rules of the road better is called to the attention of every officer in your fleet, and that he is supplied with the necessary material for acquiring that better knowledge. If you are a master, start the ball rolling on your own ship; first, by improving your own knowledge, and then by encouraging your officers to go and do likewise. If you are a licensed officer, make up your mind to have a clear knowledge of the rules of the road as part of your professional equipment; and begin to carry out your resolution by studying the rules regularly. Find out just what they mean, as interpreted by the highest authority in the land, and impress them so firmly in your own mind that the next time you get into a close place your action will be automatically what it should be. You will find the rules a most interesting study, and the confidence that comes from knowing just how to take care of your ship in all circumstances will more than repay the effort. And what is more important, we shall have fewer collisions.

Pacific Marine Review
The National Magazine of Shipping

576 Sacramento Street
SAN FRANCISCO, CALIFORNIA U. S. A.

Official Organ of the Pacific American Steamship Association

Subscription Price, per year (Domestic) $2.00
(Foreign) $3.00
Single Copies . . . . 25 cts

J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor

NEW YORK OFFICE
339 at 30 Church Street
M. B. STEWART, Manager

Pacific Marine Review is sold at all leading News Stands
Entered as second class mail matter at Postoffice
San Francisco, California

Published on the First of Each Month. Copyright
1921 in the United States by J. S. HINES

AMERICAN SHIPBUILDING

FREQUENTLY during the excitement of the war emergency shipbuilding program, Pacific Marine Review has pointed out editorially the folly of building so many standard ships of one type. This view has been emphasized recently by the statement of Chairman Lasker that more than one-third of the steel ships owned by the Shipping Board are useless for ordinary commerce and that another third are suited thereto only very moderately. This statement by the chairman of the Shipping Board aroused a storm of protest, and it was at first very much misunderstood.

For a number of years before the war freight service by sea developed a decided trend toward specialism, it being found that certain types of steamer or motorship were especially adapted to certain routes and trades, and today under the stress of competitive freight rates the shipping world is coming back to the lessons which it learned before the war and is finding that only by the judicious use of the best type of cargo carrier for the work in hand can even the minimum of profit, which is the present rule, be maintained.

The British shipbuilders and shipowners are loudly calling for the "scrapping" of much of the present tonnage of the world, and many of the old, established shipbuilders are in receipt of inquiries from prospective purchasers for especially designed ships.

Many of the ships of the Shipping Board in the United States and many of the standard ships abroad could undoubtedly in normal times be profitably converted to special types, and undoubtedly many of them will be so converted, provided that they come through the slack time in shipping in sufficiently good condition to make such conversion profitable.

With this knowledge of the real need for special types of ships the American shipbuilder should be alive to the opportunities now before them for research work in naval architecture and marine engineering so that they may be prepared to put before the prospective American customer the most economical ship for his needs. He may be sure that his European cousins are doing this very thing, many of them spending huge sums to keep their organizations abreast or ahead of the best practice in the world's shipbuilding yards.

It would seem to the editor that the shipyards of America might at this time profitably get together for the purpose of supporting research work in marine engineering and shipbuilding methods, the results of which would be open to all the yards. There are so many questions in connection with the development of the Diesel engine for marine purposes in connection with the use of welding to replace riveting in ship construction; the savings to be effected in the handling of materials aboard ship by the use of electricity instead of steam; so many methods and materials yet open to improvement, that a competent corps of experimental workers should be able to produce very tangible results for the good of the American merchant marine and the American shipbuilder at a cost which, if divided among the various yards, would be practically negligible when compared with the results.

THE NAVAL ARCHITECTS AND MARINE ENGINEERS

HE twenty-ninth general meeting of the Society of Naval Architects and Marine Engineers was held in New York, November 17 and 18, and produced a very well balanced program of thirteen addresses. Two of these were strictly naval, one by Rear-Admiral Rogers on "The Technical Relations Between Different Classes of Men of War in Relation to Design"; the other by Mason S. Chace on "The Development of the Three-Plane Navy With or Without Battleships."

Three of the papers were directed chiefly to the factor of operation. "American Classification of American Vessels," by W. A. Dobson, makes a very eloquent plea for the American Bureau of Shipping. "How Can American Ships Compete Successfully with Foreign Ships?", by Winthrop L. Marvin, which is printed in full as the leading article in this issue of Pacific Marine Review, gives a masterly analysis of the operating problem facing American ships in competition with the ships of European and Japanese nationals. "The Improving of Port Facilities in the Development of a Merchant Marine," by Rear-Admiral H. H. Rousseau, treats of the material handling problem at our ports in its relation to ship operation.

Those papers devoted exclusively to marine engineering features are two in number and both deal with the use of electric power on board ship—one by W. E. Thau on "Electric Propulsion of Ships"; the other, "Electric Auxiliaries on Ships," by Edward D. Dickinson.

The shipbuilders will find interest in "Cost Accounting and Estimating," by H. H. Schulze, and "American Shipyard Apprenticeships," by Charles F. Bailey.

Naval architects will delight in "The Technical Calculations of the Transverse Strength of Submarines," by Professor William Hovgaard, and "The Influence of Shape of Transverse Sections Upon Resistance," by Professor Herbert C. Sadler and E. M. Bragg.

Of general interest to operator, marine engineer, naval architect, and shipbuilder alike, is the paper on "Power and Speed Trials of a 10,000 Deadweight Ton Tanker," by H. H. Everett, and that on "The Design and Construction of Passenger Steamers," by E. H. Rigg.

NEW MOTORSHIPS

On page 718 of this issue of Pacific Marine Review will be found a general description of the motorships Californian and Missourian now being completed at the Merchant Shipbuilding Corporation for the American-Hawaiian Steamship Company. These motorships are notable as being the first privately built and owned American motorships in the 10,000-ton class.

The American-Hawaiian is certainly to be congratulated upon its progressive policy in building these two fine vessels at a time when building costs are so high and freights so low. For that matter, the American-Hawaiian has always been a progressive pioneer among the American merchant marine companies. They started the first real coast to coast freight service by water. They were the first, or among the very first, to use oil fuel on their ships; and now these two first-class 11,500 deadweight ton motorships give them the premier rank among American motorship operating companies.

A comparison of the dimensions of these motorships with those of the original California is given in the article above referred to, and the attention of operators is directed to the tremendously increased cruising radius of the motorship with practically the same amount of fuel in proportion to the total cargo capacity.

Operators should also carefully follow the performance of the William Penn, the big Shipping Board motorship, which recently completed a trip from New York to Yokohama carrying 11,000 tons of cargo. No attempt had been made on this ship to show any particular record for economy. She consumed on her voyage an average of 13 tons of fuel oil a day at sea for an average speed of 11 knots. We note from a clipping in a Japanese newspaper that the Japanese are marveling at her low consumption of fuel in port. Working her winches and lights, "she consumes the ridiculously low amount of two barrels of oil a day. She took on oil at Honolulu and has enough in her bunkers to carry her around the world. She has a crew of 42 men as a motorship and would require 56 men as a steamer, and in the latter case would burn in the neighborhood of 40 tons of fuel oil per day. Her operation on her maiden voyage has been 100 per cent perfect."

THE LEVIATHAN

At the time of her war use the Leviathan was the largest ship in the world, and with the exception of the White Star steamer Majestic, which is not yet in use and will not be until sometime in April, 1922, the Leviathan is still the largest ship afloat.

All Americans who are interested in America's merchant marine will feel a thrill of natural and pardonable pride in the fact that this greatest of modern steamers is under the American flag. They will also feel a sense of shame that this steamer has for so long a time been tied up to a wharf on the New York waterfront.

The history of her sale to the International Mercantile Marine Company and of the stopping of that sale by an injunction suit is well known to all of those who read the daily press. Not so well known, however, to the American public is the fact that, notwithstanding what would seem to have been very harsh treatment of the International Mercantile Marine at the hands of America's politicians, that company, which is a strictly American company—rumors and propaganda to the contrary notwithstanding—have practically at their own expense supervised the care of this ship so that she is now in just as good condition as she was at the close of the war.

We are reliably informed from authoritative sources in New York that the Leviathan, as far as the hull of the ship is concerned and the upkeep of the engines and her machinery, is in first-class condition. After the fire of August 24 the International Mercantile Marine Company installed aboard a Newman's safety clock system, which checks the watchmen in such a way that no spot on the vessel can remain uninspected for over one hour. The International Mercantile Marine Company also executed a contract with a New York company who were to clear the vessel of rodents at a certain rate per rat. At the last report this contract was working out on the basis of the five men catching two rats a day. When it is considered that the Leviathan, fully equipped, is practically a floating town of 4000 inhabitants, it will be seen that in comparison with any similar structure, afloat or ashore, she is practically free of rats.

In addition, the company's experts and draftsmen have prepared plans and specifications for the reconditioning work on this ship to equip her as a first-class passenger liner for the North Atlantic trade. This work, which involves a tremendous amount of detail, had been going on for over eight months, and at the time of the recent renewal of interest by the Shipping Board Emergency Fleet Corporation in the reconditioning of this vessel this work was finished and became immediately available for Shipping Board purposes.

The man personally responsible for the production of these plans and specifications was W. F. Gibbs of the International Mercantile Marine Company, who for eight months devoted practically all of his evenings and Sundays to supervising the work of the draftsmen and preparing therefrom the specifications. It is sincerely to be hoped that when the government calls for bids on the reconditioning of this vessel the International Mercantile Marine Company will be given ample opportunity to use the results of the work of Mr. Gibbs, and that the experts of this company will be permitted to supervise the actual reconditioning of the vessel These experts are more familiar with this class of work than anyone in America and possibly than anyone in the world.

It is roughly figured that the reconditioning will cost in the neighborhood of $10,000,000. The American Legion class of Shipping Board passenger and freight liners—517 feet between perpendiculars; 14,300 gross registered tonnage—cost between $7,000,000 and $8,000,000. The Leviathan measures 907 feet 6 inches between perpendiculars and has a gross registered tonnage of 54,282. If we consider her value to the Shipping Board in her present condition as $4,000,000, which was the highest price offered for her at the time of the attempted sale, we must certainly figure that $10,000,000 added to that price will still hold her book value well within conservative limits as compared with the book value of the American Legion class. On a tonnage basis, if the American Legion is worth $7,000,000, the Leviathan would be worth $28,000,000. In speed, in elegance of accommodations, and in everything that goes to make up a first-class passenger vessel, the Leviathan is the last word in the pre-war race for supremacy in the crack passenger fleets on the North Atlantic. Nuff sed.

AMERICAN MARINE WEEK

FOR six days, November 14 to 19, inclusive, New York, acting as host to the shipping and shipbuilding industries of America, featured the annual meeting of the American Society of Naval Architects and Marine Engineers, the annual meeting of the American Society of Marine Draftsmen, and the annual Marine Show under the auspices of the Marine Equipment Association of America.

This show was an unqualified success financially, and as an exposition of marine machinery, marine fittings, equipment, shipbuilding facilities, etc., was stated by experts to be the best thing of its kind ever put over in America.

During the show the Marine Equipment Association of America held its annual meeting, at which Colonel Edward A. Simmons was re-elected president, W. M. Wampler of the Ellcon Company was elected vice-president, and the nominating committee recommended to the executive committee that H. C. Davis of Row and Davis be re-appointed treasurer, and that Robert B. Lea of the Sperry Gyroscope Co. be appointed secretary to succeed K. L. Ames, Jr., resigned. The following members were elected to the executive committee succeeding those whose terms expire at the end of this year: First district (New England States), Albert C. Ashton, Ashton Valve Company, Boston, Mass., and E. S. Anderson, Scovill Manufacturing Company, Waterbury, Conn.; second district (New York and New Jersey), Gardner Cornett, Pneumercator Company, New York City; third district (Pennsylvania, Maryland, Delaware, District of Columbia, Virginia and West Virginia), W. P. Smith, William Cramp & Sons Ship & Engine Building Company; fifth district (states contiguous to the Great Lakes and the Middle West), Benjamin Neilds, Jr., National Malleable Castings Company (Cleveland), New York City; and sixth district (Pacific Coast), K. W. Heinrich, Bethlehem Shipbuilding Corporation, Ltd. (California yards), South Bethlehem, Pa.

At this meeting a resolution was adopted requesting the executive committee to consider changing the name of the association to Marine Association of America, which name the meeting felt would cover in a broader way the activities of the association. Undoubtedly this change will be made.

Much of the credit for the success of this show is due to Colonel E. A. Simmons, who not only devoted much of his own time to the preparatory work but also put at the disposal of the association a number of members of the staff of Marine Engineering and Shipping Age.

It was felt by all of the exhibitors that an annual show of this kind, properly managed under the guidance of such an association, was of vastly greater benefit than a number of smaller shows staged under the management of individuals or societies not under the control of the marine industries.

A full report and many pictures of exhibits will be found elsewhere in this issue.

IN RECOGNITION OF ACHIEVEMENT

Among the shipbuilding fraternity, of the Pacific Coast at least, Charles M. Schwab is looked upon as the greatest personal force that was behind the achievement of our records in shipbuilding during the war emergency period. Crystallization of this feeling was expressed in a banquet given to Mr. Schwab by Pacific Coast shipbuilders at the Waldorf-Astoria, New York, on Thursday, November 10.

At this dinner there was presented to Mr. Schwab "An Allegory of Achievement," a bronze shaft which had been designed especially for this occasion by Mr. Haig Patigian, a sculptor of note and president of the Bohemian Club of San Francisco. As described by Mr. Patigian, this bronze is a "shaft two feet in height and ten inches in diameter. At the top of the cylindrical composition is portrayed the idea of 'Ships that sail to the four corners of the Globe.' The conventional prows bear figureheads of Pegasus, symbolic of success and achievement. The principal circular body of the bronze is divided into four panels by four flat columns. Each panel contains a figure, typifying respectively Patriotism, Progress, Industry and Commerce."

"Patriotism is a male figure with a helmet, standing ready to defend the emblems of his country. Behind him the American eagle spreads its wings in protection.

Progress is depicted by a female figure, with the torch of civilization resting against her shoulder.

Industry, a powerful male figure, leans on a hammer and stands against a background of mechanical devices.

Commerce is a female figure whose right hand rests on a conventional rudder, while in the left she holds a caduceus, which was the wand of Mercury, god of commerce."

The committee representing the Pacific Coast shipbuilders in the arrangement of this banquet and the presentation of the bronze shaft was composed of Walter Johnson, president Union Construction Company, Oakland, California; Dan Hanlon, president Hanlon Shipbuilding and Dry Dock Company, Oakland, California; R. S. Moore, President Moore Shipbuilding Company, Oakland, California; Joseph J. Tynan, general manager Union Plant of the Bethlehem Shipbuilding Corporation, Ltd., San Francisco, California.

A GREAT AMERICAN LEGAL NAVIGATOR

EUGENE TYLER CHAMBERLAIN was appointed Commissioner of Navigation in December, 1893, by President Cleveland and for nearly twenty-eight years accordingly has had a share in the administration of laws relative to ships and shipping and also in legislation upon those subjects. Soon after entering office he took up the work of carrying into effect the recommendations of the International Maritime Conference held in Washington in 1889. As secretary of the American delegates to that conference he was instrumental in bringing about the adoption by Congress of the revised international regulations for preventing collisions at sea, proclaimed by the President in December, 1896, and the "rules of the road" for inland waters of the United States and for the Great Lakes.

In August of this year Eugene Tyler Chamberlain resigned the office of Commissioner of Navigation to enter the Bureau of Foreign and Domestic Commerce. For twenty-eight years Commissioner Chamberlain has been a conservative, constructive force in the administration and initiation of laws relative to ships and shipping. Very consistently he has opposed many of the measures passed by Congress, which have since been proved handicaps against American competition in foreign trade, and some of the most constructive measures were personally drawn up and recommended by him.

The Department of Commerce is to be congratulated on the fact that the rich experience and mature judgment of this able official is still available for their use.

In 1895 he secured the passage of the ship measurement act, which with later modifications brought the tonnage measurement of American ships, especially steamers, into accord with the system employed by Great Britain and other maritime powers. The same year through the active efforts of the late Senator William P. Frye of Maine a bill drafted by Mr. Chamberlain was enacted repealing nearly all of the obsolete navigation laws which embarrassed to a greater or less extent American shipping. He drafted the law of 1898 which applied more rigidly the coastwise principle to trade by sea with Alaska to meet the rapid development of that territory following the discovery of gold, and also the laws of 1900 applying to Hawaii and Porto Rico that principle of reserving to American ships the trade between American ports. He has always opposed, however, the application of that principle to trade with the Philippines on the ground that it would be detrimental to the progress of the archipelago and might create a grievance there similar to one of those which led to the American Revolution and furthermore would be a perversion of the coasting trade principle as recognized in international law.

The extensions of free shipbuilding materials in the Payne and Underwood tariffs were recommended by the Commissioner of Navigation as well as the reduction of tonnage taxes in the tariff of 1909. The revision in 1908 of the Act of 1882 relative to accommodations for steerage passengers was drawn by Mr. Chamberlain as well as the motor boat act of 1910, providing the safety equipment of this increasing and popular type of water transportation.

The Act of 1910 requiring wireless apparatus and operators on ships carrying fifty or more passengers was drawn by and passed on Mr. Chamberlain's recommendation and has since been adopted by other maritime nations. In 1912 this act was extended so as to require continuous wireless watch on shipboard, and this principle was incorporated in the International Convention of 1914 on Safety of Life at Sea. In short, as Commissioner of Navigation, Mr. Chamberlain has been consulted on nearly all American maritime legislation for a quarter of a century, except that involving the United States Shipping Board. He opposed for years several features of the LaFollette Seamen's Bill, especially the provision requiring a large percentage of able seamen of three years' deck experience on American cargo boats, on the ground that it would be a heavy handicap on American ships and would tend to increase alien deck crews on American ships and keep young Americans from a seafaring life.

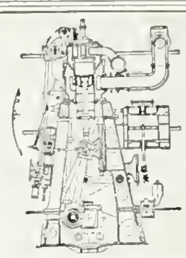
Mr. Chamberlain has been for some years an honorary associate member of the Society of Naval Architects and Marine Engineers, and a member of the Maritime Law Association. He was secretary of the Pan-American Customs Congress, comprising delegates from the United States and the republics of South and Central America and Mexico, which met in New York in 1903 to promote uniformity of navigation laws among the American republics. He helped in the American preparations for the International Conference on Safety of Life at Sea at London in 1913-14, following the Titantic disaster and was one of the American delegates to that conference. In 1902, by designation of President Roosevelt, he acted temporarily as auditor for the Navy Department in addition to his regular duties.

At the outbreak of the world war in 1914 Mr. Chamberlain drew up and recommended the Ship Registry Bill which was passed August 18, 1914, and resulted in the prompt transfer from foreign flags to American register of upwards of 500,000 gross tons of shipping, which, without costing the government a penny, gave the initial impetus to recent American maritime development and added greatly to our ability to transport at once our troops and supplies overseas when the United States entered the war in 1917. He then served as a member of the Shipping Committee of the Council of National Defense.

Generally Mr. Chamberlain has been for years an advocate of "free ships" for foreign trade (adopted in the Ship Registry Act of 1914) and of subsidies on the ground that these policies are not alternative or conflicting, but independent methods of dealing with two phases of the subject and are both employed by the other principal maritime nations of the world. He has opposed discriminating import duties on the ground that they are contrary to traditional and approved American doctrine, that they are specially disadvantageous to a nation like the United States, the volume of whose exports so greatly exceeds its imports, and that when employed over a century ago they were provocative of retaliation and counter-retaliation, commercial irritation and ultimately war.

(Continued on page 732)

Oil Engines and Motorships



THE MOTORSHIPS CALIFORNIAN AND MISSOURIAN

The American-Hawaiian Steamship Company has always been a pioneer. First in coastwise purely freight service, beginning in 1900 with the original steamer California, which was lost in war service, they were the pioneers in the use of oil fuel under boilers, beginning the change in this system in 1904. Now they are the pioneer American company in the use of big motorships.

THE twin screw motorship Californian was launched at the yard of the Merchant Shipbuilding Corporation, Chester, Pennsylvania, November 14, 1921.

The Missourian, sister ship to the Californian, will be launched within a month thereafter.

The launching of these motorships marks the advent of the Merchant Shipbuilding Corporation into the field of large full-powered Diesel engine freighters, and the placing of this corporation in the foremost rank of progressive shipbuilders of ships of modern type.

The only American-built ship comparable with the Californian and Missourian is the William Penn, whose engines were built in Denmark and installed in a hull originally intended for geared turbines.

For long voyages, the motorship will soon be regarded as the desired type. This seems to be the generally accepted opinion, judging from the numerous inquiries received in reference to the Californian and Missourian upon the efficiency and economical points in question.

Evidently prospective ship-buyers are studying the problem with keen interest. Recent British ship construction reports show that there have been less motorship cancellations than there were steam propelled ships. German shipbuilders have very actively taken up the construction of Diesel driven motorships. American ship-owners are beginning to appreciate the situation and desirability of developing the construction of ship types similar to the Californian and Missourian.

The initial cost of equipping these new types of motorships with internal combustion engines did not deter the directors of the American-Hawaiian Steamship Company, whose ships are operated by the United American Lines, from appropriating the additional investment, because they were assured by the officers and technical staffs of the owners and builders that the efficiency and economy effected would finally justify the expenditure.

It is believed by advocates of the motorship that it would be a progressive step in the upbuilding of the American merchant marine to convert at least 50 per cent of our existing freighters and passenger freighters, which are tied up, to Diesel or Diesel electric power.

Best Type

The Californian and Missourian are considered the most acceptable type of motorship for the establishment and maintenance of long distance voyages for both cargo and passenger carrying trade or for combined cargo-passenger routes. Both are equipped with the most modern, efficient, and economical machinery and commercial appliances known today.

The size and tonnage of these motorships are the outstanding features for economical service. The lines of the Californian and Missourian especially distinguish them for their elegance and practicability, while the quality of workmanship is superior in every detail—the sample product of a new type of cargo vessel in an old shipyard which has been building ships for more than sixty-two years, and which continues to hand down the enviable motto of "The shipyard with a tradition."

In order to conserve length, the quarters amidships in these vessels are two decks high and relatively short, giving a maximum length for hatches and cargo handling gear. They are rigged with two masts and six king posts, carrying twenty-one booms, one of 30 tons capacity, one of 10 tons, 11 of 5 tons, and 8 of 3 tons. These serve seven hatches, all 18 feet wide and of varying lengths, the longest being 35 feet.

All masts, posts and booms are of steel, the masts being of steel right up to the trucks, eliminating the

Principal Dimensions of Motorship California and of Old Steamer Californian

	Steamer	MotorShip
Length overall	429′ 6″	461′ 0″
Length between perpendiculars	413′ 0″	445′ 0″
Beam, molded	51′ 0″	59′ 8″
Depth, molded to shelter deck	33′ 6″	39′ 0″
Contract draught	26′ 0″	28′ 6″
Displacement at contract draught	11,970 tons	16,500 tons
Deadweight at contract draught	9,500 tons	11,000 tons
Cargo capacity including deep tank bal		650,000 cu. ft.
Contract speed	10 knots	11.5 knots
Normal fuel capacity	(coal) 1182 tons	14.000 tons
Reserve fuel capacity in deep tank		760 tons
Normal radius	6000 miles	25,000 miles

usual wooden plug top masts.

The cargo handling machinery for these ships has been most carefully selected, and consists of fourteen double geared winches, and two Shepard Crane & Hoist Company's winches on each ship, the fourteen winches for the Californian being manufactured by the American Engineering Company and the winches for the Missourian were made by the Maine Electric Company. Each winch is driven by a thirty H. P. electric motor of the "Mill Type." The motors and the controllers for the Californian were supplied by the Westinghouse Manufacturing and Electric Company. Those for the Missourian were furnished by the General Electric Company.

The propelling machinery consists of two Burmeister and Wain six cylinder, single-acting, four-cycle Diesel engines of the cross-head type. Each engine is rated at 2250 Diesel I. H. P. and 115 R. P. M. Cylinders are 740 mm. diameter by 1150 mm. stroke. Thrust bearings are of the horseshoe type, and the 14-foot diameter propellers are manganese bronze.

Electricity for engine room auxiliaries, deck machinery, etc., is generated by four 65 K. W. direct current 230 volt generators each direct connected to a two-cylinder four-cycle Diesel engine. At sea only one set will be required, and in port a maximum of three, so that there always will be a stand-by set.

Both main and auxiliary Diesel engine sets are nearing completion in the shops of the Wm. Cramp and Sons Ship and Engine Building Company, Philadelphia.

All deck machinery, including windlass and steering gear and all engine room auxiliaries, except one small auxiliary steam driven air compressor for charging air bottles, are electrically operated. The steering gear is electric hydraulic drive.

There is one 120 H. P. electrically driven two stage auxiliary air compressor.

A donkey boiler 48 inches diameter by 108 inches total height is installed to generate steam for heating purposes and for fire extinguisher service.

The Rich fire detecting and extinguishing system is also fitted, in conjunction with steam and CO_2, the latter being carried in flasks located on deck.

No effort has been spared in these ships in obtaining only the best in workmanship and material, and in the selection of auxiliaries, so that, when they go into service, it is expected that they will rank with the best freighters in the world in economy and reliability.

DECK MACHINERY OF THE WILLIAM PENN

By G. A. PIERCE
Electrical Engineer William Cramp & Sons Ship & Engine Building Company

ONE of the recent developments in marine engineering is the tendency to use electric motors in place of steam engines for driving ship's winches, windlasses, capstans, steering gear, pumps, blowers and other auxiliary machinery. This tendency implies the general recognition of two facts: in the first place, that reliable marine motors are now available; and secondly, that motors are more satisfactory than steam engines for auxiliary service.

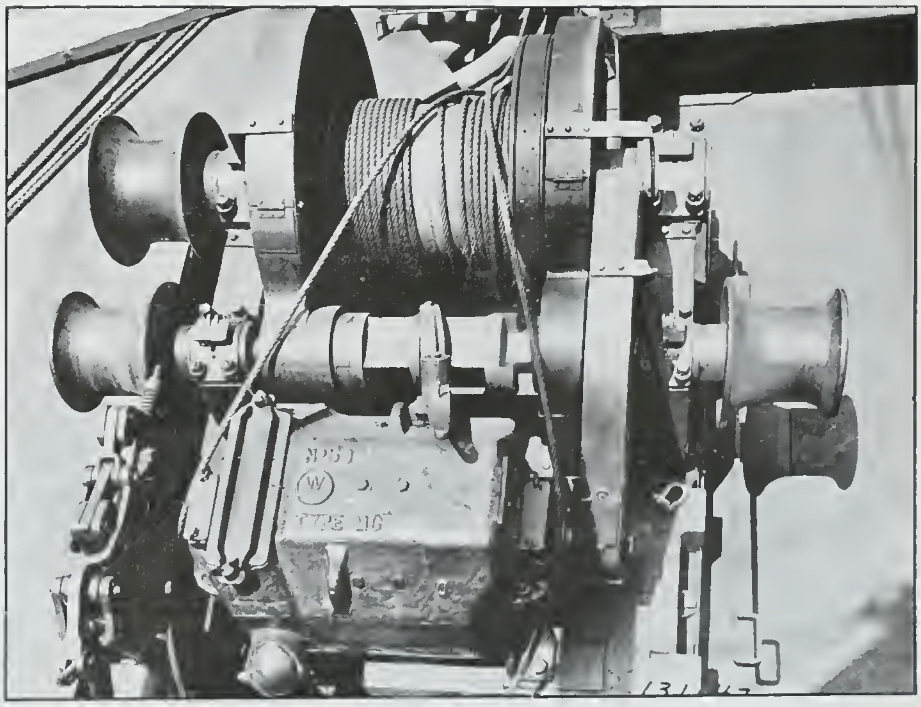
The reliability of motors on shipboard has been amply proved by their records on both naval vessels and motorships. Motor manufacturers have had difficulty in building practical electrical equipment for ships, but increasing experience and a better knowledge of marine conditions are providing the remedy for such troubles, and it can be proven conclusively that the cases of motor failure have been due to installing apparatus which was not at all suitable for shipboard use.

As regards the desirability of motors from an operating standpoint, such tests as are available indicate that an electric deck auxiliary system requires only from one-third to one-quarter the amount of fuel needed by a corresponding steam system, so that substantial economies can be obtained through the use of motors. In addition, electric wires are far more convenient, economical, and satisfactory than steam pipes for distributing power throughout a ship.

The designing of marine auxiliary motors is, however, still in its early stages, and no generally accepted standards have as yet been developed. Consequently it is believed that a description of the construction, control, and performance of the winch motors of the U. S. S. B. motorship William Penn, which are of an entirely new design, will be of interest at this time.

The M. S. William Penn

The William Penn is the Shipping Board's first motorship. She is a cargo vessel of 12,358 tons deadweight capacity and is propelled by two 2250 I. H. P. Burmeister and Wain Diesel engines direct connected to her propellers. Her hull was built at the Gloucester Yards of the Pusey & Jones Corporation, and she was fitted out by William Cramp & Sons Ship and Engine Building Company. She is allocated to the Bar-



View from above of one of the cargo winches on the William Penn showing electric motor and arrangement of gearing and clutches ber Lines, where she is being used in the Far Eastern trade.

Practically all of her auxiliaries are motor-driven, the power being supplied by three 65-kilowatt Diesel-engine-driven generators, supplying 220-volt direct current. Most of the below-deck motors are of foreign make; but those for the deck winches, anchor windlass, and steering gear were supplied by the Westinghouse Electric and Manufacturing Company in consultation with the William Cramp and Sons Company, and these form the subject of this article.

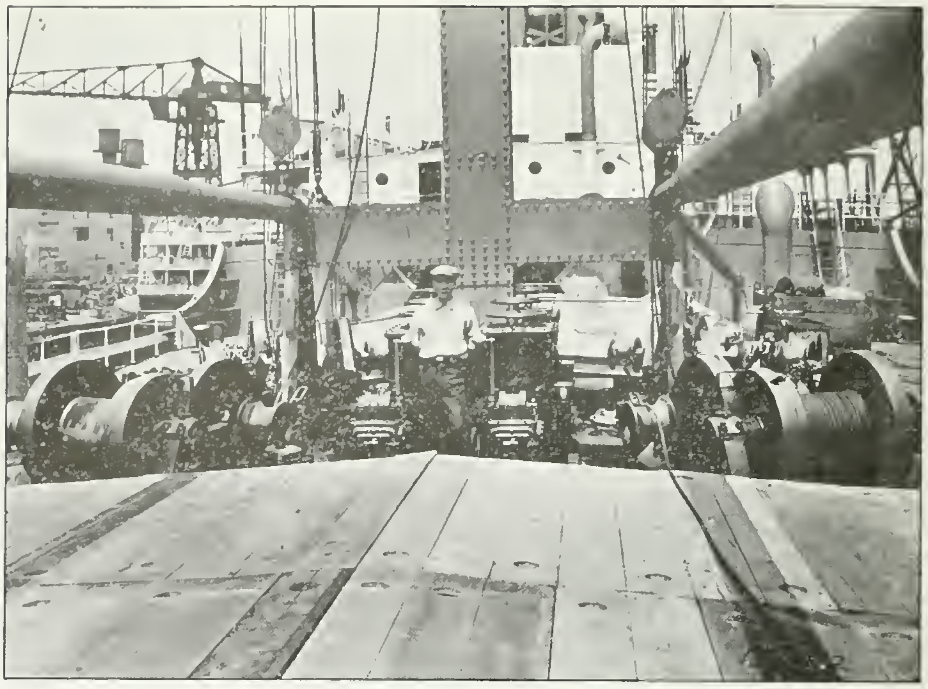
There are altogether eleven deck-winches on the William Penn, ten being used for cargo handling, and one in the stern for warping. They were built by the American Engineering Company of Philadelphia in accordance with the Cramp Company's particular requirements. They are of compound gear type with gear ratios of 12.5 to 1 and of 26.45 to 1, from motor to drum, with the hoisting drum 18 inches in diameter. Each winch has three gypsy heads, two of which are on the first reduction, or counter, shaft and are used for handling light loads and whips. The winches are designed to lift 5000 pounds on the first gear ratio and 10,000 pounds on the second. A ¾-inch steel hoisting line is used on the drums.

The Winch Motors

In designing the winch motors it was recognized that they must be very different from similar machines for land service, and special attention was given to their mechanical strength, waterproofing, ability to withstand high temperatures, and their speed characteristics.

Great strength is necessary to withstand the rough handling these motors are bound to receive, so they have been built with cast-steel frames and extra large shafts and bearings. The commutators and brushes have also been made especially large in order to eliminate frequent renewals of these wearing parts. The armatures are of especially small diameter to reduce the flywheel (WR^2) effect. This results in an appreciable saving in power when all of the winches are in operation and permits a reduction in the generator capacity.

The frame, which totally encloses all of the working parts of the motor, is split horizontally to permit access to the interior. The joint between the two parts is made waterproof; and for the same purpose, the handhole covers are provided with gaskets; the wires enter through a special watertight junction box; and the shafts are made watertight by S. E. A. rings. All small parts usually made of steel, such as springs and bolts, are made of non-corrodible metal. Thus, these motors are capable of withstanding total submergence.



View on deck of William Penn showing arrangement of electric cargo winches, controllers, and booms

But the arrangements that insure waterproofing also prevent ventilation; and since these motors are liable to be operated when exposed to the full force of the tropical sun, special precautions had to be taken to prevent injury due to high temperatures. Internal heating was, therefore, reduced to a minimum by making all current-carrying parts of liberal proportions, thus cutting down the losses due to resistance; while practically all of the coils are provided with water - and - oil - proof mica or asbestos insulation.

The field windings have been so designed that high speeds are obtained with the empty hook and light loads, and low speeds with heavy loads.

The nominal rating of each of these motors is 30 H. P. at 220 volts.

Brakes

Each winch motor is provided with a brake, which is released when the current is turned on and is promptly applied and holds the load when the current is turned off. The brake parts are of non-corrodible metal, and the bearing pins of the shoe mechanism are of bronze with brass bushings to prevent sticking. The operating coil is imbedded in a waterproof cement and is enclosed in a watertight housing. Means are provided to release the brake when the current is off, in case of necessity.

Controllers

The controllers are operated by vertical brass handles, which can be arranged so that one man can operate either one or two winches, as desired. The mechanism is enclosed in a cast iron case, with doors in three sides, giving ready access to the interior. These doors are watertight even when totally submerged. The operating parts are interchangeable as far as possible and can be readily renewed. A small knife-switch disconnects the controller from the line so as to permit inspection and repairs without interfering with the operation of the other winches.

The necessary resistors are of non-corroding cast iron and are enclosed in waterproof cases. Ventilation is provided by openings with covers which are raised and lowered by means of a hand wheel. These covers are electrically interlocked with the controllers, so that no motor can be started unless the covers of its resistor are open.

Operation

Moving the controller handle in either direction from the vertical position releases the brake, starts the motor in the corresponding direction of rotation, and brings it up to full speed in several steps. Moving the handle back towards the vertical position reduces the motor speed; but if the load on the hook is sufficiently heavy to lower by its own weight, dynamic braking is automatically applied.

In this process, the winch motor is transformed into a generator operated by the weight of the load. Since, under these conditions, the speed of a generator depends upon the current being generated, the speed of the winch motor (and therefore of the descending load) can be regulated with great nicety by means of the controller. The use of this method greatly increases the speed and safety of handling the cargo; and it also effects some economy as well, since some of the current generated returns to the line and helps to operate the other winches.

When the controller handle is moved to the off position, the full force of dynamic braking is applied, thus checking the speed of the load smoothly and almost instantly. The mechanical brake is then automatically applied.

In case of an overload on the motor or the failure of the line voltage, the motor is automatically disconnected from the line by a circuit breaker, and the mechanical brake is applied. By bringing the handle of the controller back to the off position, the motor is re-connected; but if the cause of the trouble has not been removed, the circuit breaker immediately opens again.

Other Motors

The anchor windlass motor is similar in design to the winch motors but is considerably larger, having a capacity of 68 horsepower. Its controller is mounted below decks and is operated by a hand wheel above the deck.

The steering gear motor, which operates the hydraulic pump of the steering gear continuously, has noncorrodible parts, impregnated windings, and bearings that will operate at an angle.

Performance and Tests

Tests on the winch motor gave the following results:

Rope speed, no-load, hoist	457 ft. per min.
Rope speed, no-load, lower	337 ft. per min.
Rope speed, 5000-lb. load, hoist	170 ft. per. min.
Rope speed, 5000-lb. load, lower	470 ft. per min.

(The above figures are for operation on high gear.)

The maximum continuous cargo-handling capacity of each winch motor was found to be 45 tons an hour. That is to say, the motors could handle cargo at this rate indefinitely without injury, if the loads could be supplied to them.

When operating with two winches lifting 4000-pound loads, 80 tons per hour can be handled by each pair of winches, and the ship could be loaded at this rate in 30 hours of continuous operation.

However, it was found that the speed of loading was dependent upon the dock facilities, as the winches were able to handle cargo more rapidly than it could be supplied to them.

The fuel consumption of the auxiliary Diesel engines when supplying current for electric lighting, all auxiliaries, and all six winch motors, was 90 gallons of oil per 24-hour day, the winches being in use for 8 hours.

PROGRESS IN MOTORSHIP BUILDING

An Interesting Analysis of the Present Condition in Diesel Engine Propulsion

FULL-POWERED Diesel-engined vessels of over 2000 gross tons increased in number from 107 on June 30, 1920, to 145 on June 30, 1921, and in gross tons from 462,000 to 692,000, says Commerce Reports. There has been a remarkable development in the ten years which have elapsed since the first large motorship was built, especially in view of the fact that during the war construction of vessels was largely confined to standard types. While the gain in steam tonnage, exclusive of motorships, was not quite 9 per cent in the year ended June 30, 1921, ocean-going motorship tonnage increased 50 per cent. The United Kingdom leads, with 34 ships over 2000 gross tons each, aggregating 217,000 tons. The United States is fourth, with 28 vessels totaling 86,000 tons, as will be seen from the table below.

In addition to the large full-powered motorships there were 553 small Diesel-engined vessels, aggregating 210,118 gross tons. Of this number, 59 were American vessels, totaling 27,521 gross tons.

Auxiliary Sailing Vessels

The increase in sailing vessels equipped with Diesel or semi-Diesel engines for auxiliary power has also been rapid. On June 30, 1915, only 45 ships, totaling 13,000 gross tons, had auxiliary Diesel power; on June 30 last, 777 ships, of 342,530 tons, had such installations. The United States leads in this kind of tonnage, as it does in sailing vessels, and owns 61 ships, aggregating 60,103 gross tons.

The complete list of motorship vessels, both full-powered and auxiliary, on June 30, 1921, comprised 1478 vessels, with a total gross tonnage of 1,244,418.

Although it is frequently stated that British steamship companies are conservative, it will be noticed that they have doubled their motorship tonnage within the past year.

Tonnage of motorships over 2000 gross tons each

	June 30—			
Countries	1920		1921	
	Number	Gross tons	Number	Gross tons
United Kingdom	19	108,713	34	217,104
Denmark	16	93,295	21	121,580
Sweden	14	63,951	20	91,681
United States	22	59,807	28	86,457
Norway	19	68,750	21	85,032
Italy	5	24,102	6	26,449
All other	12	43,071	15	63,467
Total	107	461,689	145	691,770

EUROPEAN MARINE NOTES

Impressions of a Californian Abroad

SINCE my last letter to Pacific Marine Review there has been no very great change in the labor situation in British shipyards. Improvement is manifest in some localities, mainly in the partial abandonment of the "ca' canny" principle and in the improved output per man, while in other locations conditions are becoming much more involved and complicated.

A rather ridiculous example of the latter condition was shown in the stand taken by the Boilermakers' Union in the shipyards and repair yards on the Mersey in and around Liverpool. The Mersey Boilermakers' Union had about 1000 of its members more or less constantly engaged on repair work. The employers have been introducing in repair jobs the use of the oxyacetylene flame for cutting up plates and burning out rivets and other processes incident to the repair of marine boilers. Two men with the assistance of the oxyacetylene flame could do the work formerly done by twenty-three men with hand tools. The Boilermakers' Union took the stand that it was perfectly proper for the employers to use the oxyacetylene flame, but that with each oxyacetylene flame used they should employ twenty-three boilermakers. The result is that the work is being done now with any men available trained to the use of the oxyacetylene flame, and the 1000 boilermakers who formerly were working at repair jobs are largely sitting on the bench waiting for work.

Removal of War Bonus

There have been several small strikes, due to the removal of the war bonus, as, for instance, the apprentices in the shipyards on the Clyde. There has also been considerable trouble caused by the decision of the ship joiners that no joiners should work overtime under any consideration.

The consensus of opinion seems to be that daylight is in sight for the return of shipyard labor to normal conditions, and the principal difficulty now facing the shipbuilder in Britain is the handicap in competition with continental builders, due to exchange conditions, and the general handicap common to all shipbuilders in the world—that of high construction costs and low market value of the finished product.

Value of Ships

Six German sailing vessels of 1500 to 2300 tons gross were sold recently on the Baltic Exchange, London, at an average of 8s. 3d. per ton. A new, handy sized steel cargo steamer sold recently on the Northeast Coast at £9 per ton, which was less than one-half the cost of construction, and it may be taken as a general fact that any vessel finished during the last six months, or any vessel now building, will have cost at completion more than twice the actual market value.

As was pointed out in Fairplay in a recent issue, this condition is nothing new in the shipbuilding industry. During the whole of the last century every boom in freight rates and shipping prosperity brought in its wake a long period of depression. As soon as freight rates at sea get to a point where shipping is abnormally profitable, there is a shipbuilding boom, too many ships are built, and the shipping business of the world is in for four or five years of unprofitable business. Since boom freight rates are generally coincident with wars and wars generally bring in their wake depressed conditions in world trading, the depression in shipping is usually more aggravated than the general business depression.

Stability of Old Firms

Old established shipping firms who have gone through one or more of these depression periods in the past foresaw what was coming and wisely used a large portion of their boom time profits to establish large surpluses for the depression of the value of their tonnage, and the majority of such companies are now in a position to weather the storm and come through the depression period with unshaken stability.

In Great Britain, however, and all over Europe, just as at home, the boom in shipping brought on a flock of new companies which bought tonnage at wartime prices and used the greater part of their large earnings for ruinously expansive programs or for the payment of high rates of dividends on large capitalization. Such companies now find themselves with vessels which have for them a book value of from two to five times the actual market price, and such companies are either in the hands of a receiver or struggling along in very desperate circumstances.

I have been particularly struck with the attitude of British and Northwestern European shipbuilders and ship operators at the present time as contrasted with the attitude of American shipbuilders and operators as I saw it on the Pacific Coast at the beginning of the present year. Practically all of the shipbuilders here are carrying out research and experimental work looking to improvements in hull and in motive power, and this on a scale that would lead you to believe that a boom in shipbuilding was imminent.

The Urge of European Shipping

Their reasons for this activity should be interesting to the proponents of an American merchant marine. They are very simple and are based entirely on the knowledge that Great Britain, the Netherlands, Denmark and the Scandinavian countries must have ships. They live on ships, shipbuilding and what ships bring to them. Thus we see, for instance, the East Asiatic Company of Copenhagen, Denmark, at a time when profits from the operation of ships are practically nil, building at Leith,

Auxiliary sailing vessel Kobenhavn of the East Asiatic Company

Scotland, a beautifully equipped five-masted steel sailing vessel with 5000 tons deadweight capacity, fitted with a 600 horsepower Burmeister & Wain motor and a two-bladed feathering propeller, as a training ship for officers and men for their fine fleet of motorships. Denmark has not as much productive acreage as some counties in California, but the ramifications of her shipping companies reach into every port on the globe.

British Bread Wagons

In all these countries, and particularly in Great Britain, one is impressed with the necessity for large fleets of ships simply for the sake of bringing into the country sufficient food to keep the inhabitants alive. The figures for Great Britain would indicate that in foodstuffs alone over 16,000,000 tons are brought into the United Kingdom every year from across the sea. The great bulk of this material comes from quite distant points — Australia, the two Americas, or the Orient, and the tonnage would in itself, without any reference to raw materials for the manufacturing industries which are necessary in order that the people of Britain may buy this food, easily account for a fleet of about 5,000,000 tons deadweight of shipping.

England has the most dense population of any country in the world, and while she remains in that condition every man, woman and child knows that ships are necessary; therefore, ships will be built and operated by Britain, and so the British shipbuilder knows that anything which he can produce in the way of improvements to facilitate the building and operation of these ships will find profitable use.

Sir William Noble summed up this attitude very nicely in an address delivered at Newcastle-on-Tyne to the Northeast Coast Institute of Engineers and Shipbuilders at their meeting of October 14, 1921:

We were proud of our merchant navy before the war, but it was the searchlight of the war which revealed to us its true relation to the life of the nation. Few among us ever thought of the peaceful merchantman as an instrument of war and yet our merchant fleet became one of our fighting units, almost, if not quite, as important as our warship fleet. It was found that the one was complementary to the other, and we know what heroic work was done by the officers and crews of merchant ships. Without those men and without those ships neither we nor our allies could have issued victorious from that stupendous conflict. As a matter of sober fact, a predominant mercantile marine is necessary for the safety and well-being of the whole community. No one can view any decline in the maritime supremacy of this country without alarm. Only across the sea can we gain access to the markets of the world, and, therefore, our merchant fleet is our only means of trading at an economic advantage with other countries.

Cheap food and cheap raw materials are the foundation of our commercial prosperity. They cannot be obtained unless we have tonnage sufficient to bring them at cheap rates. One hundred years ago the population of this country was about 16,000,000. Presumably, that was the population which the land could feed comfortably. Nowadays, in spite of our war losses, we have, owing to industrial expansion, about 47,000,000 to feed and clothe, and an aspiration that the general standard of living should be raised for the mass of the people. Therefore, we must import food and raw materials to keep us going throughout the whole gamut of our national life.

Depleted Tonnage

When war broke out in August, 1914, the world's steam tonnage was 42,500,000 tons gross. It had grown year by year following the rapid expansion of the world's commerce caused by the application to industry of steam and electrical power. Of this total the United Kingdom tonnage was represented by nearly 19,000,000 tons—44½ per cent of the whole, but in real efficiency a much higher percentage. Steamers of 1600 tons gross are usually taken as the standard for overseas trading and 90 per cent of the United Kingdom tonnage was of this size and upwards. Further, 68 per cent of this class of tonnage was under fourteen years old—the most up-to-date tonnage in the world in type, size, speed and equipment. This was shown by the fact that the British mercantile marine was responsible for over 50 per cent of the world's seaborne commerce. All nations were dependent on us. As a matter of fact, 30 per cent of the trade between foreign countries was carried in British bottoms, and the work of the British mercantile marine represented a cash value in invisible exports of something like £100,000,000 as a contribution to the national resources.

It may be asked how did we acquire such a mercantile marine? It was not accomplished in a day or a year, it was the slow growth of some 200 years of patient endeavor, and was the outcome of that spirit of adventure combining initiative, resource and courage which has built up the Empire. Shipowners, shipbuilders and engineers, animated by this spirit, took risks scarcely calculable, and in the end we had the greatest mercantile marine the world ever saw.

It is the simple truth that the British mercantile marine has developed because of economic necessity, and that fact may well give us confidence when we are tempted to fear the friendly rivalry of competitors who have been actuated more by sentiment than national need.

Baltimore City Fire Boat Torrent

A NOTABLE addition to the fire-fighting fleet of the city of Baltimore is nearing completion at the lower yard of the Baltimore Dry Docks plant of the Bethlehem Shipbuilding Corporation. This vessel represents the most modern type of fire-fighting marine equipment, and embodies the valuable experience of the fire board as gained from operation of the present fireboats Deluge and Cataract.

The vessel is 121 feet 4 inches long, has a beam of 28 feet and a depth of 15 feet, drawing when fully coaled about 10 feet. She is equipped with the best fire-fighting apparatus, including five large monitors, one of which is mounted on a high steel tower. Suitable quarters are provided for housing the crew aboard.

The propelling plant consists of a double cylinder, inverted steam engine of 20-inch bore and 20-inch stroke. Two coal-fired B. & W. boilers working under induced draft furnish steam.

The main fire pumps consist of two turbine driven centrifugal pumps, each having a capacity of 4500 gallons per minute, at 150 pounds nozzle pressure. Two auxiliary pumps for small fires, washing down, etc., are also installed. These pumps are engine driven, and have a capacity each of 1000 gallons per minute.

The Torrent will be delivered to the city early in December and take its place as a valuable addition to the protection of Baltimore's increasing waterfront property.

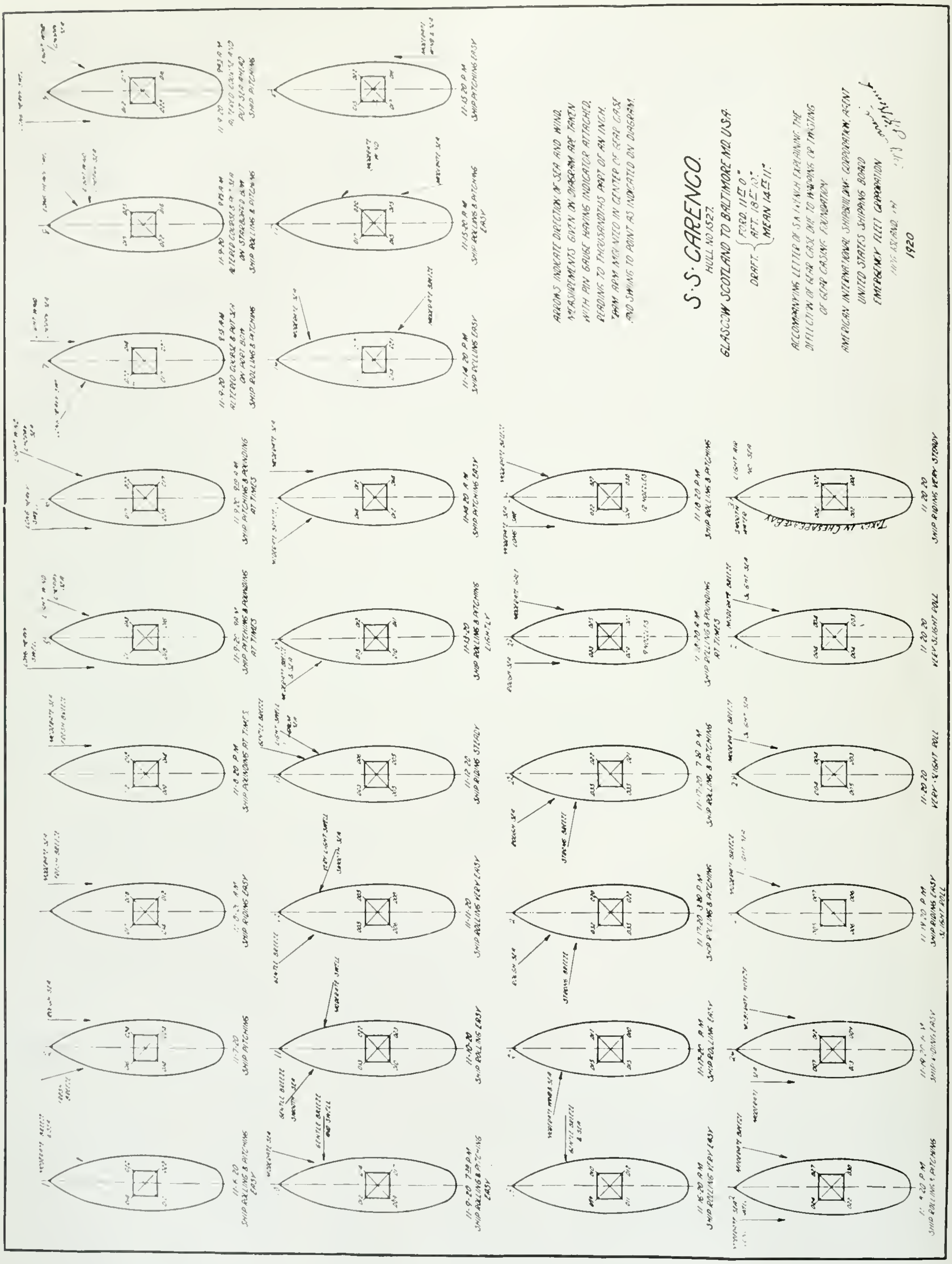

ARROWS INDICATE DIRECTION OF SEA AND WIND.
MEASUREMENTS GIVEN ON DIAGRAM ARE TAKEN
WITH PIN GAUGE HAVING INDICATOR ATTACHED.
READING TO THOUSANDTHS PART OF AN INCH.
THAN ARM MOUNTED IN CENTER OF GEAR CASE
AND SWUNG TO POINT AS INDICATED ON DIAGRAM.
S.S. CARENCO.
HULL NO 1527.
GLASGOW SCOTLAND TO BALTIMORE MD USA.
DRAFT.
FORD. 11 FT 0"
AFT. 18 FT 10"
MEAN 14 FT 11"
ACCOMPANYING LETTER OF S.A. LYNCH EXPLAINING THE
DEFLECTION OF GEAR CASE DUE TO WARPING OR TWISTING
OF GEAR CASING FOUNDATION
AMERICAN INTERNATIONAL SHIPBUILDING CORPORATION, AGENT
UNITED STATES SHIPPING BOARD
EMERGENCY FLEET CORPORATION
HOG ISLAND, PA
1920
11-6-20 SHIP ROLLING & PITCHING EASY
11-7-20 SHIP PITCHING
11-8-20 A.M. SHIP RIDING EASY
11-8-20 P.M. SHIP POUNDING AT TIMES
11-9-20 9 A.M. SHIP PITCHING & POUNDING AT TIMES
11-9-20 9.10 A.M. SHIP PITCHING & POUNDING AT TIMES
11-9-20 9.15 A.M. ALTERED COURSE & PUT SEA ON PORT BOW SHIP ROLLING & PITCHING
11-9-20 9.15 A.M. ALTERED COURSE & PUT SEA ON STARBOARD BOW SHIP ROLLING & PITCHING
11-9-20 9.25 A.M. ALTERED COURSE AND PUT SEA AHEAD SHIP PITCHING
11-9-20 7.20 P.M. SHIP ROLLING & PITCHING EASY
11-10-20 SHIP ROLLING EASY
11-11-20 SHIP ROLLING VERY EASY
11-12-20 SHIP RIDING STEADY
11-13-20 SHIP ROLLING & PITCHING LIGHTLY
11-14-20 A.M. SHIP PITCHING EASY
11-14-20 P.M. SHIP ROLLING EASY
11-15-20 A.M. SHIP ROLLING & PITCHING EASY
11-15-20 P.M. SHIP PITCHING EASY
11-16-20 A.M. SHIP ROLLING VERY EASY
11-17-20 A.M. SHIP ROLLING EASY
11-17-20 3.30 P.M. SHIP ROLLING & PITCHING
11-17-20 7.30 P.M. SHIP ROLLING & PITCHING
11-18-20 A.M. SHIP ROLLING & POUNDING AT TIMES
11-18-20 P.M. SHIP ROLLING & PITCHING
11-18-20 P.M. SHIP ROLLING & PITCHING
11-19-20 A.M. SHIP RIDING EASY
11-19-20 P.M. SHIP RIDING EASY SLIGHT ROLL
11-20-20 VERY SLIGHT ROLL
11-20-20 VERY SLIGHT ROLL
11-20-20 SHIP RIDING VERY STEADY
TAKEN IN CHESAPEAKE BAY

Diagram showing the results of observations on the warping of the gear casing on a United States Shipping Board steamer during a trip from Glasgow to Baltimore

MARINE ENGINEERING

WARPING OF GEAR CASES

By John L. BOGERT

A CONSIDERABLE amount of trouble has been experienced in the operation of reduction gears on shipboard. The evidence of trouble is generally "pitting." To prevent "pitting" on the driving face of a tooth, four things must be kept constantly in mind: the character of the material constituting the tooth, the shape of the tooth, the tooth pressure and lubrication.

Mr. S. K. French, while general superintendent of the propulsion machinery department at Hog Island, Pennsylvania, had under his personal supervision the installation and operation of 122 gear sets. He also had occasion, while in the service of the American International Shipbuilding Corporation, to inspect a large number of gears of all makes from other shipyards.

Careful study of the subject and close observation convinced him that most of the trouble arose from the warpage of the gear case while in operation, due to the twisting of the hull as the ship worker in a seaway.

His conclusions not being shared by many leading engineers, he designed a piece of apparatus that could be used to accurately measure the warpage of any gear case while the vessel was at sea. This piece of apparatus consisted of a tram built like an engineers' transit-head with a seamless drawn steel tube extending 7 feet each way from the center, 14 feet from end to end. To secure the necessary rigidity for this tube it was trussed with pianoforte wire. By means of a pin gauge to which was attached a Starrett indicator, readings could be taken in thousandths of an inch. By stationing two men, one at each end of the tram, readings could be taken at diagonally opposite corners of a gear-case simultaneously. In describing the working of the apparatus, Mr. French says:

"It was observed while taking these checks (observation measurements) that a long heavy swell passing fore and aft under the hull caused nearly as much deflection in the gear as a very rough choppy sea would do in bad storm conditions."

He placed one of these trams on board the S. S. Carenco, a turbine-driven double-reduction geared ship of 7825 D. W. T. capacity. The readings secured on this ship are shown in the accompanying chart, and the figures given at the corners of the square which is intended to represent the gear case, are the total deflection of the indicator during each movement of the ship due to a swell or wave-crest passing under the hull.

This paper and the diagram on the opposite page should be of great value to designers of reduction gears for marine power plants. Mr. French has evidently put a great deal of thought and time into this research work, and we are indebted to John L. Bogert for his interpretation of the work.

The reader will note that Diagrams 21 and 22 show a maximum distortion. Ship was then operating in a heavy gale, 400 miles off Cape Henry. It will be noted that the heaviest deflections are on the windward side of the ship as indicated by the arrows. Note that Diagrams 5, 6, 7, 8 and 9 were taken within a period of forty-five minutes on November 9 while ship was operating in a moderate sea and under varying conditions of wind and wave, as indicated by directions of arrows shown on chart. This condition was purposely caused by swinging the ship off her course, to bring the sea and wind at points as indicated.

Note that Diagram 30 was taken after the ship had passed inside the Capes and was operating in perfectly smooth water at full speed. The readings indicate the rigidity of the bridge arm. These readings were taken as shown on the chart when the ship was in ballast.

"On the trip over to Glasgow with the ship loaded, these deflections reached as high as .050 of an inch on diagonally opposite corners of the gear-case; and from these figures, it is perfectly apparent why we cannot expect to get perfect operation of a double-reduction gear set, or any gear on a marine job if it is so designed and bolted down to the hull of the ship that these motions will be transmitted to the driving gears. Also that one of the great elements that enter into the imperfect operation of marine gears is their not being properly lined up and secured, in which case the bending of the hull tends to exaggerate the out-of-line condition.

The French tram set up on gear case of West Carenco

"The instant at which the gear is distorted to its maximum amount is also the instant at which the surges of the sea take effect on the propeller and raise its overload to 100 per cent.

"The gear-case on which this check was made has an over-all dimension of 8 feet 6 inches by 12 feet 4 inches. The driving face of the low speed gear is 5 feet 1½ inches from outside to outside.

"It is perfectly apparent therefore that at the angle with which the low speed pinion engages its driven gear less than 50 per cent of the driving face is in contact. Add to this 100 per cent overload with a gear which is already designed for a tooth pressure of 800 pounds per lineal inch of face, and you can readily see what the gear has to withstand — a load of over 3000 pounds per available inch of driving face, and this theoretically carried on line contact.

"Design the gear case for a three-point suspension, same as an automobile engine which has to withstand the same kind of strains, and let the propeller shaft absorb the out-of-line conditions; and not take it up in the gears themselves by bolting these large gear cases to a foundation which we know is going to bend. Thus the gears will be enabled to do their work while running in proper alignment, the same as in a land job."

Where possible, gears should be designed for tooth pressures below 500 pounds per lineal inch of driving face.

The foregoing is a very close copy of Mr. S. K. French's letter describing his tram. The blueprint and photographs were also furnished by him.

STEAM SUPERHEATERS

Design, Construction, Application and Use

By H. B. OATLEY*

SINCE 1700, when the noted French physicist, Denis Papin, inserted a heated mass of iron in a piston, so that the steam moving the piston might be kept freer from moisture, the advantages of superheated steam, the difficulties of properly designing apparatus for generating it, and the necessity for having prime movers so fitted as to use it effectively, have been known and, as time passed, have been more keenly appreciated by engineers throughout the world.

The present paper will be confined to four phases of the question, namely:

a. Fundamentals of design and materials used
b. Characteristics and details of locomotive, marine and stationary superheaters
c. Operating conditions where reciprocating or rotating prime movers use superheated steam.
d. Results obtained by using superheated steam.

Design and Materials

Only the tubular form of superheater, and its use as an integrally-built live-gas or waste-gas superheater will be herein discussed.

Important factors in superheater design may be considered under the headings of efficiency, durability, accessibility and safety. A design to be of merit should have a high rating in these four fundamentals.

Efficiency may have three interpretations: efficiency in design, efficiency in operation, and efficiency in return on the investment.

Efficiency in design may be measured in terms of superheater bulk and weight, and by the draft retardation produced by its interposition in the path of the products of combustion. It is generally true that a superheater of minimum bulk will have a minimum weight and naturally offer a minimum retardation to gases. It also follows that superheaters located in relatively high gas-temperature zones have greater heat-transmitting efficiency; hence, are smaller and more advantageously used. In many cases waste-gas superheaters of not over 50 deg. fahr. capacity have double the weight and bulk of 200-deg. fahr. superheaters of the live-gas type. In the foregoing consideration of elements of design, equal capacities of the superheater should be made the basis of comparison.

Efficiency in operation is effected by the sustained cleanliness of both the gas-touched and steam-touched surfaces, by accessibility for inspection, tightening and repair of the superheater itself, or by the ease with which conditions existing in the vicinity and affecting the performance of the superheater may be corrected.

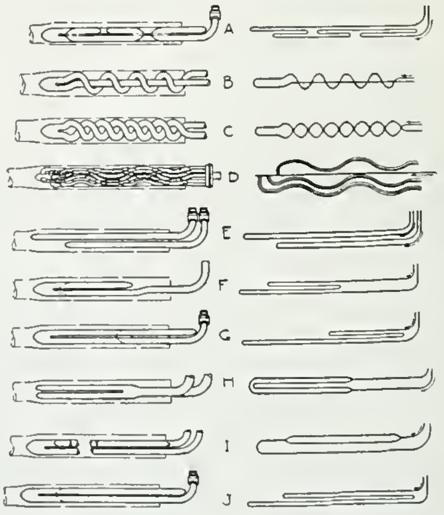
The character of the outer surface of the superheater pipes, whether smooth or corrugated, controls the ease and thoroughness with which it may be cleaned. It also limits the ability of the soot blower to thoroughly cleanse the superheater from soot and dirt. The predominant use of the smooth surface indicates a general acknowledgment by superheater designers and users of the heavy heat losses resulting from soot-coated superheaters, and the difficulties in cleaning rough surfaces. The importance of the heat losses possible due to soot will be better appreciated when it is realized that it requires five inches of fine asbestos to equal the heat-insulating capacity of one inch of soot.* The time required to blow soot from the superheating surface should be as brief as possible, in order to conserve steam.

Efficiency in return on the investment is affected by first cost of the superheater, installation expense and maintenance charges compared with the financial gain obtained. Generally speaking, fuel economy is first considered among the advantages of superheating, although in many cases, particularly in railway and marine service, the results of large water economy aggregate a considerable item. Reduced boiler maintenance, because of the smaller quantity of fuel burned, and water evaporated, per horsepower-hour frequently appears as a credit due the superheater.

Durability is measured by the life of the superheater parts, and by the period elapsing between repair periods. This feature is affected by service conditions, and by the position of the superheater with respect to the path of the gases. In superheaters located where soot accumulation is rapid and where moisture may reach it, the soot will produce greater deterioration than where the superheater elements are subjected to live gases. This to some extent may explain the attempt to protect, by cast or malleable iron, steel unit pipes of waste-gas superheaters. The deposit of soot is naturally less where gas velocities are high, and explains the preference of the majority of designers for live-gas superheaters, and for the high gas velocities that are obtainable with such designs.

Accessibility should embrace "getatability," not only of the superheater but of adjacent parts of the boiler and other details. A minimum number of steam joints in the superheater, and their location at a point where inspection may be made without shutting down the boiler, or involving excessive labor and trouble in making such inspection, are to be considered under this head.

Safety rarely becomes a problem in superheater design, inasmuch as the size of superheater parts is small in comparison with boiler drums and also because the stored energy in the entire superheater is relatively small. Furthermore, the factor of safety in both units and headers, due to the consideration of durability, and the small sizes of parts, is relatively high. In case of failure of a unit, damage to property is negligible and injury to the operating personnel practically unknown. A representative of one of the largest insurance companies recently made the statement before a board of boiler inspectors that his company, and he believed that other



A few of the forms of superheater units in use companies, had not received a single claim in connection with a superheater failure.

---

*Chief Engineer, Locomotive Superheater Co. Mem. Am. Soc. M. E.

Condensed from a paper presented at a meeting of the Eastern New York Section of The American Society of Mechanical Engineers, Schenectady, N. Y., January 13, 1921.

*Paper Industry, November, 1920, p. 1187.

Characteristics and Details

It may not be realized that the locomotive superheaters in use in this country alone have an aggregate horse power of over 60,000,000. All of these superheaters have tubular structure, and are of the bare fire-tube live-gas type. What is true in the United States as to type and structure of superheater, is true in other countries of the world where steam locomotives are in use.

The limitations imposed in the design of a superheater for a locomotive boiler are, in the author's opinion, more severe than for any other use. Space is restricted, weight conditions important and the requirements for high degrees of superheat very pronounced. The compactness of the boiler provides severe operating conditions for the superheater, because of the quality of the steam delivered to it. Steam velocities existing within the superheater units, gas velocities passing over the outer surface of the units and the necessity for strong and rugged structure to withstand the severe vibratory conditions encountered while the locomotive is running, require great care in the design and construction of the equipment.

The superheaters installed in more than half of the steam locomotives in this country weigh from 3.0 to 4.0 lb. per maximum cylinder horsepower of the engine. These figures are interesting, particularly in comparison with the running-order weight of engine per maximum cylinder horsepower, which, on the modern locomotive, ranges between 115 lb. and 160 lb. The figures in Table 1 show these ratios for the United States Railway Administration standard engines built during the war.

The steam velocity in units of locomotive superheaters frequently is in excess of 12,000 ft. per min. This may be startling to many power-plant engineers who consider 6000 to 8000 ft. per minute as the upper limit of steam valocities in pipe lines.

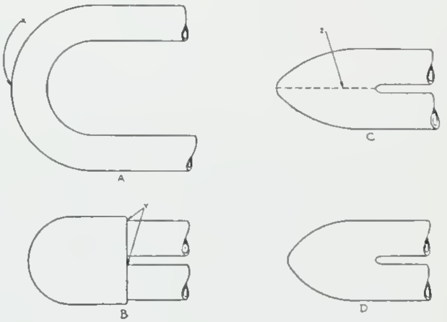
Gas velocities through the flues of locomotive boilers, as in stationary power plants, vary through a wide range, and it is not unusual to find velocities of 8500 ft. per min., or more than 90 m. p. h., when locomotives are working to their capacity.

The form of top header, termed the "modified through-bolt" design, is fitted in nearly one-half of the superheater locomotives in this country. This header is made of high-grade cast iron, is rather intricate in coring and good foundry practice is required in order that a satisfactory header may be obtained. Alternate cross-passages carry saturated steam and superheated steam. Expansion is provided, as will be noted from the coring which separates adjacent fingers, without setting up excessive stress in the header. This construction at the same time reduces to a practical minimum the amount of wall surface subjected to different qualities of steam.

There have been numerous forms of header, in which cast-steel and steel-plate construction have been used. Experience has demonstrated, however, that there is no necessity for using cast steel.

Units in locomotive superheaters are universally of cold-drawn seamless steel tubing and range from 1⅜ in. to 1⅝ in. outside diameter, with the 1½-in. size as the most generally used size.

Units designed for use in fire tubes have undergone a most interesting development. The diagram shows a few forms, all applicable to a fire-tube superheater, and some possessing features applying equally to a water-tube boiler installation.



Some of the methods of forming the closed end of return tube superheater units

In summing up the question of superheater unit, it is considered that unit J, which is really a world-standard form, represents the highest average of any thus far developed, particularly when considered on the basis of—

a Efficiency in the abstraction of heat from the gases
b Thorough mixing and uniform superheating of the steam
c Better equalization in the area of gas passage and more constant gas velocity
d Maximum superheating surface
e Minimum resistance to flow of gases when (c) and (d) are considered
f Less opportunity for deposit of soot and cinders by maintaining relatively high gas velocity through length of flue
g Cost.

Units H and I are forms not thus far used, but experiment has demonstrated that they will meet, from an efficiency standpoint, all of the advantageous features of the standard unit J and from a practical operating standpoint would not differ appreciably from the standard unit. They would be more expensive to manufacture, and under present conditions are, therefore, not generally preferred.

In design and installation of units two important features are (a) return bends and (b) the jointing of units to the leaders.

Sketch A is the simplest form and is merely a pipe bent into a "U," or hairpin, form. Diameter of tube and distance between the two pipes have naturally minimum limits if distortion in the bent portion of the pipe at X is to be avoided. For fire-tube superheaters, where a close spacing is essential, bending of the pipe in this way is obviously prevented.

Form B shows two pipes fitted to a return bend. The return bend as used is almost always of cast steel, and the pipes are threaded into it. In designs where expansion stresses are excessive, it is necessary to acetylene or electric weld the joint Y between the return bend and the pipe, in order to insure permanent steam-tightness.

Increasing demands in capacity, particularly for locomotive and marine installations, require a minimum of obstruction in the flue and, for a number of years, pipes have been joined by forming their ends, and welding the two pipes together. The extremely severe service conditions of a superheater have demonstrated that the durability of electric or acetylene welds is not sufficient to insure requisite life and freedom from possible steam leakage. Long experiment and persistent efforts to develop practically a perfect bend resulted in the form now in world-wide use, and termed the "forged" return bend. Particular points of advantage are uniformity in the character of the metal, freedom from any roughness or obstruction, either within or without the return bend, and a strength which is never less than that of the pipes of the unit from which the return bend is made.

The jointing, or connection, of superheater units to the headers, or collector castings, is another detail which has passed through numerous stages of development. The term "permanent" as here used covers joints which are welded, or are made by rolling the pipe in the header, either method requiring considerable work and time for removal.

Where pipes are welded to the header, actual breaking of metal is necessary in order to remove a unit. Where pipes are rolled into a header, in a manner similar to the setting of a tube in a boiler, it is necessary to remove a handhole plate, or a plug, and then to crimp the expanded end of the unit pipe and drive it out of the header. It is, of course, possible to cut off the unit outside of the header, and to remove the cut-off portion separately. This is perhaps better practice, as it makes available, for later attaching the unit to the header, material which has not been stressed and fatigued by previous rolling and expanding. Obviously, to cut off the end of a unit, applicable to fire-tube boilers, makes necessary welding on a short piece of pipe, or rebending the unit, in order that it may reach the header, and at the same time occupy its proper position in the boiler tube. Either method involves considerable time and expense.

Disconnected, or detachable, unit ends have been in almost universal use for locomotive and marine superheaters, and to a considerable extent in stationary practice. The advantages of disconnectable units are obvious and recognized fully in all lines of superheater use.

The gasket joint is to be preferred where the smaller diameter and more flexible superheater pipes are used. With small pipes the joint is easily drawn up normal to the seat and, because of the flexibility of the pipe, expansion and vibration cannot produce leakage.

In the locomotive field where unit pipes are of larger diameter and consequently more rigid, it has been found of decided practical advantage to use a metal-to-metal spherical joint. This form has been developed in the United States and its adoption has followed in a number of other countries.

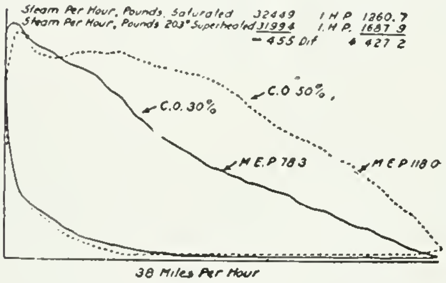
Some Considerations in Marine Practice

In marine practice fire and water-tube boilers are met with. The former have, for years, been used almost exclusively in merchant ships, while the latter, for a decade or more, have been practically a standard in naval construction. During, and since the war, water-tube boilers have had greater application to passenger and cargo vessels.

Heine boilers with superheaters were fitted in a number of war-built American vessels. The unit pipes are parallel to the water tubes, running through both water legs, and being attached, front and back, to the headers by rolled joints. The use of this type of equipment has thus far been confined to American vessels built within the past four years.

The Power Specialty Company's waste-gas superheater was applied to both Scotch fire-tube and water-tube boilers fitted in some vessels built by the Emergency Fleet Corporation. The units in this design are of the covered type with extended surface. The covering is of cast or malleable iron slipped over the steel superheating tube. The units are attached to the header, as well as to the return bend, by rolled joints with handholes and covering plates opposite the pipe opening.

The Locomotive Superheater Company's type M apparatus has units, of the bare-tube type with forged return bends, connected to the headers by the recess gasket joint previously referred to. With this method of joining no handholes or handhole covers are required.



Cards from a locomotive showing improvement in economy due to the use of superheated steam

The headers, to which the units are attached, are made of either high-grade cast iron, cast steel or forged steel, as may be desired, and as may be deemed acceptable by the classification societies in the countries in which the ship is to be built. Attention is invited to the chief difference between the type M marine superheater, and the type A locomotive superheater. In the marine design, pipes of from ⅝ in. to 1 in. outside diameter are used, and only one loop of the unit occupies a flue. In the locomotive type two loops of a unit occupy the same flue. In the marine type there may be from two to six loops in as many flues, depending on the proportions of the boiler and the degree of superheat specified.

In type M installations no change is usually made in the diameter of the tubes in the boiler from what would be fitted for saturated-steam operation. It is possible to do this because—

a The tubes in Scotch marine boilers have a relatively low ratio of length divided by internal area, and

b The gas area may be made more favorable, because of the flexibility permitted by the superheater design.

The question is many times asked how it is possible to insert superheater units in the tubes of Scotch boilers without retarding the draft. The explanation is not difficult to understand, when it is realized that a reduction in fuel per hour of from 10 to 18 per cent is made possible through utilizing highly superheated steam. This means that the quantity of gas passing through the tubes is reduced in the same proportion as the quantity of fuel burned per hour, and that therefore a smaller area is sufficient if the same gas velocities are obtained. The obstruction caused by reduction in gas area, resulting from the insertion of the superheater units, is calculated in the design and in determining the diameter of the superheater pipe. The number of boiler tubes receiving the units, as well as the length of the unit, are varied to meet the conditions. It is also interesting to point out that the resistance of the gases passing the unit has, by careful test, been shown to be not more than the resistance encountered in passing a retarder having one turn. The use of retarders in marine practice is quite general, and they are frequently given from one and one-half to three turns. If a boiler fitted with retarders of two turns should be considered, it will be quite possible to remove the retarders, apply superheaters, obtain the fuel economies consistent with the type of prime mover used and, without increasing the air pressure from the fan, to burn, if occasion requires, a larger amount of fuel per hour and, assuming that the prime movers in the ship are suited, to obtain a very much greater indicated or shaft-horsepower output.

The superheater installation in the S. S. Cuba, the first passenger vessel under the American flag to receive turbo-electric propelling equipment and to use high degrees of superheat, may illustrate more fully the points referred to. There were originally four Scotch boilers supplying saturated steam to triple-expansion engines of 2400 i. h. p. These boilers were, if anything, small for the power to be developed. The space available in this vessel for the boiler room could not be increased without prohibitive expense and cutting down on the space usable for other purposes. It was desired to provide 3000 shaft hp. in the new installation of propelling equipment, and the question immediately arose as to whether the boilers would be adequate. The substitution of turbines for reciprocating engines naturally effected economy in steam, but without increasing boiler efficiency. The installation of fire-tube superheaters has not only increased the boiler efficiency, but has provided a more efficient working medium, the net result being that 3000 shaft hp. is being supplied from the original boilers.

In the marine field, the adoption of superheaters has gone forward more slowly due to a number of causes which, previous to the world war, made the question of relatively less importance. American ships were not to any extent then in competition with vessels under foreign flags and fuel costs were comparatively insignificant. Today this condition does not exist. Our war-built merchant fleet, which will be the nucleus of a greater American merchant marine, is now in competition on all seven seas against vessels flying other flags, and this competition necessitates the most careful study of operating costs. More than 75 per cent of the steam-driven merchant ships built abroad since the war have been fitted with superheaters, and fuel economies of from 12 to 18 per cent, depending on the type of propelling equipment, are being obtained by foreign operators. Fuel costs where they now are, or where they may be in the future, are compelling reasons why American marine engineers must adopt superheated steam, and other means of reducing fuel costs, or face handicaps which will militate against American success.

Many of those opposed to such betterment in operating conditions have contended that the personnel on American ships is unable to handle superheaters and equipment using superheated steam. To make such contention is a slander on American ability to do aboard ship what is being done in our power plants, and on locomotives.

It is doubtful whether our war-built vessels can be made quite as effective in the use of fuel as pre-war construction. This statement is made without the intention of criticizing the colossal task which the Emergency Fleet Corporation and Shipping Board performed from the date of its organization up to the armistice. For failure, however, to change their viewpoint subsequent to November 11, 1918, and for failure to make the changes which were possible and necessary in order that post-war construction should have high operating efficiency, considerable criticism may be given fairly to the officials in charge. It is only within the past nine or twelve months that a few ships have been so revised as to produce operating economies which will give them a more nearly even chance with foreign-operated vessels. The S. S. Eclipse may be cited as one instance of this character.

The original decision of the Emergency Fleet Corporation at the beginning of their program called for low-capacity superheaters giving not over 50 or 75 deg. of superheat. It was believed that this would be adequate to provide protection for turbines. Had the specified amount of superheat been obtainable under the severe conditions existing at sea, such a program would have been correct and justified. The many instances of turbine blades cut by water, after but a few thousand miles of operation, demonstrated that low-capacity superheaters, under the conditions stated, failed to provide the protection which was necessary. It is difficult to understand why the known successful means of fuel economy, all the data for which were in the possession of the Emergency Fleet Corporation in 1917, have not been utilized in the post-armistice program. Not only would the protection to turbines have been assured, but economy in fuel and increased cargo space, vital as they are, would have been assured. The tonnage of iron and steel, critical as it is, would have been reduced 50 per cent, so far as the metal entering into the construction of superheaters was concerned.

Operating Conditions

To go into the details of operating conditions would require more space than is available, and only a few of the more important factors will be referred to.

Increased steam temperature makes necessary provision for greater expansion of pipe lines, expansion joints, etc., than where saturated steam is used. In installing superheaters in existing plants, it is therefore necessary to determine what expansion is provided for, and if not adequate, provision must be made, or pipe-line difficulties will ensue.

Where reciprocating engines are using superheated steam, the valves must be of proper design and material, and suitable lubricating conditions must be provided by using oil of proper quality.

When turbines are to change from saturated to superheated steam, it is necessary to know that the turbine design is suitable, and what degree of superheat may be used without distress.

Results Obtained

In locomotives, upward of 20 per cent in fuel economy is believed conservative as applying to the 33,000 locomotives, with high-degree superheaters now operating on the United States railroads. Road tests of locomotives are more difficult to carry out with the accuracy obtainable from stationary plants, but comparative results, on which conclusions may be reached, have fortunately been available through testing plants of the Pennsylvania R. R., Purdue University and University of Illinois.

In marine service interesting data have been collected, generally from the owners, for over fifty vessels ranging from 2800 to 16,000 deadweight tons cargo capacity, some driven with reciprocating engines, some with geared turbines, and some having turbo-electric drive. Thirty-eight of these ships provided with superheaters averaged a coal consumption of 3.3 lb. per 100 deadweight ton-miles, while for fifteen not so equipped the fuel consumption averaged 5.28 lb. per 100 deadweight ton-miles. Comment on these figures would be superfluous.

The results obtained by using superheated steam in stationary power plants are more numerous, and very complete accounts of carefully conducted tests have filled the pages of the technical papers for a number of years.

In the railway field, where its adoption and extension has been most rapid and complete, there is a strong desire to go to even higher degrees of superheat than formerly, and hundreds of our locomotives are operating with steam at temperatures beyond any ordinarily found in either stationary or marine service.

The belief of many engineers, strengthened by considerable study of the problem, is that steam of 800 deg. fahr. temperature is adaptable for general use, and that the results will be entirely justified and will prove gratifying to owners and operators of such plants.

ERRATA

In the October issue of Pacific Marine Review, on page 591, in an article by R. Z. Dickie on "Motor Shipbuilding in Germany," credit for quotation of the first three paragraphs should have been given to The Motor Ship, London. We regret that this mistake occurred.

THE BLOW-OFF COCK

ONE HUNDRED YEARS BEHIND THE TIMES

The First Answers the Chief

THE "Blow Off Cock" is a good name for this new department, so I would like to answer the chief who calls everything "junk" and wants to go back to the "simple life."

A note of his, "Freighters De Luxe," in the October number. He states that the average man going to sea is of one type. I think he is away off. At one time that may be true, but today no, as they are in at least three classes and each a class by itself.

In the first place any full born engineer who does not want to have everything clean and up to date and able to keep them so has no place at sea today except on one class of ship.

He states that generators, ice machines, wireless, etc., and all the other "mollycoddling" things, such as supperheaters, are not needed. I wonder where he ever came from? They buried all of his class one hundred years ago, I thought.

"Running Water"?

As to running water in every officer's room, electric fans, etc., I would like running water myself, but so far never have had it. Electric fans are O. K. in a hot climate as a ship (i. e., ocean-going) don't always stay in a cool clime. Sometimes they go into hot climates.

The generators there should always be two (2) in every deep water ship and kept running all the time on a ship of any size. The engine and fire rooms are a little dark without them to make lights. Wonder if he ever thought of the value of a wireless set as a lifesaver? Also the daily press news from the outside world goes pretty good after you have been ten or twelve days at sea, and a good many aids it gives to navigation.

As to the ice machine, he either don't know anything about them or don't want to or enjoys rotten beef, sour food of all kinds, etc. The ice machine (should be two of them) is a great money saver for the ship owner and a life saver for the world.

What Are "Supperheaters" For?

How about supperheaters? I don't think he knows what they are for. If he did, he would not speak of them as mollycoddling junk, etc. The cost of supperheaters should pay for themselves in a very short time in the fuel they save.

Any engineer can write to any company that builds a marine machine used on a ship and ask for dope on it and he will find the company will be only too glad to send him dope of all kinds, as they know that it may mean a lot to them to keep their machine in A-1 shape, and understand that all engineers don't know everything. I know I don't ana never will, as all engineers can learn even from a person who knows nothing about engineering.

Possible Savings

Now here are ways I believe large sums can be saved. First, by using turbine generator sets as they can be run with little cost and upkeep, using supperheated steam. I have heard engineers kick at them and say they are N. G. I don't agree with them at all, as they are the ones that are N. G. and not the turbine. It seems that a good many engineers are afraid of supperheated steam and won't try it and so what happens. As for myself, I'll try anything within reason and try to make it work. If I fall down the first time I'll try and find my fault and try once more.

A good way to save fuel, electric lights, fans, etc., i. e., in the ships' officers' rooms: have the room door open out on deck and not into a hot alleyway or passageway next to the engine room door. Don't be afraid to put plenty of portholes in a room, as the fresh air goes a long way to keep a room cool and light, also is healthier. I think with a lot of fresh air you can sleep better. You know we have a saying, "Let there be light and there was light," and that saying is true aboard ship in a number of ways. Am I wrong in my ideas on the question or not? I don't think I am.

Now I should like to speak of one more thing. The writers are Pacific American Steamship Association and Shipowners' Association of the Pacific Coast, "All Hands." I agree with them as, "No man can serve two masters." Think I used that once before in a letter printed in the September number.

Too Much Mixing

I honestly believe they make one mistake, i. e., in the employment office or, rather the idea of any ship's officer going to a general employment office with the crew, longshoremen, etc. They should have a place or room by themselves to go to, as if any officer mixes with the crew, longshoremen, etc., how can he at the same time keep discipline on shipboard? A case I know of—and every deck and engineer officer knows of thousands of them: Mr. First Mate or Mr. First Assistant Engineer goes ashore with John Fireman, John Seaman, etc., for the evening. They take in a movie, have a couple of drinks. Next day or shortly after John is told by Mr. Mate or Mr. Engineer to get a move on and do something. He has his feelings badly hurt and expects you to take your hat off to him and say please, etc. No, the two don't go together, as you cannot mix the officers and crew and have discipline at the same time.

The conditions are the best in the world and I know it; have even known Englishmen and Germans admit it, and I think that there are improvements that can still be made that will save money and cost less than some we have now. We now have a few laws that are a long way from being any improvement.

Americanizing European Staff

To change the subject, I am glad to know that Mr. Joseph E. Sheedy will cause an Americanization of the European U. S. S. B. staff. (Would not mind one of those jobs myself.) In the first place, when a U. S. S. B. ship makes port, here comes a gentleman and inquires of the draft, fuel used, repairs (and if you have no repairs to be done by a shore gang they get sore and say you cannot do it yourself). He will be gone only a short time and here comes a line of them all asking the same questions or nearly so. The government pays them a nice wage and they don't earn it. Most of them will arrive just in time to ask themselves to a square meal and then kick because you don't have "plum duff" and a few more things. One man even came daily for three days and enjoyed two meals per day at the ship's expense. So I am glad Americans will manage to receive those nice fat plums (I think I'll ask for one myself). Hope I get it so I can show my wife and family some part of Europe.

In regards to the ship's crew doing their own repair work, I don't see any reason why they cannot do all of it except a very few jobs that may cause a delay in the ship's movements if it is too large for the ship's force to do. It seems that some men are afraid to take anything down for fear that they cannot put it together again without making what is called a bull—not able to put the bearing together again with the .008 or .010 clearance it should have.

First's Dream

Here is what I want some day. I want the chief's job on the largest ship in the world and have it flying the American flag; also whereas any man going to sea should look at his ship as his home, keep it clean, etc.; also would like to see the day when my wife and baby girl can make a trip with me once in a while.

Whereas it is now time to turn in and pound my starboard ear, I am,

Yours truly, FIRST ASST.

HIGH OPERATING COSTS

The Chief Comes Back for More

THERE is no disputing the fact that it costs more per ton mile to carry freight in an American steamer than it does in the foreign vessel. This should not be, but it is so, and until present conditions are changed the commercial success of our shipping will be nothing or less.

Patriotism is a splendid thing. It is fine to say that one American can do so much more than two or three foreigners. As a matter of fact, the average crew of American ships is much less efficient than that of foreigners. It takes more men to run an American ship than it does the other sort, so naturally it costs more. Besides the great difference in wages, the American seaman is more costly to feed. This, with his wasteful ways, augments shipping charges materially.

The writer has before touched upon the extravagance of building American vessels with their many unappreciated luxuries provided the members of the crew. He here points out a few of the most sapient reasons for high operating costs.

First, the LaFollette Seamen's Act, while admirable in its intentions, will never work with the average deep water crew. This law should be absolutely repealed, and a completely new one put on the statutes. The evils of the present law have been so often detailed that a repetition would be wearying. However, one of the most glaring defects is its giving the seaman the right to demand half of accrued wages at every port. The writer knows personally of two vessels he has been on where a full day's loss of the ship's time was caused by part of the crew being absent, drunk, when the ship was ready to sail. Then having to pay full wages to men who have incapacitated themselves by reason of their own foolishness does not appear to be good business. Under the present law it has to be done.

The writer can see no reason why a ship cannot be operated much as a machine shop or other factory is. Pay for the time worked and no more. There will be little or no trouble at sea. The misery and loss of time are in port. If all hands knew their pay stopped when they were not on the job, fewer of them would be A. W. O. L. in foreign ports and ships would be less delayed.

It is also believed much waste could be prevented by instituting some sort of a method by which all food should be paid for by the seaman as he eats it. This it is sure would prevent much waste. It would not be difficult to have coupon books issued good for different amounts, these books to be charged to the seaman, who would pay in coupons as he desired. Something along the lines of the Panama Canal commissary could easily be worked out and would prevent great waste. It is known that anything given free is not appreciated, and this fact is very noticeable on American ships as regards bedding, towels, food, water, light, etc.

Another Method

The average American does not submit to discipline gracefully, unless that discipline is enforced by military methods. One way the writer believes might be taken advantage of, and that would be to make the merchant marine an auxiliary navy only so far as the crew goes. Let the operator or owner of the vessel pay to the Navy Department a fixed amount for crew service, the crews to be under naval regulations but the operation of the vessel entirely under the orders of the owners in so far as her voyages, loading, etc., were concerned. By this method an efficient Naval Reserve would be built up, and discipline could and would be maintained. It would also insure all American crews. Let the same regulations as regards liberty, service, promotions, etc., obtain as in the regular navy, the crew to feel they are a part of that navy and not of "Hooligan's Navy," as the U. S. S. B. men were derisively called.

An Evil in Foreign Ports

As the Shipping Board rules stand now, anyone shipped in a foreign port receives the standard American pay, no matter what the rate is at the place shipped from. For instance, some member of the crew is paid off in Para, Brazil. His successor is signed on at, say, oiler's wages, $80 gold per month; yet the wages for oilers out of that port are but $25. This is not right, yet the argument put up by labor leaders and mollycoddles is that if the crew could be "run out" by cruel ship's officers and all new ones signed on at the lower figure, it would result in a hardship to the seafarers. This is a fallacy. An experience covering fifty years has shown the writer that no good man is ever run out. His services are in demand.

It is believed possible to have it so arranged that any seaman can enter or leave any maritime port in the world without immigration restrictions. This would make it so that changes of crew could be made with little or no trouble, the bad ones gotten rid of and given bad records, that they be not hired again except in most urgent cases.

However, the subject is a complex and difficult one and should be taken in hand by a committee appointed by the President of the United States. This committee should be empowered to seek information bearing on the matter and to formulate some good sensible seamen's laws, and then Congress should enact them.

The present laws were evidently designed with the idea that seafaring men were not endowed with common sense. As an American consul in a South American port told the writer, "Seamen are evidently not human beings, as the United States shipping laws would seem to indicate." At that, the consul was in a measure right, for regrettable as it is to say it, a more despicable, low, drunken, depraved lot of men than the majority of the men of the American merchant marine it would be hard to find. And this also goes for many of the officers. The writer knows a howl of anger will go up, if this ever reaches print, but the truth of it can be proven by referring to our consular records in foreign ports.

So, after all, perhaps the best solution is to man our ships with naval men. For one thing, they would be under discipline, and the officers for the most part would be efficient and skilled in handling men and enforcing regulations in a dignified manner. That some change is needed is evident, and men of experience in the practical handling of ships at sea, both on deck and in the engine rooms as well as commissary departments, should be chosen to formulate just, equitable and proper laws, fair alike to the owner and to the crews, and for the public good.

"But a man can't keep a family on ninety dollars a month," remarked an oiler to the writer a few months ago on a steamer, of which the latter was chief engineer.

This remark made some figuring necessary. While in no way desiring to belittle the worth of an oiler, can rightly class that sort of labor with that of a helper for a marine machinist. The result is this: at wartime wages a helper received $4.80 per day. His average days' labor per month was 24. This made a total of $115.20. Out of this he had to keep his home, if he had one, or pay his board; had in most cases to pay not less than 10 cents a day transportation; also in most of the yards 15 cents a week hospital dues. This left him, allowing only $40 for room and board, $72.20.

The oiler has his board and room; transportation and hospital dues nil. So it seems at even $80 per month the oiler has the best of it.

Now take the assistant engineers: first assistant $200, second $165, and third $145; average $170 per month. Compare this with shop wages: leading hand $7.20 per day; marine machinist $6.40 per day; foreman $200 per month; average $178.80 per month. In this, too, the assistant engineers have an advantage.

So the great cry that "a seafaring man cannot keep a family" is not based on facts. True, there are disadvantages in following the sea, but money earning power is not one of them. Money wasting power is the factor to be considered.

A recent steamer on which the writer was employed had the usual sixteen men besides the chief in the engine department. Less than 9 per cent of these saved any money during a voyage of nearly six months. Five of them did have allotments. Of these, only two saved any of what was due them after allotments were paid. The balance, under the wise (or unwise) provisions of the Seaman's Law, drew one-half of such amounts as were due them at every port and arrived back in the United States with little to show for the voyage except an assortment of physical diseases and experience.

With a desire to help these folks, the chief gave them all possible good counsel regarding the evils of intemperance, wastefulness, etc., but it did little or no good, so the conclusion is arrived at that the less pay a certain class receives the better it is for them.

And this leads up to another suggestion. Could not some system be devised by which steady service would be rewarded; where the man who was sober and saving would receive a higher rate next voyage, and the drunk and waster left in his rut? This, it is believed, might help to solve the "turnover" and tend to the betterment of those deserving. This, with a system of proper marking of "ability and conduct" sheets, should do much toward clearing up the difficulty. SEA FLAME.

A GREAT AMERICAN LEGAL NAVIGATOR

(Continued from page 717)

In 1895 he compiled the Navigation Laws, since issued quadrennially, designed primarily for the convenience of the officers and owners of American vessels. He has also contributed articles on maritime subjects to popular and scientific publications here and abroad.

He was born in Albany, New York, September 28, 1856, the son of General Frank Chamberlain and Celia Deborah Tyler. His ancestors on either side served in the wars of the Republic from the Revolution. He was educated at the Albany Academy and at Harvard College, graduating with honors in metaphysics in 1878. After teaching school one year and employment in the transportation and grain elevator business for two years, he entered newspaper work as legislative correspondent for the Associated Press for some years and as associate editor of the Albany Evening Journal and then editor of the Albany Argus until 1893, when he came to Washington as Commissioner of Navigation, from which position he resigned in August, 1921, to enter the Bureau of Foreign and Domestic Commerce. He married April 17, 1900, Mary Lee, daughter of Captain Dudley Portieux Barnette, aide under Stonewall Jackson. Mrs. Chamberlain died August 29, 1904. He is a communicant at St. Patrick's Church, Washington, a member of the Military Order of the Loyal Legion and of various organizations. President Millerand of France awarded him recently the cross of Chevalier of the Legion of Honor for special educational work among French war orphans for several years.

FULL SPEED AHEAD

EDITED BY ANDREW FARRELL

Steamship Operations

Full Speed Ahead: Steamship Operations, 733; With Exporters and Importers, 742; Shipbuilding, 747; Marine Insurance, 755; Personals, 758.

Oceanic Plans Vessels

In the event that a satisfactory arrangement is made with the United States government for the continuance of the Oceanic Steamship Company's Australian mail service, the company is prepared to build two vessels. During a season of rapidly dwindling construction, when new contracts are most rare, this is eminently important news. Just what the company seeks of the government has not been disclosed, but it is well known that the present contract, executed under the Ocean Mail Act of 1891, is thoroughly unsatisfactory and not likely to be renewed. In this attitude the Oceanic Line follows the lead of the American Line, which declined to consider any renewal of its Atlantic contract last year, although Postmaster General Burleson retorted in kind by saying that he lacked authority to act even though the company were willing.

Mr. Burleson Is Gone

But happily Mr. Burleson is gone from the seats of the mighty. Perhaps Postmaster General Hayes and the Shipping Board will be more amenable to the pressure of facts. In their hands lies the future of American shipping so far as mail contract lines are concerned, for the Merchant Marine Act provides that they may act jointly in executing new agreements, although the Ocean Mail Act and its limited subventions are not specifically abrogated. In fact, they are, however, by the refusal of the American and Oceanic lines to consider renewing contracts under their provisions.

In any discussion of mail contracts the word "subsidy" is likely to confuse the issue. For a long time the American people, or at least their representatives in Congress, have been opposed to any general ship subsidy, even though a protective tariff has been a conspicuous feature of our national policy for more than fifty years. To speak of subsidy, therefore, is to endanger the whole scheme of contract mail services; and certainly the history of the Oceanic Line's Australian service does not permit the accurate use of that word. "A subsidy may be a simple gift," says the dictionary, "or may consist in the payment of an amount in excess of the usual charges for any service." Now the ocean mail services, established and maintained under the Act of 1891, have not received any "simple gifts," and in fact have been paid less, in some instances, than other steamship companies received for transporting the mails.

Many Failures Recorded

With the passing of the American Line's trans-Atlantic service, the Oceanic remains the most conspicuous of the "subsidized" companies. Its history is longer than that of any other company engaged in the American-Australian trade, for the last fifty years are full of repeated failures. In 1870 the American-Australian Steamship Line, operating under the British flag, established the first San Francisco-Sydney service on behalf of the New South Wales and New Zealand governments. It operated for only one year. Webbs & Holliday followed in 1871 with four wooden paddle-wheel vessels, all of American registry, and managed to survive until 1873. Promptly on their heels, the third service, that of the American Steam Navigation Company, was established in 1874 under the British flag; it died in the same year, although subsidized by the governments of Australia and New Zealand. Next came the service of the Pacific Mail Steamship Company, American, and the Fairfield Shipping Company, British, which operated jointly from 1875 to 1885, when the Pacific Mail withdrew and the Fairfield company sold its vessels.

The fifth line was established jointly by the Oceanic Steamship Company, American, and the Union Steamship Company of New Zealand, British, in 1885. Two steamships, Alameda and Mariposa, were operated by the Oceanic Line until 1900, when the Union company dropped out and the Oceanic constructed the Sierra, Sonoma and Ventura, and remained in the trade until 1907, when as a result of the San Francisco earthquake and fire it was compelled to withdraw; but in 1912 a new contract was negotiated with the government and the Ventura and Sonoma, both of which were reconditioned and converted to oil-burners, returned to the service.

Less Than Pound Rates

The Oceanic Line is receiving from the government approximately $187,000 a year for transporting outward mails and about $12,000 for carrying inward mails from Pagopago, American Samoa, and Honolulu. What service has been given in return is evidenced by the report of the postmaster general for the fiscal year ending June 30, 1919, which says in part: "The cost of the service on route No. 80, San Francisco-Sydney, was $177,058.84 less than the conveyance of the mails concerned would have cost if the steamers had been paid at the rates applicable to non-contract steamers. . . ."

This mail "subsidy" may be profitably compared with those received by some other companies. The Commonwealth of Australia pays to the Orient Line £130,000 for a four-weekly service between Australia and the United Kingdom. Should the company increase its sailings to fortnightly it would receive £170,000 a year. The Peninsular & Oriental Line receives the same amount from the British government, and both lines transport inward and outward mails.

Some Other "Subsidies"

For the Vancouver-Suva-Auckland-Sydney monthly service of the Canadian-Australasian Line (Union Steamship Company of New Zealand) the New Zealand government pays £20,000 a year, Fiji £5000 and Canada £37,000; and the company's vessels, moreover, often transport United States and Australian mails at pound rates. The Union Steamship Company also maintains a San Francisco-Tahiti-Wellington route with monthly sailings, for which it receives £25,000 a year from the New Zealand government and 200,000 francs for eighteen months from Tahiti; and poundage also is paid by Australia and the United States, each nation being responsible for the transportation of its outward mails.

The Japanese government appropriated yen 7,269,300 for its subsidized steamship lines during the fiscal year April, 1921, to March, 1922. Most of the companies are subsidized in the true sense of the word; the largest of all, the Nippon Yusen Kaisha, is not, as it requested that its subsidy be changed to a direct mail payment. This was done, at a saving of yen 700,000 to the Japanese government; nevertheless, the N. Y. K. will be paid yen 1,450,000 for the transportation of mails in the Seattle, Melbourne and Antwerp trades; the T. K. K. will receive yen 1,164,137 for operating three vessels between San Francisco and the Orient: and other lines will get smaller amounts.

The Oceanic Company's contract with the government under the Ocean Mail Act expires in June, 1922. It is to be hoped that the postmaster general and the Shipping Board will make it possible for the company to continue the service.

Fruit Exchange Plans Refrigerator Line

Decidedly the most interesting news of the month comes from Los Angeles in the form of an announcement that the California Fruit Growers' Exchange is working on plans for the establishment of an intercoastal refrigerator service. Almost coincident with this is the entry of the North Atlantic & Western in the coast-to-coast trade with six refrigerator vessels, which make the long-awaited service an actuality.

Since the revival of the intercoastal shipping early in 1920 there has been discussion of a refrigerator line, the principal function of which would be to transport Pacific Coast fresh fruits to the Atlantic market. When railroad rates were increased in August, 1920, discussion naturally waxed greatly; but in spite of the large quantities of freight that appeared to be in prospect no private steamship line decided to enter refrigerator vessels. That there were good reasons why operators should decide against such a service was made evident in Pacific Marine Review for July and October. These reasons will be outlined later.

Seventy-eight Cents a Box

After making an exhaustive study of water transportation of citrus fruits, the water transportation committee of the California Fruit Growers' Exchange, under the chairmanship of C. S. Whitcomb, recommended as follows to the board of directors:

"That it is to the best interests of the exchange that an independent steamship company be organized and financed in Southern California, having as its first object the transportation of citrus fruits from San Pedro to Atlantic ports"; and:

"In order to lay a foundation on which to finance the steamship company, we further recommend that the management be authorized to take the necessary steps with its citrus shippers to contract as much as 2,000,000 boxes (about 5000 cars) per year, for a term of three years, of citrus fruits for transportation by water from San Pedro to Philadelphia, New York and Boston, in ships equipped with cold-air refrigeration system, especially for fruits, and at a freight rate to be fixed on a sliding scale for the term of the contract, the freight rate the first year not to exceed 78 cents per box from the dock at San Pedro to the dock at Philadelphia, New York and Boston, with a reasonable additional rate for transporting the fruit from the packing houses to San Pedro and pre-cooling the fruit at San Pedro."

Rates Are Compared

The water transportation committee compares its proposed rate of 78 cents with existing rates as follows: "Our present transportation charges on this fruit are: freight, $1.92 per cwt., plus average icing charges, 12 cents, equals $2.04 per cwt. Credit 2,000,000 boxes by steamship under refrigeration with $2.04 per cwt., equals $3,182,400. This amount of money would pay the entire operating expenses of the steamship line if it went east with citrus fruit only, which would be only two-thirds of a cargo, and came back empty; therefore, you (members of the exchange) are now paying the bill. At this particular time, owing to the abnormal conditions surrounding business and shipping, we are offered the opportunity to do with $2,000,000 what would require under normal conditions at least $6,000,000 to accomplish." The present water rates are $1.05 for lemons and $1.15 for oranges, etc., the fruit being ventilated but not refrigerated. Relatively little has moved in intercoastal steamships, as may be seen from a summary that appears at the end of this article.

An investigation made in the East, the water transportation committee reported, indicated that "the oldest and strongest steamship companies are dominated by railroad influence through capital sources and will not compete" and that companies not so dominated were operating Shipping Board vessels and lacked necessary capital. Both of these statements appear to be ill-considered: by their very presence in the intercoastal trade the steamship companies discredit the first assertion; and, in order to undermine the second, it is necessary only to point out that but one company is operating Shipping Board tonnage. At any rate, the exchange turned to the Shipping Board, which agreed, the committee reported, to install cold-air refrigeration in about two-thirds of the space of each of six vessels and to charter the craft to the exchange on the bareboat form for five years with option of purchase. (The exchange carried on negotiations during the summer with the American Shipbuilding Company for ten 3800-ton steamships, but these vessels were not large and fast enough and nothing was done toward consummating a deal.) The vessels desired of the Shipping Board are 7500-tonners and would have capacities, in two-thirds of their holds, for maximum cargoes of about 74,000 boxes, although the committee estimated that average cargoes would be 60,000 boxes from January to October inclusive, so that space for 3000 tons of other cargo would be available. On westbound voyages, said the committee, general cargo could be carried, for "there is plenty of this cargo for all the ships now operating."

Westbound Cargo Scarce

The latter statement will bear investigation. As a matter of fact, the exchange cannot count too surely on westbound general cargo. During the month of September 25 vessels in the intercoastal trade carried 72,620 long tons of cargo from the Atlantic to the Pacific, an average of less than 3000 tons to the ship. This is by no means near capacity, for the average gross tonnage of the 25 steamships was 6681 and the net 4418, these being roughly equivalent to a deadweight of 10,000. An added trouble is that care must be exercised in loading refrigerated vessels, lest the insulation be damaged; and the necessity of choosing freight would reduce the amount obtainable.

To operate these vessels, the exchange proposes to organize a Producers' Steamship Company of California, capitalized at $5,000,000, of which between $1,000,000 and $2,000,000 would be offered for sale, the remaining stock to be held in the treasury and offered to exchange shippers at the end of the third year. Should the company be organized, the committee continued, Prentiss N. Gray of New York, well known as the founder of P. N. Gray & Company, shippers and grain exporters, agreed to take a substantial block of stock and to operate the vessels on a percentage basis.

The steamship company would handle fruit as the railroads do now; that is, dispatch trucks to packing houses, transport the fruit to San Pedro (Los Angeles Harbor), precool it and hold it cool in storage until it should be unloaded at Atlantic ports. This system would require a fleet of trucks and a precooling plant at San Pedro capable of taking about 200 cars of fruit. A dock could be obtained in New York near the Auction Market, the committee ascertained; in Boston the Commonwealth and Quincy Market Cold Storage & Warehouse Company docks could be had; and in Philadelphia a municipal dock was found to be available.

Objections Are Answered

Objections raised by different steamship operators to the practicability of an intercoastal refrigerator line may be summarized as follows: Refrigerated freight, being perishable, demands an immediate market; accordingly, many railroad cars are consigned to some such city as Omaha or Council Bluffs and on arrival reconsigned to whatever city offered the best prospect of sale, with the result that large quantities of fruit are not cast on any one city; a refrigerator steamship, on the other hand, would have to discharge at one or at most two ports and thus probably create a glut, especially since adequate storage facilities could not be obtained. Nor would reshipment from Atlantic tidewater to interior cities answer, because of the increased expense over direct rail transportation. Some of these objections are anticipated by the exchange's plan to ship only 2,000,000 boxes to New York, Boston and Philadelphia, or about one-half of the fruit now sold in those markets and only 10 per cent of total shipments of the year, which means of course that the railroads would continue to do a large business. A more detailed analysis of the attitude outlined above will be found in the following statement, prepared by C. S. Whitcomb, chairman of the water transportation committee, at the request of Pacific Marine Review:

"The California Fruit Growers' Exchange sold in the three auction markets of Philadelphia, New York and Boston during the fiscal year 1920-1921 over 11,000 cars of citrus fruit. One-half of this amount, or about 6000 cars, were direct shipments to the three auction markets, and the remainder were diverted cars from interior points. The railroad companies are giving fairly good service to this traffic now, and the direct shipment cars arrive at their destination in twelve to thirteen days; the diverted cars in from thirteen to fifteen days. However, during the years 1918 and 1919 the average time varied from eighteen to thirty days, and the refrigeration under these conditions was very uncertain and variable.

"Refrigeration by steamship would be maintained uniformly at any temperature desired, and humidity and ventilation would also be regulated. A good steamship will make the run from San Pedro to New York in fifteen to sixteen days. Therefore, we expect to land our fruit by steamship under refrigeration in better condition than the average condition of our rail shipments at that point.

Glut Is Not Feared

"As to the quantity of fruit that would be landed in these markets in one cargo, we are assuming average cargoes of about 60,000 boxes, to be divided proportionately between two ports, either New York and Philadelphia, or New York and Boston. When I tell you that we frequently sell 25,000 to 30,000 boxes on New York auction in one day, and have sold as high as 40,000 boxes in a day, you will see that the average cargo would not supply the two markets more than two days, and that the maximum cargo during the peak of the season would not constitute more than three days' supply. During the past summer there was sold in New York auction, on several occasions, over 300 carloads of California fruits in one day. It is neither logical nor efficient that all of this fruit should be transported across the continent by rail at an excessive transportation charge, when it can go by steamship under excellent refrigeration and, in about four days' additional time, land in the market in better condition and at about half the transportation expense.

"As to the question of storage facilities, that does not interest us as applied to our product, for the reason, as stated, that our maximum cargo would not be more than three days' supply for the markets to which consigned, and would be sold about as rapidly as it could be discharged from the ship. Therefore, there would be no necessity for storing any portion of the shipment.

Not an Experiment

"Water transportation under proper refrigeration is not an experiment. The United Fruit Company have been in the business for years, transporting both bananas and oranges, and oranges are being brought up to England from South Africa by refrigerated ships through the tropics, after having made a 1700-mile rail journey to the coast. When we shipped out of California during the past year (November 1, 1920, to October 31, 1921) over 150,000 cars of perishable food products — deciduous fruits, citrus fruits, melons and vegetables, about 20 per cent of these shipments went to the Atlantic seaboard for consumption in the large cities, where consuming population is densest. It is a transportation axiom that 'the tonnage will follow the service.' With over two million tons of these products to draw from, about 20 per cent of which go to the Atlantic seaboard, it seems quite certain that the steamship company that first establishes a regular, frequent and dependable refrigerated service from coast to coast, will get its proportion of this tonnage.

"As to the stage of our enterprise, I would say that ours is a large organization. There are 200 shipping organizations connected with it, and all details must be worked out with each one of these organizations, all of which consumes a great deal of time. However, we are steadily making progress, and our people have definitely made up their minds to carry out this shipping enterprise."

Nawsco Service

The North Atlantic & Western service will be maintained with the steamers Dochra, Deerfield, Neponset, West Catanace and two unnamed vessels, all of which, except the Dochra, can take full refrigerated cargoes. The Dochra is partially insulated. This service was inaugurated by the Elder Steel Steamship Company with two steamships in November, but was taken over almost immediately by the North Atlantic & Western, which is represented on the Pacific Coast by the Pacific Steamship Company, and the two and perhaps three vessels of the Elder Steel Line were increased to six.

During the eight months of 1921 ending August 31, declared shipments of fresh fruits through the Panama Canal aggregated 7132 tons, of which 5927 tons was from the Pacific Coast of the United States, 1193 from Australia and New Zealand, 10 from the West Coast of South America and 2 from the West Coast of Central America. All the Australasian fruit and 149 tons from the Pacific Coast of the United States, an aggregate of 1342 tons, went to the United Kingdom; 1023 tons from the Pacific Coast went to other countries of Western Europe and 4745 tons to the Atlantic Coast of the United States. In terms of boxes the fruit movement was 213,960, of which 177,810 boxes was from the Pacific Coast.

American vs. Foreign Shipping

The accompanying tables, prepared by the statistical department of the Shipping Board and published in Commerce Reports, tell the story of a marked decline in that portion of our foreign trade transported by vessels of United States registry. Somewhat singularly, the greater relative loss has been recorded in imports, although it is a maxim of shipping that a nation may be expected to carry more of its imports than of its exports, inasmuch as the consignee is usually credited with the power and the desire to direct that his goods be transported in his own country's vessels.

That this belief may have to be subjected to considerable revision is apparent to anyone who studies the tables. The aggregate tonnage of imports moved in American bottoms declined from 64 per cent of the total in July, 1920, to 44 in August, 1921, and in the same time foreign lines gained 20 per cent, from 36 to 56; in other words, practically the whole loss of 600,000 tons in the volume of imports fell on American shipping, while foreign lines did as much business in terms of long tons in August as they did in July, 1920.

Board Business to Foreigners

An immediate cause of the falling off in tonnage handled by American vessels is to be found in the tying-up of Shipping Board bottoms, which had attained considerable magnitude by October, 1920. In July of that year there was practical equality between foreign, American private and Shipping Board vessels as regards percentage of import business, although the foreign lines were handling 36 per cent as against the 32 per cent of each of the others. Statistics of succeeding months tell an almost unbroken story of defeat, despite a temporary gain made by American private vessels in November and December, 1920. The result is that independent American lines did 33 per cent of our aggregate import business in August, 1921, as against 32 per cent in July, 1920, while the foreigners had gained 20 per cent and the Shipping Board had lost 21 per cent. The Shipping Board's proportion of trade has not gone to other American vessels, as one might expect; it has not even been divided more or less equally between the American independents and the foreigners; it has gone wholly to the latter.

If these facts prove any conclusion at all they prove that American importers are not supporting their own merchant marine.

Opposite Tendency of Exports

It is at least striking, however, to discover that diametrically the opposite tendency has been manifested in our export trade, which is much

United States imports carried by American and foreign ships July, 1920–August, 1921 (excluding oil).

Months.	Foreign.		United States, independent.		United States, Shipping Board.		Total, in long tons.
	Long tons.	Per cent.	Long tons.	Per cent.	Long tons.	Per cent.	
1920.							
July	608,008	36	531,382	32	546,707	32	1,686,097
August	700,838	40	571,804	33	482,676	27	1,755,318
September	723,999	42	530,295	31	458,435	27	1,712,729
October	1,082,358	48	802,676	36	359,175	16	2,244,209
November	899,091	42	892,268	41	363,400	17	2,154,765
December	703,834	34	1,074,812	52	298,440	14	2,077,086
1921.							
January	641,671	51	397,585	31	230,809	18	1,270,065
February	516,063	46	355,355	33	226,832	21	1,098,250
March	655,226	42	597,712	38	307,108	20	1,560,046
April	730,164	49	548,967	36	226,580	15	1,505,711
May	647,358	48	516.362	.38	196,751	14	1,360,471
June	524,785	52	364,633	36	127,204	12	1,016,622
July	442,885	54	300,358	36	86,788	10	830,031
August	606,166	56	363,350	33	118,978	11	1,088,394
Total	9,482,446	45	7,847,559	36	4,029,789	19	21,359,794

United States oil imports carried by American and foreign tankers, July, 1920–August, 1921.

Months.	Foreign.		United States, independent.		United States, Shipping Board.		Total, in long tons.
	Long tons.	Per cent.	Long tons.	Per cent.	Long tons.	Per cent.	
1920.							
July	37,395	4	623,323	61	351,552	35	1,012,270
August	118,276	8	861,857	62	416,277	30	1,396,410
September	110,865	8	887,814	62	434,880	30	1,433,559
October	125,776	9	910,177	61	448,992	30	1,484,945
November	198,896	11	1,057,617	59	546,067	30	1,802,580
December	172,524	10	1,056,250	62	476,338	28	1,705,112
1921.							
January	155,208	9	1,047,345	64	436,807	27	1,639,360
February	133,557	8	1,081,957	63	493,355	29	1,708,869
March	143,711	9	1,001,324	69	313,907	22	1,458,942
April	89,461	7	1,008,747	78	193,869	15	1,292,077
May	190,285	15	944,975	73	156,452	12	1,291,712
June	246,879	19	905,632	71	128,897	10	1,281,408
July	107,393	12	627,036	74	115,470	14	849,899
August	96,330	20	330,783	71	40,362	9	467,475
Total	1,926,556	10	12,344,837	66	4,553,225	24	18,824,618

United States exports carried by American and foreign ships July, 1920–August, 1921 (excluding oil).

Months.	Foreign.		United States, independent.		United States, Shipping Board.		Total, in long tons.
	Long tons.	Per cent.	Long tons.	Per cent.	Long tons.	Per cent.	
1920.							
July	2,583,399	58	786,449	17	1,110,796	25	4,480,644
August	3,306,966	59	1,043,779	19	1,232,893	22	5,583,638
September	3,365,790	59	1,036,537	18	1,288,925	23	5,691,253
October	4,202,368	65	1,189,261	18	1,134,427	17	6,526,056
November	2,989,480	58	1,007,596	20	1,153,732	22	5,150,808
December	3,254,343	66	855,478	17	845,987	17	4,955,808
1921.							
January	2,409,214	67	567,411	16	591,888	17	3,568,513
February	1,872,521	64	508,336	18	530,158	18	2,911,015
March	1,919,809	62	551,302	18	603,090	20	3,074,201
April	1,945,793	60	614,257	19	694,002	21	3,254,052
May	2,653,424	68	670,326	17	599,675	15	3,923,425
June	2,637,338	55	1,113,063	23	1,059,660	22	4,810,061
July	2,665,929	60	1,113,361	25	673,963	15	4,453,253
August	2,412,345	57	1,277,981	30	523,453	13	4,213,779
Total	38,218,719	61	12,335,137	20	12,042,650	19	62,596,506

United States oil exports carried by American and foreign tankers, July, 1920–August, 1921.

Months.	Foreign.		United States, independent.		United States, Shipping Board.		Total, in long tons.
	Long tons.	Per cent.	Long tons.	Per cent.	Long tons.	Per cent.	
1920.							
July	163,375	53	102,345	33	42,814	14	308,534
August	173,514	49	129,851	37	49,714	14	353,079
September	193,004	53	110,290	31	57,682	16	360,976
October	242,402	55	125,150	28	76,972	17	444,524
November	256,615	54	152,056	32	67,243	14	475,914
December	256,918	55	143,602	31	66,035	14	466,555
1921.							
January	321,254	58	196,953	35	37,689	7	555,896
February	283,289	60	123,059	26	68,275	14	474,623
March	252,269	49	196,085	38	69,945	13	518,299
April	261,964	56	159,259	34	46,511	10	467,734
May	309,576	75	104,531	25	....	....	414,107
June	259,174	60	153,129	35	23,032	5	435,335
July	269,207	58	183,948	39	11,819	3	464,974
August	350,101	73	112,593	23	17,536	4	480,230
Total	3,592,662	58	1,992,851	32	635,267	10	6,220,780

more important to the operator because of its greater tonnage and because the decline in volume during the fourteen months under survey was only 270,000 tons as against 600,000 of imports. In exports the American independents have been able to gain the entire percentage lost by the Shipping Board, whereas the foreigners are in practically the same percentage status as they were in July, 1920. As regards tonnage, indeed, our private operators have gained 500,000 tons and foreigners have lost 175,000; but it should be added that the American gain first became apparent in June, probably coincident with the revival of trade, and that much of our recent success may be due therefore to the ability of American operators to take immediate advantage of increased exports. Nevertheless, in spite of our gain, the tables record that foreign vessels carried 57 per cent of our exports in August, while American independents had only 30 per cent and the Shipping Board 13. Even if private American operators actually are gaining on their foreign competitors, even if they should make permanent their increased tonnage of June, July and August, they have, it must be confessed, a long way to go before they can lay claim to any practical equality.

For the entire period of fourteen months, foreign steamships transported 45 per cent of our imports and 61 per cent of our exports, as compared with 36 per cent of imports and 20 per cent of exports carried by private American bottoms and 19 per cent of both imports and exports handled by the Shipping Board.

Regarding Fuel Oil

Not so much importance may be attached to the tables of imports and exports of oil, because the transportation of oil is largely in the hands of producers and does not concern the general carrier. Yet it is interesting to note that foreign tankers have been making some appreciable gains in percentage, although their share of the import oil trade remains small in comparison with that of the American independents. The Shipping Board's volume sank from 35 per cent in July, 1920, to 9 per cent in August. On the export side of the account, foreign tankers have decidedly the best of the battle, but their position is not nearly so strong as that of American independent operators in the import trade. Of the total import and export tonnage of oil of the fourteen months, foreign vessels carried 5,519,218 tons, American independent 14,337,688, and Shipping Board 5,188,492; while in the general cargo trade during the same period foreign vessels handled 47,701,165 tons, American independent 20,182,696 and Shipping Board 16,072,439.

While the American operators are handling less than half of American foreign trade, imports and exports both included, foreign lines are not only defeating us on our own ground but also are engaging in fifty services unknown to our vessels. Except for a few around-the-world routes, some of which have had only doubtful success, American vessels do not engage in trade between foreign ports. Our entire shipping structure is based on our own import and export trade; while British vessels are competing with American in the New York-River Plate service and with Japanese between Liverpool and Yokohama, or with French between the Pacific Coast and the Channel. Whatever the remedy (and there will be as many proposed as there are observers), there is no disguising the fact that the situation is serious.

A Voice from Canada

That Canada on her own behalf, and without any particular eye to the interests of the British Empire, opposes free passage for American coastwise shipping using the Panama Canal was stated in these columns a few months ago. The argument repeated then was that Canadian intercoastal shipping would be placed at a decided disadvantage as compared with American; now comes the Canadian Railway and Marine World with still another criticism:

"Should the bill (now pending before Congress) in its present form become law, it would be possible to ship freight intended for Europe, by U. S. ships, from any Canadian or U. S. port on the Pacific Coast, to any U. S. port on the Atlantic, where it could be transhipped to other ships crossing the Atlantic; and again goods could be shipped at any Canadian or U. S. port on the Atlantic Coast to any U. S. port on the Pacific Coast, for transshipment across the Pacific, in both cases, without paying Panama Canal tolls, while British or Canadian ships, passing from coast to coast, or direct through the Panama Canal, to the Orient, or Australasia, would be discriminated against to that extent.

"The argument used in the U. S. Senate, that U. S. money built the canal, and therefore U. S. ships should receive the benefit, does not hold, when the full history of the project is considered. At the time of the signing of the Clayton-Bulwer Treaty, the rights of Great Britain and the U. S. in the matter were, at least, equal, and the condition imposed on the U. S., under the Hay-Pauncefote Treaty in 1901, viz., the use of the canal by all ships of all nations observing the rules, on terms of entire equality, was the consideration for which Great Britain transferred her rights to the U. S. Any discrimination in favor of U. S. ships would therefore be a gross break of the treaty's provisions and an act of national dishonesty."

It Is Far-fetched

This argument appears to be rather far-getched, inasmuch as a saving of $1.20 a net ton, registered tonnage, hardly would pay the cost of discharging and reloading cargo. Even if it should cover these expenses, there is little reason to believe that transfer of freight at an Atlantic port would be any more successful in competition with direct lines than was the similar plan governing Atlantic-Orient freight that was put into effect on the Pacific Coast last year. That arrangement failed to produce much cargo and scarcely is heard of today.

Such arguments as these serve the purpose of beclouding the issue, but they accomplish little else. Evidently the actual question of tolls remission hinges upon the Clayton-Bulwer and Hays-Pauncefote treaties, regarding which highly competent opinion is hopelessly divided. Extraneous issues should not be dragged in. If they must be, then something surely is to be said regarding the canal's cost and its failure to pay any return whatever on America's investment of $368,543,272.

No "Profit" Made

The canal administration plumes itself, and justly, upon the fact that for four consecutive years the canal has earned an "excess of revenues over expenses of operation and maintenance;" but this language is quite precise and omits, it should be observed, any mention of "profit." Despite an excess of $2,711,918 during the fiscal year ending June 30, 1921, the actual excess for the entire period of operation was only $420,000, due to deficits incurred in removing slides from the Gaillard

Cut. What if such items as interest, sinking fund, depreciation and others were to be included? How would the account stand?

If the United States intends to keep tolls at a level insufficient to pay the cost of the canal, if, in other words, Panama is to be maintained by the nation as an unprofitable commercial and naval waterway between the Atlantic and Pacific for the benefit of the world at large as well as of our own navy and shipping, then, it appears, foreign nations have little ground for complaint, even if tolls should be increased because of the exemption of American coastwise vessels. Our British cousins might bear in mind that the Suez Canal pays a profit. If the worst comes to the worst, the United States government easily might increase tolls to a level just under the cost of steaming via Magellan and use the receipts for the subsidy of an American merchant marine. Perhaps such a course would prove even more unpopular abroad than would remission.

The Suez Canal

A British correspondent sends the following:

Traffic through the Suez Canal is rapidly recovering from the disastrous effects of the war, during which it fell off to the extent of 50 per cent, as shown by the figures given below. There can be very little doubt that within the next two or three years the figures of 1912-1913 will be reached again; a 25 per cent increase will suffice to bring up the number of steamers using the canal to 5000 annually.

The following table shows canal business since 1900:

Year	Vessels	Net ton'ge	Receipts
	Peace Years		
1920	4009	17,574,600	$29,169,000
1919	3986	16,013,800	27,580,000
	War Years		
1918	2522	9,251,600	15,978,000
1917	2353	8,368,900	12,316,000
1916	3110	12,862,400	15,525,000
1915	3708	15,266,100	17,957,000
1914	4802	19,409,400	23,471,000
	Peace Years		
1913	5085	20,033,800	24,317,000
1912	5373	20,275,100	26,193,000
1910	4533	16,581,800	25,043,000
1905	4116	13,134,100	21,862,000
1900	3441	9,738,100	17,399,000

High Mark in 1912

Before the war canal traffic showed a tolerably steady increase up to 1912, when it reached its high-water mark; there was then a slight setback, followed by the war; the recovery since the armistice has been retarded by the recent depression of trade throughout the world. The vessels passing through the canal belong to twenty or more different nations, but more than 50 per cent are British.

The countries mainly represented before the war were the United Kingdom, Germany, France, Holland and Austria; now most of the vessels belong to Great Britain, Japan, Holland, Italy and France in the order named. German vessels are again using the canal after an absence of five years, and we may expect to see their number increase rapidly as their mercantile fleet war losses are made good.

Japanese Are Second

Notable points are the limited use the French make of the canal and the remarkable increase of the Japanese steamers using it. The Japanese are now the second largest users. American shipowners find the Panama Canal more convenient; therefore only a small number of American vessels use Suez.

The nationalities of steamers using the Suez Canal are as follows:

	1920	1919	1918	1915	1910	1905	1900
Great Britain	2359	2679	1862	2736	2778	2484	1935
Germany	3	......	....	....	635	600	462
France	184	112	102	171	240	272	285
Holland	330	181	1	334	259	219	232
Italy	188	117	200	124	87	91	82
Japan	385	438	162	119	72	....	63
United States	132	54	5	1	8	6	22

Most of the vessels using the canal navigate it both day and night; only a small minority navigate it during the day only; and there is necessarily a great difference in the duration of the passage. Before the war it was made within eighteen hours by steamers navigating it both day and night; during the war the average was about twenty-two hours; now the former rate has been restored. Steamers navigating by day only average twenty-six hours and thirty minutes. There have been no marked changes in the working of the canal during the last two decades as regards the time required to complete the passage by steamers navigating day and night. A state of efficiency was reached twenty years ago, which has been maintained and hardly can be improved upon. The steamers using the canal are mainly trading vessels; there are a limited number of mail steamers and a varying number of warships, transports and government chartered vessels, also a few ships in ballast.

Number of Mail Steamers

The mail steamers are now mainly British with some French and Italian; their number during recent years has been as follows: 1920, 487; 1919, 303; 1918, 87; 1915, 545; 1910, 964; 1905, 823; 1900, 773.

During many years German mail steamers outnumbered British. The vessels passing through the canal have been increasing in average size for a long series of years; the following figures show the changes during recent years: 1920, 4383 tons; 1919, 4017 tons; 1918, 3668 tons; 1915, 4117 tons; 1910, 3658 tons; 1905, 3191 tons; 1900, 2830 tons.

The draft of water of steamers passing through the canal has also deepened as the sizes increased; the draft has increased seven feet in two decades and has now possibly reached a stage not likely to be much exceeded. The changes during recent years are shown below:

1900—23 ft. 0 ins. to 25 ft. 7 ins.
1905—24 ft. 7 ins. to 26 ft. 3 ins.
1910—26 ft. 3 ins. to 28 ft. 0 ins.
1915—27 ft. 0 ins. to 29 ft. 0 ins.
1918—29 ft. 0 ins. to 30 ft. 0 ins.

The ultimate intention is to have a uniform depth of twelve meters (thirty-nine feet) over all.

Post-War Traffic

The vessels passing through the canal since the war ended may be classified as follows:

Trading steamers loaded:
1919 — No. 2068, 8,542,000 net tons.
1920 — No. 2320, 10,235,000 net tons.

Trading steamers in ballast:
1919 — No. 477, 1,679,000 net tons.
1920 — No. 400, 1,406,000 net tons.

Mail steamers:
1919 — No. 303, 1,525,000 net tons.
1920 — No. 487, 2,531,000 net tons.

Government vessels:
1919 — No. 1138, 4,266,000 net tons.
1920 — No. 802, 3,400,000 net tons.

The government vessels include warships, transports and chartered vessels. Ships that have recently passed through the canal in ballast have increased largely, no doubt due to the general trade depression. The transit dues earned by the canal show large increases over pre-war times, due to increased tolls having been levied on a smaller traffic. The toll was formerly $1.20 and has been increased to $1.68 (6 fr. 25c to 8 fr. 50c), an increase of 36 per cent.

	Transit dues	Total receipts
1920—	$28,742,000	$51,350,000
1919—	27,432,000	35,462,000
1913—	24,168,000	21,686,000

The net profits available for distribution have been for 1920 $27,580,000, and for 1919 $20,011,000. All these amounts are normal values. Profit is distributed as follows: 71 per cent goes to the shareholders, 15 per cent to the Egyptian government, 10 per cent to the founders, 2 per cent to the administration, and the remaining 2 per cent to the working staff.

Canal Well Maintained

The canal is maintained in an efficient condition. During the last year 2,107,500 cubic meters of sand and mud have been removed from the bed, an increase of 51 per cent on the previous year.

Before the war the average number of passengers traveling through the canal was 248,000, producing an average annual revenue of $464,000. The number of persons passing through the canal since the war may be subdivided as follows:

	1919	1920
Ordinary passengers	129,477	194,873
Military	394,224	266,549
Emigrants and others	3,801	38,725
Total	527,502	500,147
Receipts	$991,000	$955,000

This vast military traffic is not likely to continue; for within a year or two normal conditions probably will have been re-established.

American and Foreign Wages

The wages of the crew for a 7500 deadweight ton coal-burning steamer are 50 per cent greater for an American than for a British vessel, with the pound sterling converted at $3.73, says Commerce Reports, the publication of the Department of Commerce. Not only are the wages per man higher but a larger number are used, particularly in the engine room, as will be seen from the table below, which, for the American vessel, is based upon the wage agreement effective since May 1, 1921, and for the British vessel upon the scale in use during July, 1921. Wages make up about one-sixth of the total operating costs of an American vessel, with 16½ per cent fixed charges based on a $50 per ton valuation.

The table gives a comparative view of our current American and British wages under the above conditions, the pound sterling being converted at the rate of $3.73.

A comparison of wages for each rating is given herewith on the basis of agreements in force during July, 1921, in the United States, Great Britain, Sweden, the Netherlands, and Denmark. The pound sterling is converted at $3.73, the Swedish krona at 21 cents, the Dutch guilder at 31 cents, and the Danish krone at 17 cents.

Current wages on American, British, Swedish, Dutch, and Danish 7,500 dead-weight ton steamers.

Rating.	American.	British.	Swedish.[a]	Dutch.[a]	Danish.
Captain	$320.00	$193.96	....	....	....
First officer	190.00	93.25	$127.00	$99.20	$127.50
Second officer	165.00	78.83	79.80	79.05	106.25
Third officer	145.00	63.41	88.20	71.30	76.50
Fourth officer	....	60.05	....	37.20	76.50
Chief engineer	270.00	111.90	90.30	....	187.00
First assistant engineer	190.00	....	84.00	....	111.50
Second assistant engineer	165.00	93.25	73.50	....	110.50
Third assistant engineer	145.00	78.83	60.90	....	97.75
Fourth assistant engineer	....	67.14	....	....	....
Junior	....	60.05	....	....	[b] 72.25 [c] 76.50 [d] 80.75
Chief wireless operator	107.00	63.78	....	....	....
Assistant chief wireless operator	85.00	55.95	....	....	....
Carpenter	85.00	52.59	63.00	49.60	[c] 58.65 [b] 53.72
Carpenter's mate	80.00	....	....	....	....
Boatswain	80.00	48.66	63.00	49.60	58.65
Boatswain's mate	77.50	....	....	....	....
Quartermaster	75.00	....	....	....	....
Able seamen	72.50	44.76	58.27	46.50	53.72
Ordinary seamen	52.50	[c] 27.97 [d] 30.39	37.80	44.95	34.00
Boys, cabin	30.00	23.01	....	10.85	21.59
Deck engineer	85.00	....	....	....	....
Pumpman	85.00	....	....	....	....
Donkeyman	80.00	78.00	63.00	49.60	58.65
Storekeeper	80.00	....	....	....	58.65
Oiler	80.00	48.49	60.90	49.60	....
Fireman	75.00	45.13	58.27	46.50	58.65
Coal passer and wiper	65.00	[b] 44.76 [e] 48.49	....	31.00	36.55
Water tender	80.00	48.49	....	....	....
Chief steward	120.00	70.87	....	....	....
Second steward	....	49.04	....	100.00	90.10
Assistant steward	....	48.49	....	26.35	90.10
Cook	100.00	67.14	....	49.60	76.50
Second cook	80.00	52.22	....	....	....
Assistant cook	....	48.49	....	17.05	39.10
Messroom steward	70.00	48.86	....	....	....
Utility man	72.00	....	....	....	....
Boys, mess	60.00	23.01	....	12.40	15.30

[a] Bonus included in salary.
[b] Under 1 month.
[c] 1 to 2 years.
[d] Over 2 years.
Over 1 month.

⁂

Effective October 18 the Pacific Coast-West Coast South America Conference made the wheat rate $10

Comparison of wages for month on American and British steamer of 7,500 dead-weight tons.

AMERICAN CREW (49 MEN).	
Deck department (17 men):	
Master	$320.00
First mate	190.00
Second mate	165.00
Third mate	145.00
Carpenter	85.00
Boatswain	80.00
7 able seamen	507.50
3 ordinary seamen	157.50
1 wireless operator	107.00
Total	1,757.00
Engine-room department (24 men):	
Chief engineer	270.00
First assistant engineer	190.00
Second assistant engineer	165.00
Third assistant engineer	145.00
Deck engineer	85.00
Storekeeper	80.00
3 oilers	240.00
9 firemen	675.00
6 coal passers	390.00
Total	2,240.00
Stewards department (8 men):	
Chief steward	120.00
Chief cook	100.00
Second cook and baker	80.00
Utility man	72.00
2 messmen	140.00
2 mess boys	120.00
Total	632.00
Grand total of wages per month	4,629.00
Average wage per day	154.30

BRITISH CREW (40 MEN).	
Deck department (17 men):	
Master	$193.96
First mate	93.25
Second mate	78.83
Third mate	63.41
Carpenter	52.59
Boatswain	48.86
7 able seamen	313.62
2 ordinary seamen	60.78
First wireless operator	63.78
Second wireless operator	55.95
Total	1,025.03
Engine-room department (17 men):	
Chief engineer	111.90
Second engineer	93.25
Third engineer	78.83
Fourth engineer	67.14
9 firemen	406.17
3 greasers	145.47
1 donkeyman	78.00
Total	980.76
Stewards Department (6 men)	
Chief steward	70.87
Second steward	49.04
2 assistant stewards	48.49
Chief cook	67.14
Second cook	52.22
Total	287.76
Grand total of wages per month	2,293.55
Average wage per day	76.45

a short ton instead of $9 a long. The division between large and small parcels of lumber was set at 300,000 feet instead of 500,000, and rates were fixed as follows: to Callao, Mollendo, Talara, Antofagasta, Arica and Iquique, $18 for large lots, $20 for small; to all other ports, $20 and $22. These are reductions ranging from $5.50 to $2.

U. S. Shipping and Panama

During the fiscal year 1921, in spite of the world-wide depression, which resulted in the laying up of hundreds of ships, a new high record for American tonnage was established at the Panama Canal. The number of American ships making the transit was 1212 out of a total for all nations of 2892, says the Panama Canal Record. These figures do not include vessels of the United States Navy or other government-owned or chartered vessels not engaged in commercial service and exempt from the payment of tolls. The aggregate net tonnage of these 1212, measured according to Panama Canal rules, was 4,874,477, and they carried 5,179,350 tons of cargo. The nearest competitor of the United States in canal traffic was Great Britain with 970 vessels of 3,965,613 net tons, carrying 3,721,932 tons of cargo. American vessels carried 45 per cent of all cargo passing through the canal, and British vessels 32 per cent. The continuous increase of American shipping using the canal since it was first opened to navigation in August, 1914, is shown by the following table:

Fiscal Year	Atlantic to Pacific	Pacific to Atlantic	Total
1915	231	239	470
1916	114	124	238
1917	198	266	464
1918	224	404	628
1919	268	518	786
1920	493	636	1129
1921	581	631	1212

The low figures for the fiscal year 1916 are accounted for by the circumstance that the canal was closed to navigation by slides in the Gaillard cut from September 18, 1915, to April 15, 1916. Subsequently the traffic was adversely affected by the war. Since the armistice it has grown rapidly and continuously.

1921 Traffic by Trade Routes

The 1921 traffic moved over the trade routes shown in the accompanying table.

AMERICAN SHIPPING USING THE PANAMA CANAL DURING THE FISCAL YEAR 1921; SEGREGATION BY TRADE ROUTES.

	Ships.	Cargo tons.
United States coastwise, Atlantic to Pacific	177	698,429
United States coastwise, Pacific to Atlantic	145	673,959
East coast of United States to west coast of South America	129	419,994
West coast of South America to east coast of United States	152	629,274
Europe to west coast of North America	26	66,709
West coast of North America to Europe	106	736,160
East coast of United States to Far East	68	502,712
Far East to east coast of United States	23	140,260
East coast of United States to Australasia	13	88,789
Australasia to east coast of United States	17	87,385
East coast of Mexico to west coast of North America	29	286,311
West coast of North America to east coast of Mexico	42	14,455
East coast of Mexico to west coast of South America	36	296,342
West coast of South America to east coast of Mexico	32	....
East coast of Mexico to Balboa	9	72,452
Balboa to east coast of Mexico	11	....
East coast of Mexico to west coast of Central America	1	4,478
East coast of United States to Balboa	12	95,606
Balboa to east coast of United States	10	....
East coast of United States to west coast of Canada	9	58,846
West coast of Canada to east coast of United States	7	32,809
Cristobal to west coast of South America	20	2,731
West coast of South America to Cristobal	19	15,051
Cristobal to west coast of North America	23	29,972
West coast of North America to Cristobal	23	14,578
East coast of South America to west coast of North America	9	31,927
West coast of North America to east coast of South America	3	18,941
Miscellaneous trade routes, Atlantic to Pacific	20	37,842
Miscellaneous trade routes, Pacific to Atlantic	41	123,338
Totals	1,212	5,179,350

Included under "miscellaneous trade routes" in the tabulated statement above are voyages between the West Indies and the West Coast of North America, the West Indies and the West Coast of South America, the United States and Central America, Cuba and the Far East, the Far East and Europe, the West Coast of South America and Europe, the West Coast of North America and South Africa and local vessel movements.

History of Intercoastal Trade

The most important American trade through the canal is that from coast to coast, with a cargo tonnage of 1,399,814 carried in 323 vessels. The history of this trade is peculiar. In the first fractional year of canal traffic (August 15, 1914, to June 30, 1915) it engaged 335 vessels carrying 1,846,658 tons of cargo. During the following year the canal was closed for seven months, and in the interval the vessels which had maintained a coastwise service were diverted to war trades in the North Atlantic, where they remained until the close of the war and during the era of high freight rates which followed it. It was only after the slump set in that serious attention was once more given to the development of the trade from coast to coast. It is now growing rapidly, but the figures for 1921, although they show a notable increase over those for 1920 and other recent years, still fall short of the record set in 1915. It is reasonable to assume that if the war had not arrested its normal development, the coastwise trade would be far more important than it now is, and that it is capable of great expansion. An interesting and widely advertised feature of the traffic this year was the shipment to Eastern markets by sea of a portion of the Northwestern apple crop and the California orange crop. There was also a notable increase of lumber shipments from the Pacific Coast.

Competitive Trade Routes

The coastwise trade is an American monopoly; but in the other trades served by the canal, American ships are in competition with the ships of foreign nations, particularly Great Britain, Japan and Norway. In the important trade between Europe and Australasia American vessels did not figure at all, and in the trade between Europe and the West Coast of South America only four American vessels passed the canal, all northbound, with 31,800 tons of cargo. In the oil trade between the Mexican fields and the West Coast of South America American tankers carried 296,342 tons out of a total 654,659 tons. With this single exception the trades in which American vessels secured any considerable tonnage had the United States either as origin or destination.

In the trade between Atlantic and Gulf ports of the United States and the West Coast of South America, the total southbound cargo was 933,261 tons. Of this, American vessels carried 45 per cent, British vessels 15 per cent, Japanese vessels 12 per cent, and Norwegian vessels 7 per cent. Athough the trade of other nations has not yet been analyzed in detail, it is probable that the remaining 21 per cent was carried in Chilean and Peruvian bottoms. The northbound cargo aggregated 975,597 tons. American vessels carried 64 per cent of the total, British vessels 14 per cent, Norwegian 10 per cent, and Japanese approximately 5 per cent.

Australian Trade to British

In the trade between Europe and the West Coast of North America there is a great preponderance of eastbound cargo. Of this, American vessels carried 55 per cent, British vessels 26 per cent, and Norwegian vessels 4 per cent. Swedish, Danish and Dutch vessels were also operating over this route, and probably account for most of the remaining 15 per cent. Of the westbound cargo, which was relatively unimportant, American vessels carried 27 per cent, British 14 per cent, and Norwegian 13 per cent.

Of cargo moving from Atlantic and Gulf ports to the Far East, American vessels carried 41 per cent, British vessels 29 per cent, and Japanese vessels 27 per cent. Of cargo moving from the Far East to Atlantic and Gulf ports, American vessels carried 32 per cent, Japanese 38 per cent, and British 23 per cent.

In the trade between the United States and Australia, British vessels had a decided advantage, carrying 71 per cent of the total outward bound cargo as against only 14 per cent in American bottoms. Of cargo moving over this route in the opposite direction American vessels carried 56 per cent and British vessels 44 per cent.

Of oil shipments from the Mexican fields to the Pacific Coast north and south of Panama, American vessels carried 60 per cent and British and Norwegian vessels shared the remainder.

Principal American Lines

The United States Shipping Board owned 451 of the 1212 American vessels which used the canal in 1921. The more important private owners were: Standard Oil Company, with 128 vessels; W. R. Grace & Company, 94; Pacific Mail Steamship Company, 84; United States Steel Products Company, 53; Panama Railroad Steamship Line, 50; Luckenbach Line, 37; American-Hawaiian Line, 33; Union Oil Company, 25; Standard Transportation Company, 12; Crowell & Thurlow, 12; Robert Dollar Company, 11.

Briefs

An order issued by Chairman Lasker of the Shipping Board rescinds his former order prohibiting vessels of the North Atlantic & Western from calling at New York, and the company's freighters, all of which are owned by the board, will be free to make that port. The former prohibition was one result of the fight between the North Atlantic & Western and private companies engaged in the intercoastal trade.

* * *

Swayne & Hoyt have been appointed San Francisco and Los Angeles agents of the Furness-Prince Line's newly-established Pacific Coast-Europe service, and Frank Waterhouse & Company will act in Oregon and Washington.

* * *

Frank K. Hitching of San Francisco announces that the Congress Line, which as agent of the United States Transport Company was forced out of the intercoastal trade by the Shipping Board a few months ago, has been reorganized and will re-enter the service. The first vessel dispatched will be the Princess, formerly the J. L. Luckenbach. Calls will be made at Baltimore, New York, Los Angeles, San Francisco, Portland and Seattle. Mr. Hitching will act as San Francisco agent. The Northwest Shipping Company will represent the Congress Line in Portland.

* * *

The Kingsley Navigation Company of Vancouver, B. C., has added the steamships Chilkoot and San Antonio to its California-British Columbia service, which was being maintained with the steamship E. D. Kingsley.

* * *

The northbound freighting business of the Parr-McCormick Steamship Line, operator of vessels in the Pacific Coast trade, has been transferred to the McCormick Steamship Line, effective November 1. The Parr-McCormick Line will continue to handle vessels as managing owner and under charter in the coastwise and offshore trades.

* * *

The joint service of the Kosmos and Roland lines between Germany and Peru via Panama was opened with the dispatch of the steamship Theben, 1757 net tons, from Hamburg September 20. One sailing a month will be maintained. On June 30 the Kosmos Line owned 11,000 gross tons of shipping. Other new steamship services recently announced or opened are: Canadian Government Merchant Marine, two combination vessels between Canada and the Bahamas, Jamaica and British Honduras; Furness-Withy, two passenger vessels in winter and one in summer between New York and Bermuda; East Asiatic Company, monthly service between Copenhagen, Hamburg, Antwerp and Havana, Progreso, Vera Cruz, Tampico; Canadian Pacific Railway, monthly sailings between St. John (winter), Montreal (summer), and Havana, Kingston and Boston; Fred Olsen Company, between Scandinavia and Germany and the River Plate.

* * *

Indications are that favorable action is unlikely in the case of H. R. 6645, which would permit Canadian vessels and railroads to transport goods between Alaska and the United States.

* * *

Contracts for transporting United States mails to and from Southeastern and Southwestern Alaska have been awarded to the Alaska Steamship Company and Pacific Steamship Company at $2000 a round voyage. Postal clerks will be carried on the companies' vessels.

* * *

The board of harbor commissioners of the Territory of Hawaii has prepared a tentative schedule of wharfage charges, which it proposes to impose upon freight passing over territorial wharves. Heretofore the board has received no revenue from freight passing over its wharves, its income having been derived from port charges and pilotage fees; but recent action of Congress permits the levying of wharfage. On incoming freight the proposed schedule calls for 20 cents a ton on general merchandise and 30 cents a thousand feet of lumber; and in outgoing freight 15 cents a ton on sugar, coffee, pineapples and bananas and 20 cents on general merchandise. Interisland freight would pay 10 cents on general merchandise.

* * *

Advices from Japan say that the Toyo Kisen Kaisha has received permission of the Department of Communications to reduce sailings in its South American subsidized service from twelve to eight a year.

* * *

The Matson Navigation Company has announced a reduction of 50 cents a ton on freight moving to and from the Hawaiian Islands, effective January 1. General cargo will be $6 as compared with $6.50; canned pineapples will drop to $5.50, raw sugar to $4.50 and refined to $5.50. The cement rate of $5 will not be changed. This will be the third reduction made by the Matson Line within a year.

With Exporters and Importers

Rate Tendencies

Two opposing factors in ocean rate-making are beginning to make themselves apparent. On the one hand is an increase in cargo offerings, which is of wider extent than was at first apparent; on the other is the prospect of a great number of idle vessels being returned to service, with a consequent depressing effect on rates. These factors probably will tend to counterbalance each other for years, even if trade should improve rapidly; temporary ascendencies may be gained from time to time, however, as shipowners are affected by apparent changes. Unquestionably the weightiest single force making for slowly rising rates is the United States Shipping Board, which controls the greatest single fleet of the world and probably would be less responsive to larger cargoes than would private owners. In fact, the board holds the key to the entire situation and could cast the deciding vote in almost any trade: by putting tonnage into service it could depress rates; by holding vessels idle it could elevate them; what it might do in any given situation would depend upon several considerations, among which may be enumerated the cost of preparing idle vessels for sea, the comparative expense of operating vessels and keeping them in idleness, the apparent permanency of improvement, and so on.

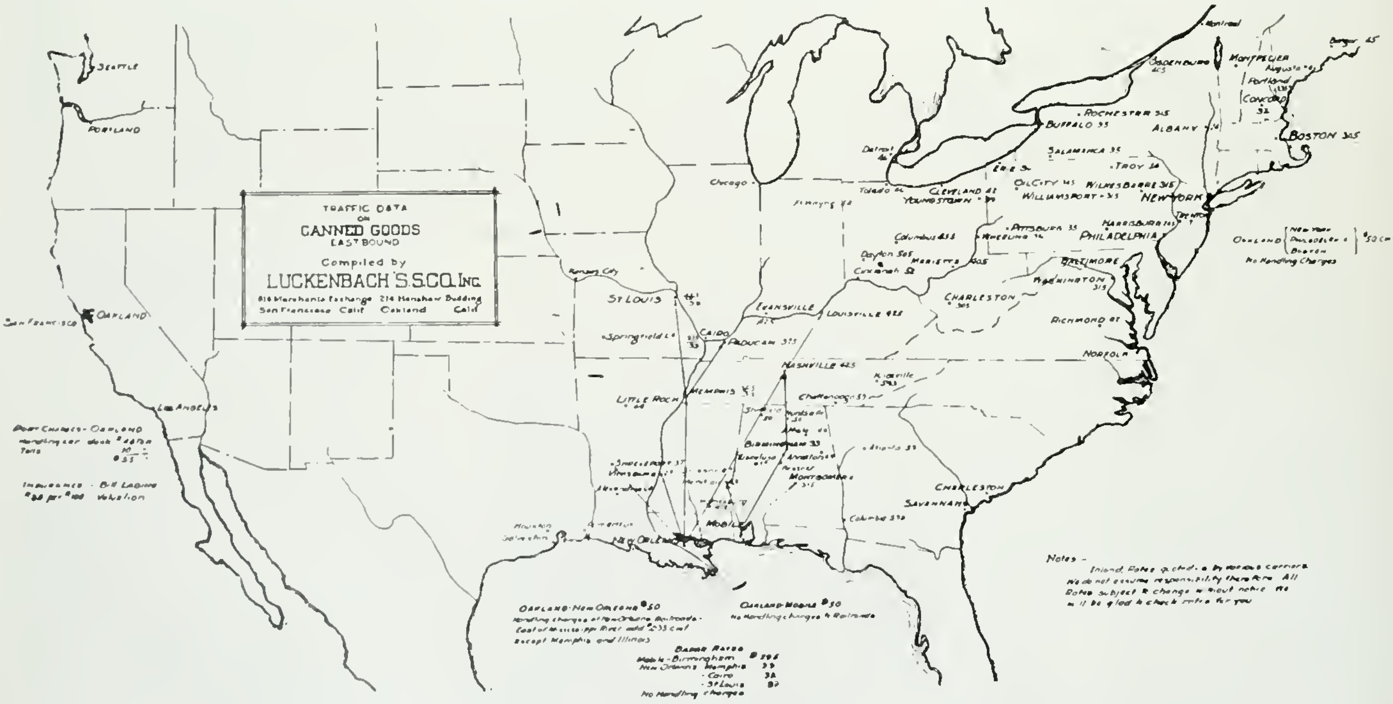
What of Foreign Owners?

Although the board evidently holds the whip hand, the attitude of foreign owners may be of considerable, if lesser, importance. In general, private operators have declined to permit themselves to be stampeded into any rapid withdrawal of tonnage from the mud flats; but signs multiply that they are beginning to respond to increased freights. For example, the number of idle Japanese vessels decreased by 14 and the gross tonnage by 23,640 from August 15 to September 15. On the latter day 136,110 gross tons of shipping was idle, and at the end of the month 2,753,612 tons was reported in active service. Japanese idle tonnage was rather inconsequential, therefore, in comparison with that in service, and was almost negligible in comparison with the 956 vessels of the Shipping Board tied up at the same time. The board, moreover, was retiring more vessels while the Japanese were returning ships to service.

Due in part to the increased number of vessels and probably also in part to the temporary nature of much of the recent revival, freight rates in some quarters, notably from the Far East to Europe, have fallen back after a rise. Such changes may be traced also to an imperfect adjustment of tonnage, for increased offerings of cargo are likely to attract a disproportionate volume of shipping in one part of the world, while other trades remain unchanged or even might support additional vessels. As an example of the latter phenomenon may be cited Australia, which, according to Birt & Company's shipping bulletin, has been able to supply sufficient cargo for all berth steamers loading for the United Kingdom and Continent; or the Pacific Coast, with transoceanic services to a minimum and cargo offerings increasing, is a case in point.

The Court of Last Resort

All considerations fortify the belief that the Shipping Board is the court of last resort. Any important release of idle tonnage would send a tidal wave through the world of rates, affecting all trades, even those in which the board has no vessels. In the absence of drastic action, however, the situation resolves itself to this: a revival of trade probably will be followed by immediate rate increases; these in turn by the appearance of more tonnage, which would tend to depress tariffs, though perhaps not to the former level; and so on, the net result being a gradual increase depending upon the degree of improvement in commerce. In the return of idle vessels to service the Shipping Board doubtless will do its share from time to time; but it easily might complicate things when rates rose sufficiently to permit its vessels to show an operating profit. Inasmuch as the board is not an ordinary operator, and desires above all to end its continuous drain on the United States treasury, a relatively high level of freights, such as would end operating deficits, conceivably might drag out the entire Shipping Board fleet vessel by vessel; and this would act to stay additional increases, although not necessarily to depress rates. The prob-



Traffic data on canned goods moving east from the Pacific Coast, compiled by the Luckenbach Steamship Company. Figures opposite the names of cities are railroad rates from seaboard able trend, therefore, is a gradual increase in cargoes and rates (provided of course that business actually is on the mend), accompanied by minor fluctuations, until a certain level, which may be described as the Shipping Board's profitable stage, is attained; thereafter the increase is likely to be slowed up materially until practically all the tonnage of the board is absorbed. Some privately-owned bottoms might remain idle when the board's fleet was all engaged, and the return of such vessels might act in the same manner, creating, that is, another plateau in the rate curve, which would be followed by a second rise as the world's tonnage was absorbed. This state of things is not likely to obtain for years; consequently, really stable and profitable rates are in the far offing, and shippers will continue to find the situation to their liking.

Three Rate Wars

In three important trade routes lively little rate wars have broken out practically simultaneously. Pacific Coast-Europe, Atlantic Coast-Brazil and Orient-Pacific Coast rates have broken under the pressure of competition; in two of the trades the conferences have been unable to hold together; and in the third, the Pacific Coast-Europe route, an attempt to organize a conference has failed.

Too Much Tonnage

Before the recent irruption of steamship lines into the European service, there was no great difficulty in maintaining rates, especially in view of the close working agreement that existed between the European-Pacific Line of Williams, Dimond & Company (now supplanted by the American-Hawaiian) and the Harrison Direct Line, represented by Balfour, Guthrie & Company. These companies were the oldest in the trade and were able to hold the newcomers in line with a fair degree of success prior to the entrance of a veritable host of operators this year. Among the later entrants the powerful Royal Mail Steam Packet and French Line most disturbed the serenity of things, for earlier competition had not been so keen as it now became. With a view to organizing a conference before conditions should become acute, the American-Hawaiian proposed that an agreement be consummated; the proposal was rejected, and rates immediately began to fall, dried and canned fruit declining 15 cents or perhaps more. Despite the large eastbound cargoes offering, the berth now appears to be over-tonnaged, and westbound freight is practically non-existent, so that the stage is well set for trouble.

Brazil Conference Defunct

In the Atlantic-Brazil trade the conference has broken, with a natural reaction on Pacific-East Coast tariffs, which necessarily were closely related to those of the other ocean. Of this trouble the immediate cause was the decision of Funch-Edye to work independently and the acceptance of the challenge by Furness-Withy, who said that they would meet whatever competition existed. These few well-chosen words split the conference; the foreigners and perhaps most of the Americans wandered far afield, each twirling a bludgeon; while the two Shipping Board operators, the International Freighting Corporation, in charge of cargo vessels, and the Munson Line, operator of passenger liners, crept together for aid and comfort. They are not saying what their new rates are, but it is known that the decline since November 3 ranges from $1 to $15 a ton, the average fall being about $2 at the middle of the month.

There has been no change in the Argentine section of the North Atlantic-East Coast South America Conference.

Oriental Tariffs Down

In the Far East all is not well. Within the last three months rates have broken one by one, and clear indications are that the end is not yet. Rattan furniture from Hongkong is down to the grotesque rate of $3 for 40 cubic feet as against a rate of $5 that existed prior to October 30. Such a charge would be low enough in the westbound service, which has some weighty cargo, such as iron and steel, that leaves space for light stuff; in the eastbound trade, which lacks heavy goods, it is absurd. General merchandise from Manila fell from $15 to $12.50, weight or measurement, September 21; beans and peas from Shanghai from $12.50 to $10, weight, October 7; Japanese tea from $8 to $5, measurement, August 9; silk, 100 pounds, from $7.50 to $6.75, August 25; the minimum bill of lading is down from $10 to $5; a firm rate of $6 on Oriental rice has been established; and on September 30 Saigon rice was fixed at $7.50, direct loading. These last two rates represent declines, but the amounts cannot be stated definitely.

Mitsui a Disturber

For several months the eastbound rate situation has been growing more and more unsatisfactory. The Mitsui Bussan Kaisha, a non-member, was a disturbing element, and its rate-cutting and the pretext thus afforded to other lines, tended to beat down tariffs and, what was more important, to engender much suspicion. At length the Shanghai general committee of the Shipping Board conference decided on September 20 that the Japan sub-committees be made independent of the Trans-Pacific Freight Tariff Bureau of Japan in fixing rates, although they might cooperate, when advantageous, with existing conferences and bureaus for the maintenance of tariffs. Operators of American tonnage as individuals might be members of any bureau, the Shanghai committee decided, but the Shipping Board conference and its various sub-committees should maintain freedom of action. The committee, however, disclaimed any intention of opening a rate war unless forced to do so.

Divorce Decree

This action at Shanghai was brought about by the Trans-Pacific Freight Tariff Bureau of Japan in granting permission to individual operators to meet Mitsui and other competition. As a result of that decision the Blue Funnel cut rates to 15 per cent below published tariffs. That line blamed the conference for the tangle; the O. S. K., N. Y. K. and T. K. K., on the other hand, sought out the Shipping Board operators, pleaded guilty to rate-cutting and sought to make peace, saying that they were in favor of maintaining rates thereafter. In spite of this conciliatory attitude of the Japanese, who, thought some Americans, were in earnest at last, the Kobe sub-committee found much that was unsatisfactory in the bureau, especially in a provision permitting members to meet actual rate cuts for seven days prior to departure and five days subsequent to departure of a non-conference vessel. Upon a report being submitted to Shanghai, the Japan sub-committees were authorized to go their own way. Just how serious was this step remains to be seen.

Too Late!

Reductions in import and export railroad rates, decided upon at a meeting of the Transcontinental Freight Bureau in Chicago in October, which probably will be made effective about December 15, have not caused a ripple on the Pacific Coast. Some newspapers, more enthusiastic than well informed, have been rather ecstatic in prophesying an immediate revival of trade, but it is safe to say that they are alone in their prognostications. No shipping operator joins with them.

The reductions, especially in the case of iron and steel, are belated. Had the new 60-cent rate from Rate Basis 2—that is, Chicago—been published several months ago some business might have resulted, for time was when the North Atlantic - Far East rate stood at $12 a long ton as against $6.50 to $8 today. But the fall of North Atlantic rates within the last three months has been disastrous, the conference has lost practically all semblance of control, and no one credits published tariffs with even approximating ruling rates. The trans-Pacific rate, on the other hand, remains steady at $5 a short ton, or only a little less than the North Atlantic, despite the great difference between the transcontinental rate of $12 and the Pittsburgh-New York export rate of $5.70. At a time when the North Atlantic stood at $11 a long ton a transcontinental export rate of 55 cents was requested of the railroad executives on the ground that a precise equalization of the Chicago - Pacific and Pittsburgh-Atlantic rates required 50 cents, but that the Pacific, because of its faster service, could demand and receive a 5-cent differential. The new rate is 5 cents more than was requested, and in the meantime the North Atlantic rate has broken $3 to $4.50. In such circumstances those who anticipate a restoration of the export steel trade are dreaming dreams.

Some Business Expected

It does not follow, of course, that some business may not result. Gary and Chicago have been shipping a few hundred tons now and then and may ship more.

Rate Basis 1, east of Chicago, will receive a new export rate of 69 cents as against a former rate of 80, the differential of 9 cents between Pittsburgh and Chicago thus being maintained.

Among other reductions are: sulphate of ammonia, Rate Basis 2 and Birmingham, from 70 to 60 cents; Minnequa, Colorado, from 70 to 46; all commodity, Rate Basis 2, from $2 to $1.50, which will be followed by an ocean reduction from $14 to $12, weight or measurement; knocked down railroad cars, Rate Basis 1, from 87½ cents to 69; Rate Basis 2 and Birmingham, 87½ to 60; Minnequa, Colorado, 87½ to 46 cents. All changes affecting lines east of Chicago are subject to concurrence of those companies.

It is evidently difficult for the Pacific Coast to reconcile itself to the complete diversion of its old Oriental export and import business; but the Pacific Coast must realize two things: that the Panama route has a decided advantage at all times and especially during a depression such as that of today; and that no success in maintaining an import and export rate structure may be expected so long as ocean rates fluctuate wildly. The necessarily involved and cumbersome methods of the railroads cannot possibly keep pace with the over-night breaks in ocean tariffs that the shipping world is discovering every morning.

More Rail Reductions

More than one domestic rate reduction has been made or is being planned by transcontinental railroads in order to enable them to meet intercoastal steamship competition. One of the most important under way affects lumber and shingles, on which, it is reported, the railroads intend to make rates of 90, 88½ and 85 cents, depending upon destination, as against $1.06½, 94 and 87½. The greatest reduction would be to New York and Boston, but even with a 90-cent rate effective there are those who hold that the railroads could not hope to take business from steamship lines. At the present time approximately 40 per cent of all new business placed with members of the West Coast Lumbermen's Association is for cargo delivery, with approximately two-thirds destined coastwise and intercoastal and one-third offshore. A statement issued by the Seattle Chamber of Commerce says regarding the rail reduction: "While the rail rate of 90 cents on fir, spruce and hemlock from Western Washington to North Atlantic markets is welcomed by Seattle lumber interests, the water carriers continue to get the business. The West Coast Lumbermen's Association says that steamers, prior to the rail rate increase, handled less than 1,500,000 feet of lumber through the Panama Canal in six months' time. However, they will wind up 1921 with intercoastal deliveries amounting to more than 175,000,000 feet. Indications are that steamship lines by spring will have to add sufficient tonnage to take care of 50,000,000 feet a month from North Pacific mills. On the basis of present water rates lumber is being delivered on the Atlantic seaboard at $4 a thousand feet less freight than is proposed under the railroads' new tariff."

Reductions averaging about 20 per cent and in some cases as high as 50 per cent were announced early in November. Both eastbound and westbound business would be affected. Rates designed to meet Panama Canal competition must be submitted to the Interstate Commerce Commission for waiver of the long and short haul clause, however. Reductions in grain and hay rates averaging 16 per cent have been ordered by the commission throughout the Western United States. It does not yet appear whether the reductions will result in larger export cargoes.

The Cotton Rate

That the fight of Galveston against a Pacific Coast cotton rate of $1.35 is something more than appears on the surface was made evident at an Interstate Commerce Commission hearing in San Francisco in November. Galveston evidently intends to wage a spirited struggle against the Pacific Coast for freight destined to and from the Southwest, and with the Atlantic for cargo bound to and from the Central States. Such an aim as this tends to subordinate the immediate issue of a 15-cent reduction on cotton.

It will be recalled that the Interstate Commerce Commission, acting at the solicitation of Galveston and the I. G. N. Railroad, suspended a proposed reduction in the Pacific Coast export cotton rate. At the San Francisco hearing both sides unlimbered some of their heaviest artillery, with the result, according to qualified judges, that the transcontinental railroads demonstrated that a rate of $1.35 would be compensatory and that therefore the I. C. C. scarcely could decline to permit its publication. But Galveston immediately served notice that a 15-cent reduction in the Gulf rate also would be published by interested railroads; if this were done, the relative situation of the Gulf and Pacific would remain unchanged. Apparently the one great obstacle to a 15-cent Gulf reduction would be New Orleans, which might fight the proposal, but if New Orleans were granted a corresponding

	Aug. 1, 1921, to Oct. 31, 1921	Aug. 1, 1920, to Oct. 31, 1920
Total to China and Japan	330,151	6150
Receipts at Pacific Coast ports	60,549	3081
Exports of San Francisco	16,128	2405
Exports of other Pacific Coast ports	44,421	676
Exports of Atlantic and Gulf	269,602	3069

COTTON EXPORTS BY BALES, 1921 AND 1920

cut, opposition in that quarter probably would cease.

Pending a decision by the Interstate Commerce Commission, cotton will continue to move largely through Gulf ports. One steamship line plying out of San Francisco had booked 48,000 bales between the announcement of the reduction and the I. C. C.'s suspension, and at the time of the hearing had lost 57½ per cent of this amount by cancellation.

Page Freight Report

San Francisco, November 16, 1921.

Since our last circular, dated October 17, not a single full cargo steamer has been chartered for grain to the U. K. or Continent, either from the North or San Francisco, but quite a large amount of space has been fixed in that direction by the regular liners from Portland, Puget Sound and Vancouver, and always with a lower tendency, at rates varying from 45/ in the last fortnight of October down to 30/ per ton in the last few days, probably about 20,000 tons being arranged. The U. S. Relief Association arranged space by one of the American-Hawaiian steamers of about 6000 tons to Riga at 45/. From San Francisco, parcels of barley have also been shipped at rates running from 50/ at the end of September down to 25/ for U. K. ports. We are glad to say there is a slightly better inquiry for barley for December/January, and we hope the worst has been seen.

The most active demand has manifested itself for steamers for November/December and even for January loading for Japanese squares to Moji-Yokohama range. Several steamers have been chartered at $14 per thousand feet for this business, most of them being Japanese steamers. The schooner William Taylor was chartered on private terms for logs from Coos Bay to Japan. J. J. Moore & Company chartered the motorship Chile from the North Pacific to two ports Japan at $14. Schooners Oregon Pine and Oregon Fir are also reported as having been fixed for lumber to Japan by Balfour, Guthrie & Company from the North Pacific on private terms.

Since the charter of the three Nielsen steamers, J. J. Moore & Company chartered the Norwegian steamer Helen at 5/9 per ton on the deadweight for one year trans-Pacific trading, delivery and redelivery on this coast, and we understand that another steamer has been chartered for two round trips between the Orient and this coast at 6 delivery and redelivery Shanghai.

Quite some business is being done in Cardiff coal to this coast, W. L. Comyn & Company having chartered the British steamer Ethelstan at $16 to a port between San Diego and Puget Sound inclusive, option of Honolulu at 20/. Steamer Pacific and one other steamer unnamed have both been chartered at 20/ from Cardiff to Honolulu by British concerns, and more business is promised either to this coast or to the Islands from Cardiff, because the price at which the Cardiff coal is being sold is below what Australian or other coal can be landed for.

W. L. Comyn, combined with his coal charter on the Ethelstan, has chartered her for 75/ per thousand to Shanghai, with the option of 80/ to two ports in Australia. J. J. Moore & Company chartered the motorship Canada at 72/6, three ports Australia, and the motorship Parana at the same rate and the same conditions. Comyn has also chartered the schooner Eric at a reported rate of 80/ from the North to Sydney. The American Trading Company chartered the steamer Peebles at $15 from the North Pacific to Australia, and they are reported to have chartered another steamer January/February at rates that are still unnamed.

For Africa two vessels have been chartered, one the Katherine Mackall by Comyn at $25, and the other, the Annie M. Rolph, by Gates, Portland, at $23.50.

For the U. K., H. R. MacMillan Company chartered the Japanese steamer Tofuku Maru at 120/ per thousand from British Columbia to three ports of discharge.

The schooner Hawaii was chartered by C. R. McCormick at $10.50 per thousand feet full cargo of ties to Guaymas. Several schooners have been chartered for copra from different South Sea Islands to San Francisco at $12 rates. The motorship Malahat has been chartered for coal from Newcastle, Australia, on private terms to Ahukini by J. J. Moore & Company, and the U. S. Navy has chartered three steamers for coal, one to Bremerton, the West Catanace at $2.98 per ton, and two to San Diego, one of which is the Redhook at $3.88 and $3.92, respectively.

Balfour, Guthrie & Company have chartered a Danish training ship with Diesel motor for a general cargo from one or two ports in Europe to San Diego, San Francisco and Honolulu on private terms, and they have also chartered their own vessel, the Monterey, for a cargo of nitrate to Honolulu. The rate has not yet been divulged, but we understand that nitrate freights are higher. We are glad to say that although rates are low, a better inquiry exists for lumber to different ports of the world.

PAGE BROTHERS,
BROKERS.

Beyfuss Freight Report

San Francisco, November 26, 1921.

Our previous report was dated October 24, and the healthier tone has kept up, manifested by the continuance of inquiries during the last month, but there has been no advance in freights.

Grain to Europe is practically dead as far as full cargo fixtures are concerned. Only one or two steamers are reported taken and rates are nominally 35/ at 40/. For some time we have had in this trade, as in other trades, the peculiar situation that parcel space by regular liners is often less than charterers are able to get by taking entire steamers.

Lumber to the Orient continues to show the greatest activity, many steamers having been reported in the past four weeks, although some of the fixtures were made previous to that time. Our records show not less than a dozen steamers (about 50,000,000 feet B. M. carrying capacity), and at this date rates are about $14 at $14.50. The large majority of this tonnage is Japanese and most of the steamers are coming to this coast in ballast to take these timber cargoes. Several of our sailers have also been chartered in this trade but in most cases they were able to get slightly better rates mainly because cedar logs were shipped.

Three or four steamers have been taken for full cargoes of lumber to ports north of Hatteras, rates ruling about $16.50.

The bids for the transportation of navy coal from Hampton Roads disclosed some low figures; $2.98 per ton to San Diego or Puget Sound was the lowest bid. The next group ranged from about $4 to $4.50 and the highest bids were $6.90 to San Diego and $10.05 to Puget Sound.

Australia has taken two full steamer cargoes at about 72/6 and a small sailer is reported at $16 for this destination.

The lumber market to West Coast South America is very quiet and no fixtures were made, and but one full cargo of nitrate is reported coming this way—a sailer fixed to the Hawaiian Islands at about $8.

The various inquiries for African

destinations resulted in the fixing of two large sailing vessels, both of which will make loading this year. The rates are $23.50 at $25.

C. BEYFUSS COMPANY,
BROKERS.

Japan and Fuel Oil

Another effort to formulate a national oil policy is being made in Japan. For several years the empire has groped rather blindly, or at least hesitatingly, without any great measure of success. The present finds it practically without domestic resources of a most important marine fuel—important both for the economical operation of its steam merchant marine and for the navy in time of war, and indispensable to the construction of any considerable fleet of motorships, to which the rest of the world is turning so rapidly. Without oil Japan finds itself in a situation of great embarrassment, and it certainly is curious that the country has not possessed itself of a sure supply by some means or another.

Domestic Production

In the Japan Advertiser of recent date appeared the following table of domestic production in koku (one koku equals 47.6 United States gallons):

Year	Production
1916	2,661,000
1917	2,612,000
1918	2,243,000
1919	2,060,000
1920	2,213,000
1921	1,109,000

Figures for 1921 are for January-July inclusive.

In the United States daily national production of oil was more than 915,000 barrels in 1917 and was about 1,180,000 in 1920. This serves to throw into high light Japan's shortage.

Very few Japanese merchant vessels burn oil. Until a few years ago the conspicuous exceptions to the rule were the Tenyo Maru and Shinyo Maru of the Toyo Kisen Kaisha, but even those vessels used coal also. Lloyd's Register for 1921-1922 lists fifteen "Marus" of an aggregate gross tonnage of 106,882 fitted for oil fuel; at the same time, Japan possessed a total of 2033 steamers and motorships of 3,354,806 gross tons, so that oil-burning vessels were only a trifle more than 3 per cent of the total. Five of the fifteen were owned by the Toyo Kisen Kaisha, six by the Kawasaki Dockyard, and one each by the Osaka Shosen Kaisha, Nippon Yusen Kaisha, Teikoku Kisen Kaisha and Towa Kisen Kaisha. One hundred thousand tons of vessels burning oil fuel is infinitesimal when compared with the enormous fleets of other countries, especially of the United States. The small amount is due largely to the lack of domestic oil and the general use of coal by steamships doubtless has made the development of a supply of oil less imperative.

Navy Uses Coal

The Japanese Navy still depends largely upon coal. The 1920 edition of Janes' Fighting Ships discloses the following:

No data regarding fuel of Kaga, Tosa, Amagi, Akagi, Atago and Takao, all capital ships, the first two of which had been laid down at the time of publication, the others being projected only.

No data regarding fuel of dreadnoughts Nagato and Mutsu.

Dreadnoughts Ise, Hiuga, Fu-so, Yamashiro, maximum, 4000 tons of coal and 1000 tons of fuel oil each.

Dreadnought Settsu, maximum, 2,300 tons of coal and 400 tons of fuel oil.

Battle-cruisers Kongo, Hi-yei, Haruna, Kirishima, maximum, 4000 tons of coal and 1000 tons of fuel oil each.

Semi-dreadnought Aki, maximum, 2000 tons of coal and 170 tons of fuel oil; semi-dreadnought Satsuma, 2000 tons of coal and 300 tons of fuel oil.

Older cruisers ("battle-cruisers") Kurama, Ibuki, maximum, 2000 tons of coal and about 250 tons of fuel oil each; Ikoma, maximum, 2000 tons of coal and 150 tons of fuel oil.

Older battleships Kashima, Katori, Mikasa, Hizen (ex-Prussian), Asahi, Shikishima, Iwami, Suwo; coast defense battleships Fuji, Okinoshima (ex-Russian), Nisshin, Kasuga; first class cruisers Aso, Idzumo, Iwate, Adzuma, Yakumo, Asama, Tokiwa: all these vessels burn coal only.

Some of the light cruisers and gunboats have space for a little oil.

If the eight new or projected capital ships ending with Mutsu be omitted, as of uncertain fuel, Japan is seen to have nine dreadnoughts or dreadnought-cruisers fitted for oil, their combined oil-bunker capacity being only 8400 tons; two semi-dreadnoughts, 470 tons; and three older cruisers (miscalled battle-cruisers), 650 tons— a grand total of 9520 tons. As was the case with the merchant marine, practically complete dependence is placed upon coal. It is, of course, possible, or even probable, that the newer capital ships will burn more oil and less coal, as is the case with Britain's newer vessels; but it is nevertheless evident that Japan has been compelled to lag behind other countries in the use of oil.

Must Seek Foreign Supply

Officials of the Finance, Navy and Agriculture and Commerce departments were engaged in daily sessions, said the Japan Advertiser, in an endeavor to formulate a policy. That newspaper continued:

> Whatever may be the nature of the policy which finally emerges, it is likely to contain provisions for various aspects of oil supply, including extension of prospecting, the acquisition of oil rights, encouragement of imports, conservation of oil resources by developing the use of coal and water power, storage, and consumption. It is evident that any encouragement of local production will only hasten the exhaustion of the already slender reserves, so that this may be taken to apply to territories elsewhere, possibly in lands to the north in which Japan has an interest, and in China. Fair sums of money, in fact, have already been laid out in this work, but little is known as to just what has been done. Respecting the acquisition of oil rights, it will be recalled that the Jananese government not long ago was in communication with the Dutch government regarding mining and drilling rights in the Dutch East Indies. Private Japanese companies have also been considering and negotiating for the purchase of oil rights in these islands for many months past.

How America Is Affected

The question of encouraging imports is related to a plan for the establishment of a government oil monopoly, which has been talked of from time to time and which is likely to receive serious consideration sooner or later. Such a step would involve the creation of an arrangement similar to that applied to tobacco, salt and camphor. It would at one stroke change the status of the large American and Dutch oil importing companies and might even force them to turn over their plant and storage facilities to the government. If such a step were taken the financial interests of the American concerns would not be likely to suffer, since the Standard and the Texas companies between them could still dictate the terms on which their oil was released if they worked in harmony. It is, however, much more likely that these and other firms would be permitted to continue their businesses under public license, importing and storing oil as heretofore. In such a case the government would be the only buyer unless it chose to designate certain distributors to act for it.

Shipbuilding

American Building

On November 1, according to the bulletin of the American Bureau of Shipping, there were 54 steel vessels of 399,767 gross tons under construction or contract in yards of the United States, as compared with 70 vessels of 542,117 tons September 1. Seven vessels of 70,300 tons were for the Shipping Board and 47 of 329,467 tons for private owners. Tankers lead all classes with 33 vessels of 247,016 tons; cargo vessels are second with 15 of 89,751 tons; and combination vessels, all for the Shipping Board, are last with 6 of 63,000. It is interesting to note that only one vessel of the 54 will be a coal-burner and that only six will burn either coal or oil, all others burning oil only. The largest number of vessels, 13, and the largest aggregate gross tonnage, 85,931, lie between the tonnage limits of 6001 and 7000. Five vessels, ranging between 13,001 and 14,000 aggregate 67,500 tons and hold second place.

Pacific Building

There were 6 steel seagoing merchant vessels of 85,750 deadweight tons under construction in yards of the Pacific Coast of the United States November 1, as compared with 10 of 129,350 tons October 1 and 73 of 746,040 November 1, 1920, according to returns compiled by Pacific Marine Review. Four vessels of 43,600 tons were delivered in October as follows: tankers for private account, 3 of 32,600 tons; freighter for U. S. S. B., 1 of 11,000 tons. There has been no change in the work on hand in Canadian yards.

The following tables show work as of November 1:

American Yards:	No. Vessels	Agg'te D.W.T.
Freighter, U.S.S.B.	1	11,000
Tankers, private	3	34,750
Freighters, private	2	40,000
Totals	6	85,750

Canadian Yards:		
Freight's, C.G.M.M.	2	16,740
Combin'n, private	1	600
Totals	3	17,340

New Work Held Up

Bids received in July by the Red D Line for the construction of two passenger vessels for the Central American trade have been rejected, says the Atlantic Coast Shipbuilders' Association, and new bids will not be asked until the Merchant Marine Act has been made effective. The company believes that the application of preferential rates and discriminatory duties is necessary in order for it to meet foreign competition. The City of New York is about to request bids for the construction of three new electric-drive ferryboats of about 3500 horsepower and about 230 feet long. The Merchants & Miners' Transportation Company is reported to be planning the construction of vessels in the near future.

Contracts have been placed by the Pennsylvania Railroad with the Sun Shipbuilding Company for the construction of two ferries for the Philadelphia-Camden service. The Staten Island Shipbuilding Company will build a tug, 136 by 27 by 13 feet, for the Staples Transportation Company. It is reported that 80-ton auxiliary schooners for the Boston-Portland-Eastport trade will be constructed at the Pushee yard, Dennysville, Maine. A fishing schooner will be built by the Arthur D. Storey yard, Essex, Massachusetts. The Marietta Manufacturing Company, Point Pleasant, Virginia, is constructing two twin-screw propeller boats, Memphis and Baton Rouge, for the Inland & Coastwise Waterways Service. These boats will be 760 gross tons each, 410 tons net, 200 feet long, 40 feet wide and 10 feet deep, and will be equipped with triple-expansion engines and watertube boilers.

The only new contract reported in the Orient in months has been placed with a Yokohama yard by Gonzaemon Ukon of Osaka. The order is for a 6000 deadweight ton steamer, to cost about yen 200 a ton.

Announcement is made that James Robertson, Alameda, will build the first ferryboat for the Golden Gate Ferry Company, San Francisco Bay. It will be in operation by May.

The Argentine government, represented by a naval commission headed by Captain Fleiss, is reported to be contemplating the building in the United States of six submarines of either single or double hull construction, involving an expenditure of more than $12,000,000. The office of the Argentine naval commission is at 2 West Sixty-seventh street, New York City. Albert F. Haas, Newport, Rhode Island, has prepared the plans for a steel double ended screw steam ferryboat for the Jamestown-Newport Ferry Company, of Newport, Rhode Island, of the following dimensions: Length overall, 150 feet; length between perpendiculars, 123 feet; beam over guards, molded, 48 feet; beam overall, 49 feet; depth, molded, 14 feet; draft, 8 feet. The steamer will be equipped with compound engine and Babcock & Wilcox boilers. Accommodations will be provided for 500 passengers and 32 automobiles. The vessel will cost about $200,000 and bids will be asked for soon. The North Vancouver, B. C., council on October 15 received tenders for construction of a steel ferryboat, to be built according to plans drawn up by the Wallace Shipbuilding Company of that city.

One of the largest dredges in the world is nearing completion at the yards of the Canadian Vickers, Limited, Montreal, for the Department of Marine and Fisheries. It will be operated on the ship channel below Quebec. The dredge is 184 feet long between perpendiculars and 292 feet long overall, with a breadth of 48 feet and a depth of 20½ feet.

Yard Extensions

It is announced that plans are now under way to make the plant of the Baltimore Drydocks and Shipbuilding Company, Locust Point, Maryland, which was purchased by the Bethlehem interests September 28, one of the greatest ship repair yards in the world. The Bethlehem Corporation took over the management of the Locust Point yards October 1. J. M. Willis, vice-president and general manager under the retiring regime, has been retained as general manager. The property comprises two plants, one on the north and the other on the south side of Locust Point, adjoining the Fort Henry government reservation, and is valued at $6,000,000. Including the new purchase and the steel and shipbuilding plants at Sparrow's Point the Bethlehem holdings on the Baltimore waterfront are now estimated at about $80,000,000. Although repair work is to be featured at the new plant for the present, it is indicated that shipbuilding will be resumed at a future date, the plant being operated as an auxiliary to the Bethlehem yards at Sparrow's Point.

Floating drydock No. 1, built by Bertelsen & Petersen Engineering Company as an addition to its plant on Border street, East Boston, was launched October 24. Although the dock is a small one, it will be an important adjunct to the equipment of the company in handling small craft. It is 120 feet long, 45 feet wide and capable of lifting 500 tons. It will be used in handling small schooners, trawlers, tugs, etc. The company plans the construction of a large floating dock in the near future.

The Jahncke Ship Repair Company of New Orleans is negotiating for the purchase of the river front property occupied by the Jackson Barracks for proposed extensions to its plant.

M. Vogel, shipbuilder, of Milton Point, Long Island, is reported to have presented plans to the Miami, Florida, city commission for the establishment of a shipbuilding concern at that port.

The Lockport Dry Dock Company has been incorporated at Buffalo, New York, by B. L. and L. L. Cowles for $5000. The new company will go in for general repairs to small vessels.

The Heinson Boat Building & Hauling Company of Manhattan has been incorporated under the laws of New York. The company will engage in boat building and general repair work and is represented by Cole & Robertson, 154 Nassau street, New York.

The new 15,000-ton drydock of the Portland Dock Commission was put in commission in November.

Yards Finish Work

The mortality among Pacific Coast shipyards during November was severe, no less than four plants completing their work, or expecting to complete it, during the month. With the delivery of the 11,000-ton freighter West Chopaka to the Shipping Board November 15, the Los Angeles Shipbuilding & Drydock Company finished its work and at the same time completed the last Shipping Board vessel building on the Pacific Coast. This vessel also was the last of any description launched, the combination Nutmeg State, building at Sparrows Point, Bethlehem, having been launched September 17, or two days prior to the West Chopaka. The last freighter to be delivered, however, will be the 10,000-ton Cathay, built at Kiangnan, Shanghai, which is scheduled to sail for the United States December 15, delivery to be made at a Pacific Coast port.

The Moore Shipbuilding Company delivered the 10,100-ton tanker Birkenhead to the Vacuum Oil Company October 26 and the 4750-ton motor tanker H. T. Harper to the Standard Oil Company of California November 2, these vessels being the last under construction.

J. Coughlan & Sons, Vancouver, delivered the 8350-ton freighter Canadian Freighter, the last vessel building at the yard, to the Canadian Government Merchant Marine November 12. Her launching, which took place October 12, was the last of any C. G. M. M. vessel, but apparently she will not be the last to be delivered.

The Wallace Shipbuilding & Drydock Company expected to deliver the combination vessel Princess Louise to the Canadian Pacific Railway November 30, and thus finish its building program.

With the delivery of the 7500-ton tanker La Purisima to the Union Oil Company October 20, the Southwestern Shipbuilding Company ended its work.

When the Coast Guard cutter Shawnee was launched by the Union Construction Company November 15, the ways of the entire Pacific Coast of the United States and Canada were cleared of sea-going vessels. Not one remained to be launched, although the Bethlehem Shipbuilding Corporation has under contract two 20,000-ton ore-and-coal vessels for the Ore Steamship Company, the keels of which have not been laid.

In the East the Davie Shipbuilding & Repairing Company wound up construction with the delivery of the C. G. M. M. Canadian Challenger October 27.

Repair Awards

Recent repair contracts are reported as follows: W. & A. Fletcher Company, Hoboken, engine repairs and general overhauling of Italian-American steamship William Ison. Robins Drydock & Repair Company (Todd), engine and boiler repairs U. S. S. B. Huron, $21,900; repairs U. S. S. B. American Legion, $14,980. Clinton Drydocks (Todd), installation of pumps and turbines New York City ferryboats James Duane and Thomas Willet, $45,890. Morse Drydock & Repair Company, repairs steamship J. L. Luckenbach, recently sold to B. L. Stafford, Jr., and associates, about $50,000. James Shewan & Son, overhauling nine ferryboats City of New York, $14,935. Port Arthur Shipbuilding Company, overhauling and repairing steamship Francis Widlar, recently refloated from Pancake Shoals, Lake Superior, Standard Shipbuilding Corporation, repairs U. S. S. B. Buckeye State, $19,000. Globe Shipbuilding & Drydock Company, replacing boilers, adding staterooms and installing steam heat and running water in Merchants & Miners' steamship Nantucket, about $75,000. United Engineering Works, extensive repairs and alterations Matson steamship Lurline. Merchant Shipbuilding Corporation, addition of 'tween-deck to United American Line steamships Franklin and Fairmont; Standard Shipbuilding Corporation, repairs U. S. S. B. Centennial State, $9520.

Warships to Be Scrapped

The following list gives the capital vessels to be scrapped under the armaments limitation proposal of Secretary Hughes, the yard at which each is building and the nature of the contract:

Newport News Shipbuilding & Drydock Company—West Virginia, Iowa, battleships, cost plus fee; Constellation, Ranger, battle-cruisers, cost plus fee.

Bethlehem Shipbuilding Corporation, Fore River Plant—Massachusetts, battleship, cost plus fee; Lexington, battle-cruiser, cost plus 10 per cent.

New York Shipbuilding Corporation—Colorado, Washington, battleships, cost plus 10 per cent; Saratoga, battle-cruiser, cost plus 10 per cent.

Navy Yard, New York—Indiana, South Dakota, battleships, limit of cost $21,000,000.

Navy Yard, Norfolk—North Carolina, battleship, limit of cost $21,000,000.

Navy Yard, Philadelphia—Constitution, United States, battle-cruisers, limit of cost $23,000,000.

Navy Yard, Mare Island — Montana, battleship, limit of cost $21,000,000.

Totals—Nine battleships and six battle-cruisers.

Of these vessels the battleships Colorado and Washington (New York Shipbuilding Corporation) and West Virginia (Newport News Shipbuilding & Drydock Company) have been launched.

The End of Faith

Named Faith; built in hope;—and sold for $5100: such is the epitaph of the first seagoing concrete vessel of the world. If St. Paul were present he might be able to round out his trinity of cardinal virtues by some passing reference to the price; but he probably would decline, in view of the fact that the purchasers were junk dealers by the name of Marx, who might resent any soft impeachment of charity.

The forced sale of the Faith at New Orleans will be accepted generally as closing a curious, even unique episode of shipbuilding. She was not the only concrete steamship built in the United States, for the Shipping Board laid down some 7500-ton tankers during the feverish days of 1918, and other "stone" ships were poured here and there; but the Faith remains, nevertheless, the prototype, and her humiliating end must be accepted as that of all. Her original cost is reported to have been $750,000; she was sold three years ago by the San Francisco Shipbuilding Company for $600,000, according to a statement of her last crew; and now her value as a seagoing vessel is practically nothing, although it is true that she was put up at auction at a time when even new steel steamships were a drug on the market.

In Bad Odor

The Faith's crew claimed about $20,000 in wages; the Armour fertilizer works added $40,180.96 for damage to a cargo of bones. Forty days prior to the sale, the United States marshal was offered $20,000, but declined because the Armour company protested on the ground that such a sum would be devoured by the seamen. The Faith's last voyage was from New Orleans to Buenos Aires and return. On that voyage the crew received no pay, according to the libel, and had difficulty in getting enough to eat.

Aside from the cargo of bones, deadweight was the undoing of the concrete ship. Despite the natural fear as to seaworthiness (a fear that appears now to have been groundless); despite the many and varied jokes that went the rounds, the Faith and her sisters might have appealed to shipowners if their actual weight had not been altogether out of proportion to their carrying capacities. For example, the concrete tankers Peralta and Palo Alto, delivered to the Shipping Board in 1920, are of 7500 tons deadweight and 3700 net, whereas a new steel tanker, La Purisima, built for the Union Oil Company by the Southwestern Shipbuilding Company, has the same deadweight but only 3032 net tonnage. In short, the concrete tankers are 25 per cent larger, with all that implies as to tonnage and canal dues and so on, without having capacity for transporting a single ton more of oil.

R. I. P., for the Faith; and that's what the junk dealers probably will do.

Reports of the Yards

Pacific Launchings

UNITED STATES

W. S. Rheem, tanker Standard Oil Company of California, Bethlehem Shipbuilding Corporation, Alameda Works, October 28.

Shawnee, tug United States Coast Guard, Union Construction Company, November 15.

Perry, destroyer U. S. N., Mare Island Navy Yard, October 29.

Decatur, destroyer U. S. N., Mare Island Navy Yard, October 29.

Pacific Deliveries

UNITED STATES

West Chopaka, freighter U. S. S. B., Los Angeles Shipbuilding & Drydock Company, November 14.

H. T. Harper, tanker Standard Oil Company of California, Moore Shipbuilding Company, November 2.

Birkenhead, tanker Vacuum Oil Company, Moore Shipbuilding Company, October 26.

Wasmuth, destroyer U. S. N., Mare Island Navy Yard, November 10.

CANADA

Canadian Freighter, freighter C. G. M. M., J. Coughlan & Sons, November 12.

Eastern Launchings

UNITED STATES

Fireboat City of Philadelphia, Bethlehem Shipbuilding Corporation, Baltimore Drydocks Plant, October 22.

President Roosevelt, ferryboat City of New York, Staten Island Shipbuilding Company, November 5.

Lightship bureau of lighthouses, Consolidated Shipbuilding Corporation, November 16.

Steel Seafarer, freighter United States Steel Products Company, Federal Shipbuilding Company, October 18.

Steel Pathfinder, freighter United States Steel Products Company, Federal Shipbuilding Company, November 17.

Californian, motorship, freighter American-Hawaiian Steamship Company, Merchant Shipbuilding Corporation, November 14.

West Virginia, battleship U. S. N., Newport News Shipbuilding & Drydock Company, November 19.

Wm. Rockefeller, tanker Standard Oil Company of New Jersey, Newport News Shipbuilding & Drydock Company, October 5.

Tanker, builder's account, Texas Steamship Company, November 19.

Eastern Deliveries

UNITED STATES

Pine Tree State, combination U. S. S. B., Bethlehem Shipbuilding Corporation, Sparrow's Point Plant, November 3.

Samuel Q. Brown, tanker Tidewater Oil Company, Merchant Shipbuilding Corporation, November 5.

Wm. Rockefeller, tanker Standard Oil Company of New Jersey, Newport News Shipbuilding & Drydock Company, November 9.

Levant Arrow, tanker Standard Transportation Company of New York, New York Shipbuilding Corporation, October 18.

President Roosevelt, ferryboat City of New York, Staten Island Shipbuilding Company, November.

CANADIAN

Canadian Challenger, freighter C. G. M. M., Davie Shipbuilding & Repairing Company, October 27.

Canadian Logger, freighter C. G. M. M., Midland Shipbuilding Company, October 12.

Pacific Coast, United States

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Purchasing Agent: O. W. Street.

Submarines USN: S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145; S-41, hull 146; all launched; outfitting proceeding slowly.

Alameda Works

Chilore, hull 5309, combination ore and coal carrier Ore Steamship Co; 571-6 LOA; 550-1 LBP; 72 molded beam; 44 molded depth; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; Curtis turbines with Falk reduction gears, 5000 SHP; 3 Scotch SE boilers, 17-6x12, each 4287 sq ft; oil burners.

Lebore, hull 5310, combination ore and coal carrier Ore Steamship Co; sister to above.

H. M. Storey, hull 5312, tanker Stand Oil Co of Cal; 500 LBP; 68 beam; 25-11 loaded draft; 11 loaded speed; 15,000 DWT; rec engs, 4000 IHP; 3 Scotch marine boilers, 16x12-9; keel Jan19/21; launch Sept28/21; deliver Dec5/21, est.

W. S. Rheem, hull 5313, tanker Stand Oil Co of Cal; sister to above; keel Mar1/21; **launch Oct28/21**; deliver Dec31/21, est.

No name, hull 5314, ferryboat Six Minute Ferry Co; 230 LOA; 63-6 beam over guards, 42 molded; 19-6 molded depth; TE eng, 1400 IHP; propeller drive; 3 WT boilers; keel Aug27/21.

No name, hull 5315, ferryboat Six Minute Ferry Co; sister to above.

HANLON DRYDOCK & SHIPBUILDING CO., OAKLAND

Purchasing Agent: R. Barker.

Dan F. Hanlon, hull 89, steam schr. D. J. Hanlon; 2500 DWT; 1400 IHP engines; 2 B&W boilers; work suspended.

LOS ANGELES SHIPBUILDING & DRYDOCK CO., SAN PEDRO

West Chopaka, hull 35, steel cargo USSB; 430 LBP; 54 beam; 28-2 loaded draft; 10½ loaded speed; 11,000 DWT; TE engs, 3500 IHP; 3 Scotch single end, 15-9; keel Feb 24/21; launch Sept19/21; deliver Nov14 21.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: W. E. Hostetter.

H. T. Harper, hull 163, tanker Standard Oil Co of California; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engs; keel Oct/20; launch June16/21; **deliver Nov2/21.**

Birkenhead, hull 166, tanker for Vacuum Oil Co; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec engs; 3 Scotch marine boilers, 15-2x12; keel Dec9/20; launch July9/21; **deliver Oct26/21.**

NAVY YARD, PUGET SOUND

Medusa, repair ship for government; 460 LBP; 70 beam; about 19 loaded draft; 17-5 loaded speed; turbine eng, 7000 IHP; 2 WT express type boilers; 10,000 tons disp; keel Jan2/20; launch and deliver dates not set.

Holland, submarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K loaded speed; turbine eng, 7000 IHP; two WT express type boilers; 10,000 tons disp; keel Apr11/21.

NAVY YARD, MARE ISLAND

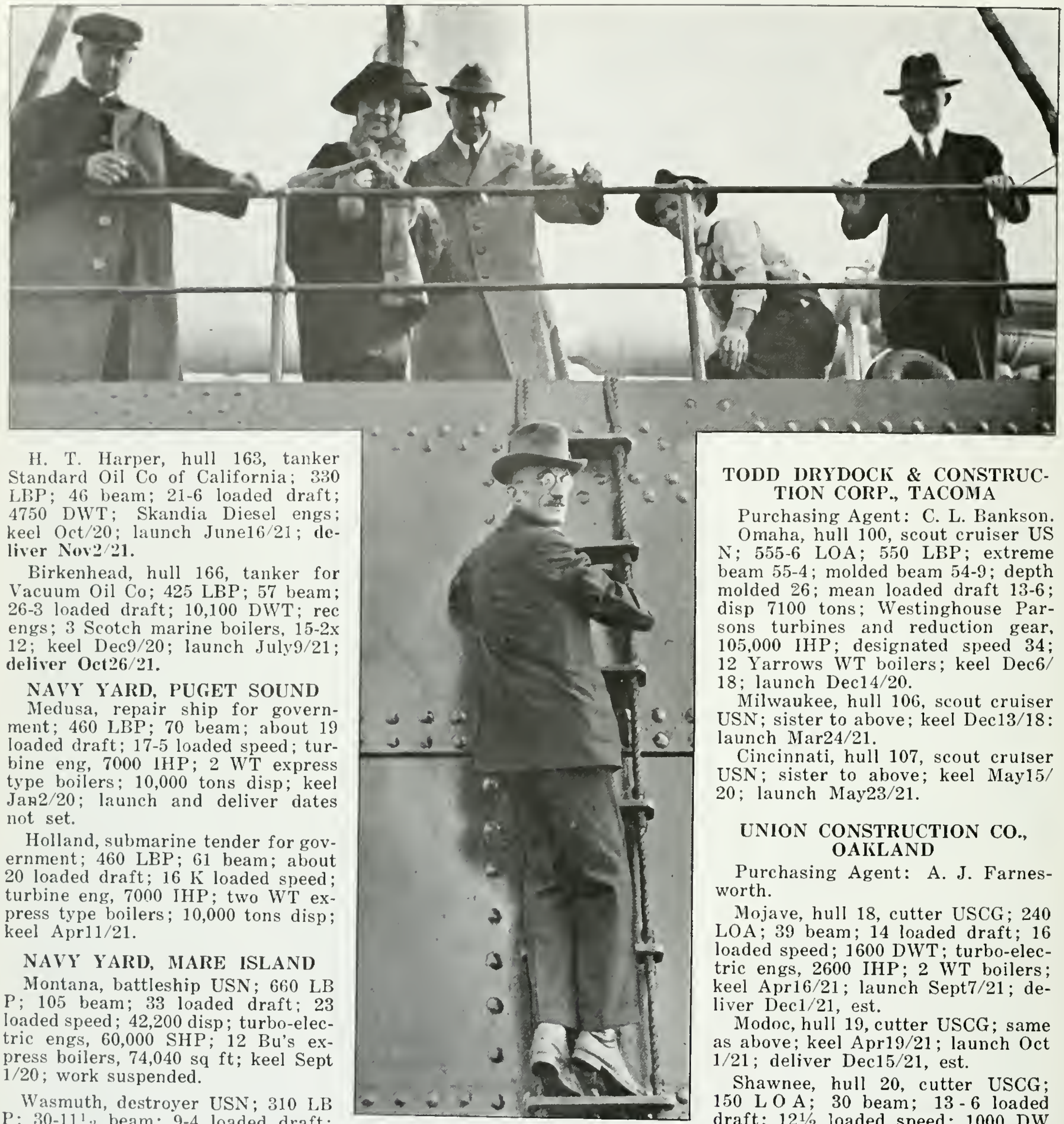
Montana, battleship USN; 660 LBP; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 disp; turbo-electric engs, 60,000 SHP; 12 Bu's express boilers, 74,040 sq ft; keel Sept 1/20; work suspended.

Wasmuth, destroyer USN; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 disp; geared turbine eng, 26,000 SHP; 4 Normand boilers, 27,000 sq ft; keel Aug12/19; launch Sept15/20; **commission Nov 10/21.**

Trevor, destroyer USN; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 disp; geared turbine eng, 26,000 SHP; 4 Normand boilers, 27,000 sq ft; keel Aug12/19; launch Sept15/20.

Perry, destroyer U S N; sister to above; keel Sept15/20; **launch Oct 29/21.**

Decatur, destroyer USN; sister to above; keel Sept15/20; **launch Oct 29/21.**



Keystone Photo Service

The gentleman grasping the Jacob's ladder with such meticulous care is E. E. Remsberg, Los Angeles agent of the Shipping Board and brother-in-law to President W. G. Harding. Mr. Remsberg intended to board the Shipping Board freighter West Chopaka before she cast off from the wharf of the Los Angeles Shipbuilding & Drydock Company on her trial trip, but he missed the sailing, and a tug of the Los Angeles yard put him aboard. The gentleman watching Mr. Remsberg's struggles from a safe place on deck and smiling fiendishly is Fred L. Baker, president of the yard.

The West Chopaka, with her propeller half out of the water, made more than 13 knots over a measured course off Los Angeles Harbor. She was the thirty-fifth and last steel freighter built by the Los Angeles Shipbuilding & Drydock Company, was the last to be launched of the entire Shipping Board freighter program, and, except for the 10,000-ton Cathay, built in Shanghai, was the last to be delivered.

TODD DRYDOCK & CONSTRUCTION CORP., TACOMA

Purchasing Agent: C. L. Bankson.

Omaha, hull 100, scout cruiser US N; 555-6 LOA; 550 LBP; extreme beam 55-4; molded beam 54-9; depth molded 26; mean loaded draft 13-6; disp 7100 tons; Westinghouse Parsons turbines and reduction gear, 105,000 IHP; designated speed 34; 12 Yarrows WT boilers; keel Dec6/18; launch Dec14/20.

Milwaukee, hull 106, scout cruiser USN; sister to above; keel Dec13/18; launch Mar24/21.

Cincinnati, hull 107, scout cruiser USN; sister to above; keel May15/20; launch May23/21.

UNION CONSTRUCTION CO., OAKLAND

Purchasing Agent: A. J. Farnesworth.

Mojave, hull 18, cutter USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engs, 2600 IHP; 2 WT boilers; keel Apr16/21; launch Sept7/21; deliver Dec1/21, est.

Modoc, hull 19, cutter USCG; same as above; keel Apr19/21; launch Oct 1/21; deliver Dec15/21, est.

Shawnee, hull 20, cutter USCG; 150 L O A; 30 beam; 13 - 6 loaded draft; 12½ loaded speed; 1000 DWT; rec engs, 1000 IHP; 2 WT boilers; keel Jun1/21; **launch Nov15/21.**

Canadian

CHOLBERG SHIPYARD, VANCOUVER, B. C.

Purchasing Agent: W. Meed.

(These vessels to be completed by Dominion government.)

Sir Henry Drayton, hull 5, 4-masted barkentine Victoria Shipowners, Ltd; 250 LOA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel; shaft logs fitted for auxiliary but no machinery installed; keel May 15/20.

No name, hull 6, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel June4/20.

No name, hull 7, 4-masted barkentine Victoria Shipowners, Ltd; sister to above; keel Feb/21.

J. COUGHLAN & SONS, LTD. VANCOUVER, B. C.

Purchasing Agent: J. Joseph.

Canadian Freighter, hull 21, steel freighter Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; TE eng, 3000 IHP; 3 Scotch boilers, 15-6 x11-6; keel Jan6/21; launch Oct12/21; **deliver Nov12/21.**

PRINCE RUPERT DRYDOCK & ENGINEERING COMPANY PRINCE RUPERT

Canadian Britisher, steel cargo Canadian government; 8390 DWT; 2-deck; bridge, poop and forecastle; 11 speed; keel Oct20/19; launch Oct 6/21.

This vessel is being completed by the Wallace Shipbuilding & Drydock Co, North Vancouver. The terms are time and material plus 8 per cent.

WALLACE SHIPBUILDING & DRYDOCK CO., VANCOUVER, B. C.

Princess Louise, Canadian Pacific; 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel Oct/20; launch Aug 29/21; deliver Nov30/21, est.

Atlantic and Gulf

AMERICAN BRIDGE COMPANY, PITTSBURGH, PENN.

Purchasing Agent: W. G. A. Millar.

Twenty-five coal barges Carnegie Steel Co; 175 LBP; 26 beam; 8 loaded draft; 20 launched.

Two tow boat hulls Carnegie Steel Co; 149-2x34 4-5 loaded draft; launch and deliver Jan/22, est.

Two coal barges, 175 LBP; 26 beam; 8 loaded draft; undisclosed interests.

Fifteen decked barges, 120 LBP; 30 beam; 7 deep; US Engineers, Memphis, Tenn.

Two decked barges, undisclosed interests, 150x32x7-6; launch Mar/22, est.

BETHLEHEM SHIPBUILD'G CORPORATION, BALTIMORE, DRYDOCKS PLANT, BALTIMORE

A. C. Crosby, assistant general manager in charge of purchases.

Hull 125, tanker builder's account; 340 LBP; 49 beam; 23-6 loaded draft; 10 loaded speed; 6000 DWT; rec. eng, 2000 IHP; 2 Scotch boilers, 15-3; keel Nov24/20.

Hull 126, tanker builder's account; 430 LBP; 59 beam; 25-4½ loaded draft; 10 loaded speed; 10,250 DWT; turb eng, 3000 IHP; 3 Scotch boilers, 15-3; keel Sept27/20.

Hull 128, fireboat City of Baltimore; 115-6 LBP; 28 beam; 9-6 loaded draft; 12 loaded speed; rec eng, 1000 IHP; 2 B&W WT boilers; keel July15/21; **launch Oct22/21.**

BETHLEHEM SHIPBUILDING CORP., FORE RIVER PLANT, QUINCY, MASS.

Lexington, hull 1300, battle-cruiser U S N.

Raleigh, hull 1382, scout cruiser U S N.

Detroit, hull 1383, scout cruiser U S N.

Massachusetts, hull 1400, battleship USN.

And the following nineteen submarines USN: AA-2, hull 1270; hulls 1309 to 1320 inc, submarines S-18 to S-29 inc; hulls 1389 to 1394 inc; submarines S-42 to S-47 inc.

J. Fletcher Farrell, hull 1496, tanker Sinclair Nav Co; 430 LBP; 59 beam; 25-5 loaded draft; 11 loaded speed; 10,600 DWT; rec eng, 3200 IHP; 3 Scotch boilers, 15x11-9; launch June10/21.

William Boyce Thompson, tanker Sinclair Nav Co; sister to above; keel Nov11/21; launch July/21.

BETHLEHEM SHIPBUILDING CORP., HARLAN PLANT, WILMINGTON, DEL.

No name, hull 3477, tanker Atlantic Refining Co; 226 LBP; 39 beam; 17 loaded draft; 8½ loaded speed; 2600 DWT; turb eng, 750 IHP; B & W boilers; keel Aug20/21.

BETHLEHEM SHIPBLDG. CORP., SPARROWS POINT PLANT, SPARROWS POINT, MD.

Pine Tree State, hull 4195, combination USSB; 518 LBP; 72 beam; 30-7 loaded draft; 16 loaded speed; turb eng, 10,000 IHP; 8 Yarrows boilers; keel Feb15/19; launch Mar 19/21; **deliver Nov3/21.**

Palmetto State, hull 4196; combination USSB; sister to above; keel Feb19/19; launch June4/21.

Nutmeg State, hull 4197, combination USSB; sister to above; keel July29/20; launch Sept17/21.

Bethore, hull 4211, ore and oil Ore SS Co; 550 LBP; 72 beam; 32-4 loaded draft; 11½ loaded speed; 20,000 DWT; rec eng, 4600 IHP; 3 Scotch boilers, 17-6x12; keel Feb 24/21.

Marore, hull 4212, ore and oil Ore SS Co; sister to above, except turb eng; keel May2/21.

Steelore, hull 4213, ore and oil Ore SS Co; sister to above; keel July 20/21.

CONSOLIDATED SHIPBUILDING CORPORATION, MORRIS HEIGHTS, N. Y.

Purchasing Agent: Bruce Scrimgeour.

No name, hull 246, US lightship; 146-3 LOA; 30 beam; 12-7 loaded draft; 825 DWT; comp eng, 400 IHP; 2 Scotch boilers, 10-6 diam; keel Mar4-21; **launch Nov16/21.**

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO., PHILADELPHIA

Purchasing Agent: Ed. C. Geehr.

(Work held up)

Richmond, hull 448, scout cruiser USN; keel Feb16/20; launch Sept 29/21; 78 per cent comp. Nov 1.

Concord, hull 449, scout cruiser USN; keel Mar29/20; 71 per cent comp Nov 1.

Trenton, hull 501, scout cruiser USN; keel Aug18/20; 52 per cent comp Nov 1.

Marblehead, hull 502, scout cruiser USN; keel Aug4/20; 47 per cent comp Nov 1.

Memphis, hull 503, scout cruiser USN; keel Oct14/20; 40 per cent comp Nov 1.

OSCAR DANIELS COMPANY, TAMPA, FLORIDA

B. D. Benson, hull 11, Isherwood tanker Standard Oil; 466 LBP; 60 beam; 26-7 loaded draft; 10½ loaded speed; 11,900 DWT; QE eng, 2800 IHP; 3 Scotch boilers, 15x11-6; keel June29/20; launch Sept5/21.

FEDERAL SHIPBUILDING CO., KEARNY, N. J.

Purchasing Agent: J. L. Hastings.

Steel Seafarer, hull 43, freighter US Steel Products Co; 425 LBP; 56 beam; 25-10 loaded draft; 12 loaded speed; 9400 DWT; turb engs, 3100 IHP; 3 Scotch boilers, 15 diam; keel May25/21; **launch Oct18/21.**

Steel Pathfinder, hull 44, freighter US Steel Products Co; sister to the above; keel June1/21; **launch Nov 17/21.**

Steel Pioneer, hull 45, freighter US Steel Products Co; sister to the above; keel July/21; launch Dec10/21, est; deliver Dec31/21, est.

LAKE TORPEDO BOAT CO., BRIDGEPORT, CONN.

Purchasing Agent: C. D. Maxfield.

S-48, hull 48, submarine U S N; launch Feb26/21.

S-49, hull 49, submarine U S N; launch Apr23/21.

S-50, hull 50, submarine U S N; launch June18/21.

S-51, hull 51, submarine U S N; launch Aug20/21.

MERCHANT SHIPBUILDING CORPORATION, CHESTER, PENN.

Vice-President: J. L. Ackerson.

Samuel Q. Brown, hull 384, tanker Tidewater Oil Co; 424 LBP; 58 beam; 25-5 loaded draft; 10½ loaded speed; 10,000 DWT; TE engs; 3 Scotch boilers, 15-3x11-7; keel Oct 1/20; launch Oct15/21; deliver Nov 5/21.

Californian, hull 385, freighter American-Hawaiian SS Co; 445 LBP; 59-8 beam; 28-6 loaded draft; 11½ speed; 11,000 DWT; 2 6cyl, 4-cycle Diesel engs, 4500 metric; 1 vertical donkey, 400 sq ft HS; keel Feb5/21; **launch Nov14/21.**

Missourian, hull 386, freighter American-Hawaiian SS Co; sister to above; keel Feb10/21; launch Nov 28/21, est.

No name, hull 387, fireboat City of Philadelphia; 120-9 LOA; 28 beam; 12-9 deep; 9 loaded draft; comp eng, 500 IHP; 2 B&W WT boilers, oil; 4 turbine fire pumps, 1 30-foot tower, 2 15-foot towers; capacity 12,000 gals a minute; keel Sept 15/21; launch Nov/21, est.

NAVY YARD, BOSTON

Whitney, destroyer tender No. 4 USN; 460 LBP; 60-11 beam; 21 normal draft; 16 loaded speed; 10,600 normal disp; geared Parsons turbs, 7000 SHP; 2 WT exp small tube boilers; keel Apr23/21; launching indefinite.

NAVY YARD, PHILADELPHIA

(All work practically suspended since July 1/21.)

Dobbin, hull 7, destroyer tender USN; 460 LBP; 60-10 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp; Parsons geared turb single screw engs, 7000 SHP; 2 WT boilers; keel Dec23/19; launch May 5/21; deliver date not determined.

Constitution, hull 8, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive, 180,000SHP; 16 WT boilers; keel Sept 25/20; launch and deliver dates not determined.

United States, hull 9, battle cruiser USN; 850 LBP; 105-4 beam; 30-11½ loaded draft; 33½ loaded speed; 43,500 disp; electric drive, 180,000 SHP; 16 WT boilers; keel Sept25/20; launch and deliver dates not determined.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY, NEWPORT NEWS

Purchasing Agent: James Plummer, 233 Broadway, New York City.

West Virginia, hull 211, battleship USN; 600 LBP; 97-3½ beam; 30-6 mean draft; 32,600 normal disp; 21 speed; GE turbo-elec drive, 28,900 SHP; 8 B&W WT boilers, oil, 41,768 sq ft plus 4168 superheat; keel Apr 12/20; launch Nov19/21.

Constellation, hull 215, battle-cruiser USN; 850 LBP; 101-8¼ beam; 31 mean draft; 43,500 normal disp; 33¼ speed, est; Westinghouse turbo-elec drive, 180,000 SHP; 16 WT boilers, oil, 198,000 sq ft plus 18,000 superheat; keel Aug18/20.

Ranger, hull 215, battle-cruiser USN; sister to above; keel June23/21.

Iowa, hull 258, battleship USN; 660 LBP; 105 beam; 33 mean draft; 43,200 normal disp; 23 speed; GE turbo-elec drive, 60,000 SHP; 12 White-Forster WT boilers, oil, 82,800 sq ft plus 8940 superheat; keel May17/20.

Wm. Rockefeller, hull 262, tanker Standard Oil NJ; 555 LBP; 75 beam; 30 loaded draft; 10¾ loaded speed; 20,300 DWT; twin screw, TE eng, 3800 IHP; 3 Scotch boilers, 17x12; keel Dec15/20; launch Oct5/21; deliver Nov9/21.

No name, hull 263, Diesel yacht Cox & Stevens; 180-6 LOA; 24 beam; 14 deep.

NEW YORK SHIPBUILDING CORPORATION, CAMDEN, N. J.

Purchasing Agent: L. G. Buckwalter.

Bay State, hull 251, combination USSB; 534 LBP; 72 beam; 30-6 loaded draft; 18 loaded speed; 11,000 D WT; geared turbs, 12,000 SHP; 8 WT boilers; keel Oct15/19; launch July17/20; deliver winter/21, est.

Peninsula State, hull 252, combination USSB; sister to above; keel July20/20; launch July6/21; deliver spring/22, est.

Lone Star State, hull 255, combination USSB; sister to above; keel May 13/19; launch Oct23/20; deliver fall/21, est.

Levant Arrow, hull 262, bulk oil Standard Trans Co of NY; 468 LBP; 62-6 beam, 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs, 3200 SHP; 3 SE Scotch boilers, 15-2x11-6; keel Nov4/20; launch July25/21; deliver Oct18/21.

Munargo, hull 263, combination Munson SS Co; 414 LBP; 57-6 beam; 23 loaded draft; 15½ loaded speed; 4950 DWT; geared turbs, 5800 SHP; 5 SE Scotch boilers, 16-4x12-3; keel Sept30/21; launch Sept17/21; deliver winter/21, est.

Eurana, hull 264, bulk oil stock; 419-3 LBP; 56-3 beam; 25-9¼ loaded draft; 10¾ loaded speed; 9870 DWT; 3 cyl TE engs, 3000 SHP; 3 SE Scotch boilers, 15-10x11-4; keel Jan17/21; launch July16/21; deliver winter/21.

No name, hull 265, bulk oil stock; sister to above.

Dixie Arrow, hull 266, bulk oil Standard Trans Co of NY; 468 LBP; 62-6 beam; 27-0¾ loaded draft; 10½ loaded speed; 12,550 DWT; 4 cyl QE engs, 3200 SHP; 3 SE Scotch boilers, 15-3x11-6; keel Aug11/20; launch Sept29/21; deliver winter/21, est.

Saratoga, hull 199, battle cruiser USN; 874 LOA; 850 LBP; 105-5¼ extreme beam; 31 mean draft; 43,500 normal disp; 33¼ loaded speed; GE turbo-electric drive; 180,000 SHP; 16 WT boilers, 198,000 sq ft plus 18,000 superheat; keel Sept25/20.

Colorado, hull 200, battleship USN; 624 LOA; 600 LBP; 97-3½ beam waterline; 30-6 mean draft; 32,600 normal disp; 21 loaded speed; Westinghouse turbo-electric drive, 28,900 SHP; 8 B&W WT boilers, 41,678 sq ft plus 4169 superheat; keel Mar29/19; launch Mar22/21.

Washington, hull 201, battleship USN, sister to above; keel June30/19; launch Sept1/21.

Kamoi, hull 267, fuel ship Japanese Navy; 497-8 LOA; 67 beam; 28 designed draft; 15 loaded speed; 13,000 DWT; elec drive, 8000 SHP; 4 B&W boilers; keel Sept14/21.

STANDARD SHIPBLDG. CORP'N, SHOOTERS ISLAND, MARINERS HARBOR, N. Y.

Purchasing Agent: Jamie Cortada.

John Purroy Mitchell, hull 32, fireboat City of New York; 121 LBP; 27 beam; 14-9 deep; 12 loaded speed; comp eng, 900 IHP; 2 B&W WT boilers, oil burning; keel Mar31/21; launch Aug6/21.

STATEN ISLAND SHIPBUILDING COMPANY, STATEN ISLAND, NEW YORK

Purchasing Agent: R. C. Miller.

Hell Gate, hull 728, dredge V. R. Browning; 140 LBP; 48 beam; 15 loaded draft; keel Aug28/20; launch Feb23/21.

Hull 736, tugboat Staples Trans Co; 136½ LBP; 27 beam; 16½ loaded draft; 10 loaded speed; 1 TE eng 700 HP; 1 Scotch boiler, 16x11½; keel May16/21; launch Aug4/21.

President Roosevelt, hull 737, ferryboat City of New York; 247 LBP; 66 beam; 19½ loaded draft; 15 loaded speed; 1 F&A comp eng, 3500 HP; 4 B&W WT boilers, 13,000 sq ft; keel May23/21; launch Nov5/21; deliver Nov/21.

SUN SHIPBUILDING COMPANY, CHESTER, PENN.

Purchasing Agent: H. W. Scott.

Agwiscot, hull 42, tanker A. G. W. I. S. Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 12 loaded speed; 12,500 DWT; single screw QE engs, 4300 IHP; 4 SE Scotch boilers, 15-10x11-11¼; keel Dec23/20.

Agwistates, hull 43, tanker A. G. W. I. S. Co; sister to above; keel Jan3/21.

No name, hull 46, tanker Sun Oil Co; 480 LBP; 65-9 beam; 26-7 loaded draft; 10½ loaded speed; 12,800 DWT; single screw QE engs, 4300 IHP; 3 SE Scotch boilers, 15x11-11¾; keel not laid.

No name, hull 47, tanker Sun Oil Co; sister to above; keel not laid.

TEXAS STEAMSHIP COMPANY, BATH, MAINE

Purchasing Agent: A. R. Weber.

No name, hull 32, tanker Texas SS Co; 415-10 LBP; 56 beam; 25-7¾ loaded draft; 11½ loaded speed; 9600 DWT; TE engs, 3000 IHP; 3 Scotch boilers, 15-3x11; keel Nov 9/20; launch Nov19/21.

Canadian

DAVIE SHIPBUILDING & REPAIRING COMPANY, LTD., LAUZON LEVIS, P. Q., CANADA

Purchasing Agent: N. W. Van Wyck.

Canadian Challenger, hull 476, single-screw cargo Canadian government; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 D WT; TE surface cond engs, 3000 I HP; 3 Scotch marine boilers, 15-6x 11-6; keel May14/20; launch July 7/21; deliver Oct27/21.

NOVA SCOTIA STEEL & COAL CO., TRENTON, N. S.

Purchasing Agent: A. M. Seely.

Sea King, hull 9, exploring yacht Baron Bliss, Nassau, Bahamas; 137-10 LBP; 28-6 beam; 6 loaded draft; 7 loaded speed; semi-Diesel 440 BH P, twin-screw eng; keel Aug24/20.

Miscellaneous Construction

The American Engineering Company has received orders for the following:

One size "F" towing machine with auxiliary warping heads, electric drive, for fuel oil supply for the Imperial Japanese Navy, now building at the New York Shipbuilding Corporation, Camden, New Jersey.

Steering gears for the ice boat Annapolis, City of Baltimore.

Windlasses for a new yacht being built by Henry J. Gielow, also for an electric windlass for a vessel being constructed in Tebo Yacht Basin, Brooklyn, New York.

The Moore Plant of the Bethlehem Shipbuilding Corporation will construct the deck machinery for a 2650-ton tanker for the Atlantic Refining Company, which is to be built by the Harlan Plant. This machinery will consist of a 7 by 7 inch Bethlehem spring quadrant type steering gear with horizontal engines, an 8¼ by 8 inch Bethlehem spur gear windlass suitable for taking 1¾ inch anchor chain, and a 6¼ by 8 inch Bethlehem steam self-contained gypsey.

The Augusta, Gardiner & Boothbay Steamboat Company has placed an order with the Kearfott Engineering Company, Inc., of New York City for new machinery for the river boat Virginia.

It is understood that an export order has been placed with the Kearfott Engineering Company, Inc., 95 Liberty street, New York, for an engine and boiler room equipment for a tugboat. The boat is quite similar to the 100-foot harbor tugs built in this country for the Shipping Board.

Drydocking and Repairs

BETHLEHEM SHIPBUILDING CORPORATION

Sparrow's Point Plant

Conversion from coal to oil burning: Fort St. George, Furness Withy & Co. Alterations to stern: Iowan, United American Lines.

UNION PLANT

Alameda Works

Engine, boiler, hull repairs, drydocking, painting: Raymond, Chas. Christensen. Miscellaneous repairs: Daisy Freeman. New propeller: Claremont, Solano, Mayfair. Miscellaneous repairs, drydocking, painting: Vanguard, Ramon, Cypress, Mojave, Trinidad (also repairs to boiler seatings).

Potrero Works

Miscellaneous repairs: Walkure, Edgar Luckenbach, Utility, Flutco, Nanking, Coquille River, Lurline, Victoria De Larrinaga (also repairs to chocks), La Purisima, Frank G. Drum, Spectator. Miscellaneous repairs, drydocking, painting: Tascalusa, Tatoosh, Hollywood, Sinaloa (also hull damage repairs), Eviken. Making and installing deck lashings: Canada. Retubing boilers, repairs to blower engine: Buckeye State. Hull damage repairs, drydocking, painting: Rose City. Engine, boiler, hull repairs, drydocking, painting: Manoa. Remetalling bearings: Honduras. Repairs to cargo pump: Olinda. Repairs to steering gear: Pomona. Engine, boiler, hull repairs: Italian cruiser Libia. Alterations to propeller: Sylvan Arrow.

LOS ANGELES SHIPBUILDING & DRYDOCK COMPANY, SAN PEDRO

Drydocking, cleaning, painting: Chase No. 323, R-7, Mervine No. 322, R-4, Hull No. 330, Summer No. 333, R-3, R-5, R-8, Farenholt No. 332, MacDonough No. 331, H-6 H-8, H-5, H-7. Repairs to anchor windlass and refrigerating system: Sierra. Docking, painting, tailshaft, stern tube, minor repairs: Whittier. Minor repairs: Pacific, Samson, Daisy Putnam, Protector, Catherine C. Sudden, Humanity, Pacific, Edna (on main engine), Robin Adair. Boiler repairs: Cold Harbor. Generator repairs, Willhilo. Minor welding job, cargo door: Yale. Docking, painting, new propeller: Henrietta. Condenser and turbine repairs: K. I. Luckenbach. Docking, painting, propeller, stern tube, boiler repairs: Springfield. Emergency repairs to hull: Thomas Crowley.

MERCHANT SHIPBUILDING CORPORATION, CHESTER, PENNSYLVANIA

Conversion from colliers to freighters: Franklin, Fairmont, United American Lines.

MOORE SHIPBUILDING COMPANY, OAKLAND

Drydocking, cleaning, painting, hull repairs: General McDowell, La Merced, Northland. Drydocking, cleaning, painting, engine repairs: Edward T. Jeffrey, Mayfair. Drydocking, cleaning, painting: Asbury Park (also wheel work). Haida, Wellington, Catherine Sudden, Rotarian (deck repairs), Seaward. Deck repairs: West Inslip, W. P. Barge No. 2-G, S. J. Luckenbach. Engine repairs: Santa Rita, Munaries, Ensley City, Newport, Matsonia, Oriental, Manukai, Buford, Lightship Madrona. New propeller blades: Sebree. Drydocking, painting, cleaning, hull, engine repairs: Venezuela, Royal Arrow. New propeller, Shabonee.

NAVY YARD, PUGET SOUND

Docking, miscellaneous repairs: Ballard, Laub, McLanahan, Shubrick, Greene, Philip, Nitro, Coal barge No. 467, 100-ton Crane, Iroquois, Subchasers No. 301, 295. Docking and minor repairs: Sinclair, Keystone State. Miscellaneous repairs: Swallow, John Francis Burnes, Wickes, Evans, Buchanan, Aaron Ward, Zeilin. Repairs to cable machinery: Burnside. Miscellaneous repairs incident to operation as district craft: Eagle No. 57, Pawtucket, Sotoyomo, Mahopac, Tatnuck. Care and preservation: Oregon, Seattle, Missoula, Charlotte, S. C. No. 310.

TODD DRY DOCKS, INC., SEATTLE

Rudder repairs: Edmore. Docking, cleaning, painting, miscellaneous repairs: West Ison, Durand. Miscellaneous repairs: Sam'l Ringgold, Talthybius, Washington, Burrard, President. Voyage repairs: Colusa. Survey and temporary repairs: Lubrico. Miscellaneous betterments: Wenatchee. Miscellaneous repairs and betterments, also new accommodations in steerage quarters: Keystone State. Survey and hull repairs: Admiral Watson. Hull repairs: Arizonan. Conversion into ferry: Whatcom. Cleaning, painting: Washtucna, Restorer, Pico, Kennecott, Petroleum II, Forest T. Crosby. Repairs to elevator: Bailey Gatzert. Repairs to main feed line: Mexican.

WINSLOW MARINE RAILWAY & SHIPBUILDING CO., INC. SEATTLE

Engine and oil burner repairs: Anyox. Drydocking, cleaning, painting: Russell Haviside (also minor plank repairs), Bainbridge (also hull repairs), Montreccio (also unshipping rudder), Meriden, Nottingham (also overhauling and replacing 16 strakes both sides). Drydocking, engine repairs: Griffdu, Griffco, Fulton.

The Greatest Fleet

When the new 20,300 deadweight ton tanker Wm. Rockefeller was delivered to the Standard Oil Company of New Jersey by the Newport News Shipbuilding & Drydock Company in November, the Standard of New Jersey's great building program came to an end. It now has 66 seagoing vessels of 641,259 deadweight tons, the largest privately-owned fleet under the American flag and the largest single tanker fleet in the world. On the Pacific Coast the Standard Oil Company of California, with 41 vessels of 165,000 deadweight tons, leads privately-owned shipping. Its building program is not complete, however, two vessels of 15,000 deadweight tons, which are included in the total, remaining to be delivered.

The Wm. Rockefeller and sister, the John D. Archbold, are the largest tankers of the world.

The First Tanker

In this connection the following

item from the Chester Compass, published by the Merchant Shipbuilding Corporation, will be of interest:

M. R. MacDowell was in charge of building the first steamer in the United States to carry oil in bulk. This steamer was built at the John Roach Yard about thirty-five years ago. She was owned by the Standard Oil Company, and was named the Standard. Her engines and boilers have been removed, but she is still in use as a barge.

He also built for the same company barges No. 57 and No. 58, some thirty-two years ago, both of which are still in commission.

Oil Carriers Feared

About the same time that barges No. 57 and No. 58 were built, he also made very extensive repairs to the steamer Maverick, which was built in Baltimore and found to be leaking very badly on her maiden trip from Point Breeze to Boston. Insurance companies in those days would not permit a vessel to be tied up at the wharf that had carried oil; therefore, it was necessary for repairs to be made in midstream. After this work was done, to Mr. MacDowell's satisfaction, he accompanied her to Point Breeze, now known as the Atlantic Refining Company, where she received a full cargo; and from there he made the trip to the Maverick Oil Works, in Boston, without a mishap of any kind, delivering her load to the entire satisfaction of all concerned.

About a year after this, when the Roach firm lost the contract for two other barges, Mr. Lewis Nixon, of Elizabethport, New Jersey, being the lowest bidder, the Standard people requested Mr. Roach to permit Mr. MacDowell to spend as much time as possible in the Elizabethport yard to look after the construction of these two barges, both of which were built under his supervision with success.

Some Early Difficulties

A few years later, when Mr. Roach was building the A, B, C, D of the navy, having trouble with the government and being forced through their treatment to make an assignment, Mr. MacDowell accepted the superintendency of the South Chicago Shipyard of Chicago, Illinois. While there he was requested by the Standard Oil Company to make a trip to Buffalo, New York, where barge No. 81 was being built for them and which had been delayed several weeks due to their being unable to make her tight. Mr. MacDowell enlightened them on many subjects, and helped them to get through the difficulty.

After severing his connections with the Harlan & Hollingsworth Yard, which position he held for fourteen years, as superintendent, he has been inspecting the building of vessels for various companies, namely, the Standard Oil Company, Texas Oil Company, Gulf Refining Company, and several others.

Oil Tanker Increase

Only 55 steam tankers, totaling 201,000 gross tons, were flying the American flag in 1914; seven years later there were 356 oil carriers under American registry, with a tonnage ten times that in 1914, according to a table compiled by the bureau of navigation and published in Commerce Reports. The United States now has 53 per cent more tanker tonnage than the United Kingdom. American-flag tankers have accounted for 76 per cent of the total world increase of such tonnage since 1914.

The rapid development of our fleet of tank ships is the story of our increasing dependence upon Mexico for crude oil; in 1914 the United States imported 3,100,000 barrels of oil; in 1920, 105,600,000 barrels. After the outbreak of the war many tankers owned by American capital but operated under foreign flags for reasons of economy were transferred to American registry, 37 such tankers, aggregating 182,000 gross tons, being so transferred in 1915—most of them from Germany.

Statistics of Tonnage

The comparative amounts of merchant steam and gas tanker tonnage accredited to leading countries on June 30 for the years 1914, 1918, 1920 and 1921, are shown in the following table:

Merchant Steam and Gas Tanker Tonnage of Principal Countries on June 30

	1914	1918	1920	1921
United States	201,160	844,691	1,362,964	2,121,863
United Kingdom	819,993	1,352,453	1,224,791	1,398,187
Norway	4,728	80,308	107,484	130,864
Holland	83,294	79,388	93,863	115,032
France	11,232	19,054	21,311	47,696
Germany	204,849	48,694	32,059	11,425
Other	106,694	71,579	87,049	145,099
Totals	1,431,950	2,496,167	2,929,521	3,970,166

In addition to the steam and gas tankers, there are in the oil-carrying service 91 sailing and barge vessels of 139,000 gross tons, 105,000 tons of which belong to the United States, and approximately 160,000 tons of navy vessels, 62,000 tons of which belong to the United States.

The essential fact in the oil situation is that the present and future sources of supply outside the United States, which is depending to an increasing extent upon other countries, are all distant overseas from the centers of consumption—for example, Mexico, Persia, the Dutch East Indies, etc.—which means, from the shipping viewpoint, more tankers. Furthermore, the rapid adoption of oil-burning ships (364 vessels, totaling 1,300,000 gross tons in 1914, now 2536 ships of 12,800,000 tons) makes necessary the employment of much tanker tonnage in supplying bunker stations. While many tankers are idle at the present time, any large increase in the world consumption of oil will call for the services of all available tonnage that can carry oil in bulk.

Deaths

Alexander F. Morrison, of San Francisco, a director of the Matson Navigation Company and other large corporations, in Singapore November 13.

Howard Carleton Holmes, civil and consulting engineer and designer of many drydocks, in San Francisco October 30.

John McAteer, president of the McAteer Shipbuilding Company, in Seattle October 24.

Gardiner C. Deering, the oldest active shipbuilder in the United States, in Bath, Maine, October 24 at the age of 88.

James Cant, superintendent of the Wallace Shipbuilding and Drydock Company, Vancouver, in Vancouver October 24.

Martin C. Erismann, formerly naval architect of the Long Beach Shipbuilding Company, in New York City.

Ernest E. Penn, for several years with the Canadian Pacific Railway offices in Portland, San Francisco and Seattle, in Berkeley, California, November 14.

J. F. Lawless, formerly general auditor of the Pacific Coast Company and manager of the Pacific Coast Steamship Company, in Bournemouth, England.

Marine Insurance

CHARLES F. HOWELL, EASTERN CONTRIBUTING EDITOR

The Hague Rules

One of the most interesting subjects before marine underwriters during the past month has been the Hague Rules, 1921, which our English confreres are anxious to have generally adopted. These are the findings made at the Hague conference of the International Law Association, and are heralded as the dawning of the international bill of lading. Several underwriting bodies in Great Britain have passed resolutions favoring an adoption of the rules, and it is said that shipping interests on the other side are cordial toward them. But American marine underwriters are not particularly impressed with the Hague output. Several meetings of the American Institute have been held at which the rules came up for discussion. It was the consensus of opinion that, although they are advantageous in that they fix the carrier's minimum liability at £100 instead of the present figure of $100, and have other minor features of interest, still they are but voluntary agreements and never could safeguard the shipper and the underwriter against encroachments of the carriers as the Harter Act would do if the pending amendments to the latter were adopted. And right there is where the hitch comes in. Will the Harter Act ever be amended? For the past ten or fifteen years there have been repeated attempts to have this done, but they have always proved abortive. This year, however, better progress to this end has been made than ever before; and our underwriters feel that rather than abandon so hopeful a case and adopt the Hague Rules, which would mean repealing important portions of the Harter Act, it would be wiser to wait a little longer, now that they have waited so long.

Policies or Certificates

As predicted in these columns, no action has been taken, or is likely to be taken, by American marine insurance interests in altering our time-honored use of marine certificates as convenient substitutes for the original policies. The startling decision of Justice McCardle, of the King's Bench Division of the English High Court of Justice, to the effect that such certificates could not be legally held as full substitutes for the policy, has not materially disturbed the employment of the former. They are in as much demand as ever, and are being used right along. To do away with these convenient instruments would involve much work and delay in settlements. It has been found advisable, however, to make a short and safe cut through the problem, by including in marine contracts the clause "policies or certificates of insurance." Certain banks and industries have adopted this phraseology, and it appears to be working out to the satisfaction of all.

Copyright Clinedinst, Washington

Charles R. Page, new manager of the Atlantic marine department, Fireman's Fund Insurance Company.

Page Resigns from Syndicates

One of the most sensational pieces of news since our last issue was the announcement of the resignation of Manager Charles R. Page from the American Marine Insurance Syndicates, as of December 31, to accept the management of the Atlantic marine department of the Fireman's Fund and Home Fire & Marine in succession to Messrs. F. H. and C. R. Osborn, resigned. This has been erroneously construed in certain quarters as indicating a growing lack of faith in the future of the syndicates, but no one scouts such an intimation more sincerely than does Mr. Page himself. As a matter of fact, his new duties will keep him in close touch with the development of those bodies and he will spare no effort to show his confidence in their practical advantages.

Neither of the Messrs. Osborn have any definite plans matured; F. H. is looking forward to a rest at his place at Miami, Florida.

Mr. Page was born at San Francisco, May 24, 1878; was educated at St. Paul's School, Concord, New Hampshire, and at Yale University, from which he was graduated in the class of 1900. He passed twenty years in the service of the Fireman's Fund, specializing in the loss and executive side of the business, and only left that company when President Wilson appointed him to the Shipping Board in 1917. He resigned that connection in 1919 to accept the treasurership of the Atlantic, Gulf & West Indies Steamship Line, which was the holding company for five important steamship lines. In the spring of 1920 he became vice-president of the Clyde and the Mallory lines in charge of operations, and it was that summer that he resigned to take the management of Syndicate A, then in process of organization. With the transfer of the latter's organization and business to its successor corporation, the United States Salvage Association, Inc., his most important service came to a successful conclusion. He has made many friends and admirers in the East, and his work with the Fireman's Fund will be followed with the best wishes of all.

Salvage Association Launched

At a special meeting of the board of managers of the American Marine Insurance Syndicates, it was recently voted to turn over the organization and business of Syndicate A to its successor, the United States Salvage Association, Inc. The entire capital stock of the latter is held by the subscribers of Syndicate A. It is a non-profit making organization, designed to provide for the American shipping trade a service that shall be the counterpart of that furnished British shippers by the Salvage Association of London. It will have agents in all parts of the world and, in fact, through its arrangement with Syndicate A, will at once be provided with carefully selected agents at many of the leading ports. It takes over the present organization of the syndicate, which has established its own offices in Boston, Philadelphia, Baltimore, Norfolk, Savannah, New Orleans, Galveston and San Francisco, with its principal operating office at New York. The surveying staff of the association will be headed by W. C. Foley, as chief surveyor, and J. A. Wilson, as deputy chief surveyor. It commenced operations on November 1, on which date Syndicate A withdrew. The officers elected at the organization meeting were: Benjamin Rush, president; Walter Wood Par-

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

sons, vice-president; Gomer H. Reese, secretary; and Charles R. Page, general manager.

Mail Truck Robbery

Inland marine underwriters received the shock of their lives when five bandits successfully held up a United States postoffice truck in New York City, a short time ago, and got away with five bags of registered mail containing about $1,500,000 of negotiable securities and currency. This rude awakening stressed the hazards surrounding the insurance of valuables sent by registered mail. There is little chance to create a reserve adequate to meet a wholesale loss of this magnitude out of the small premium yield derived from writing bonds at from 3 cents to 5 cents a thousand dollars. The effect of the hold-up of the mail truck is reflected in the suggestion now going the rounds that a considerable differential in rate should be charged on negotiable securities as compared with the less hazardous non-negotiable documents.

Demand Simpler Contract

Widespread interest is being taken in the recent meetings held by the American Institute of Marine Underwriters for the purpose of drafting and adopting a modernized standard form of cargo policy. It is an undisputed fact that merchants and bankers, who are no less interested in the policy than the underwriters themselves, are unable to read and understand the form now in use. Time has apparently sanctified the ancient, obsoletely-worded contract that has come down to us through the centuries, and the decisions of the courts have so barnacled upon and around every comma and period in it that any possible deviation from the precise language of the policy is regarded with horror. As a matter of fact, it is most misleading. There are apparent contradictions all through it, and the trade has no time to explore libraries of legal interpretations to discover the extent of the coverage. The attempt to preserve the sanctity of this venerable document has been the direct cause of the many misunderstandings that have arisen between insurance companies and banks as regards certificates and policies. The adoption in Great Britain of the Marine Insurance Act of 1906, which is in reality a codification of the laws of marine insurance in that country, was evidence of the need for a clarification of the marine contract; and that act has gone far to remove the unintelligibleness of the archaic form and smooth out the misunderstandings general on the other side. It should be of the first importance to our underwriters in rewriting the policy in America. The warehouse clause has a conspicuous place among those that should be made simpler and clearer.

Official Changes

Among the more conspicuous office developments of the last thirty days may be mentioned the following:

Carpinter & Baker, of New York, have been appointed marine managers of the Western Assurance for the United States, the company having again decided to engage in ocean marine after eighteen months' discontinuance of this line. It was natural that it should select Carpinter & Baker to represent these larger interests, as this office has had the inland marine agency of the Western Assurance for more than forty years. The difficulty less experienced underwriters are having in connecting up with desirable companies was well illustrated in the placing of this enterprise; fully a dozen of them were after the Western Assurance, but without success.

R. A. Fulton has resigned as vice-president of Talbot, Bird & Company, Inc., as also from the directorate of the Universal Insurance Company. His future plans have not been announced. He had been the incumbent of his late vice-presidency for five years, prior to which he had been a deputy assistant manager of the group of companies represented by H. K. Fowler. He is a graduate of the Thames & Mersey office, of England, the best school for underwriters in the United Kingdom.

Raymond A. Day has resigned as loss manager for the Shippers' Underwriting Agency, New York, and has been succeeded by James Murphy, of the staff of O'Keefe & Lynch.

British Marine Results in 1920

Official reports of the operations of the British marine insurance companies in 1920 have been all filed, and they show that the results for that year were not as profitable as for the preceding twelve months. The premiums for 1920 amounted to £34,076,598, and the losses for the same period reached £26,020,324, making a ratio of 76.5 as contrasted with one of 68 for 1919. The premium account increased by a comfortable margin, but the loss ratio more than kept pace. The expenses of the 1920 business amounted to 9.2 per cent of the premiums.

C. F. H.

A Bad Year

Pacific Coast business, in the opinion of most underwriters, has made little if any real improvement within the last six months. Aside from the movement of seasonal products there is little export freight offering and what does go forward is at such lower values than obtained a year or two ago that insurance premiums undergo a double shrinkage.

A few underwriters do not join in the general report of slack trade. To such as do not, the tide has definitely turned; they regard the worst of the depression as being over and view the prospects for 1922 with quite a bit of optimism. But many decline to join in this belief. These latter hold that the spurt of July, which appears to have been

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING

F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

unexpectedly general, was merely a temporary gain that has been followed by another slump. On the books of a number of companies July does stand as an isolated peak in a decline that became bad about March and has continued, except for the one revival, ever since. Minor gains are reported for different months by different companies, but that changes for the better have not been general is indicated quite clearly by the fact that one underwriter did a fair volume of business in September, while that month was poor for another firm.

To crown all, losses of the year have been severe. Some total losses of heavily-laden steel steamships, notable among which were two Japanese vessels in the North Pacific, have been accompanied by a host of smaller disasters, which in the aggregate have run to large amounts. The year has been decidedly bad.

A U. S. S. B. Company

Reports from the East say that the Shipping Board has under consideration the organization of an insurance company to write policies on cargo transported in government vessels. "At the present time," it is said, "the insurance companies rate virtually all of the Shipping Board vessels as Class B and Class C, forcing the shipper to pay a higher charge for insurance than on the older established lines. In fixing the rates on cargoes, the marine insurance companies take into consideration the losses incurred by shippers on the vessels of the various steamship lines over a long period of years. The premium bears a direct relation to the results of operation." Commissioner Meyer Lissner, in charge of insurance for the board, has been studying the situation.

The following letter has been addressed by S. D. McComb, manager, Marine Office of America, to Captain Charles A. McAllister, vice-president of the American Bureau of Shipping:

Both in the daily press and in many magazines, articles have appeared expressing the belief that users of Shipping Board boats have been penalized in their insurance rates, and that there is a tendency on the part of marine insurance companies to charge higher rates on Shipping Board boats as such. A careful investigation of this confirms my belief that there is absolutely no foundations for such a statement. I know of no marine insurance company which does such a thing. In any given trade the rates are fixed for different lines. If there is a line of steamers which operates good boats, is under competent management, with reliable officers, and has a record showing few claims year in and year out, that line will be given a low rate in accordance with its record. Another line may be operating between the same points, the management and personnel not so good, have a record of having frequent claims, and shippers by that line will be charged accordingly. If some men with no knowledge whatever of the steamship business start a new line, and in the underwriter's opinion the men are incompetent, the probabilities are that their record will be bad, and rates will be fixed on that basis.

It is an unfortunate fact that many operators of Shipping Board boats were incompetent and had a bad record, and rates on these boats are fixed in accordance with the record. The fact that they were Shipping Board boats had nothing whatever to do with the rates. Where Shipping Board boats were in the hands of competent operators, the rates on these boats were exactly the same as on similar boats which the same operators owned themselves. Some of the incompetent operators, with bad records, complain because they were not given the same rates as competent operators who had an honorable record of a year's standing, but there is no basis for a just complaint, as rates are based on results.

How Values Have Dropped

The National City Bank of New York reports the following declines in values of exports: Corn exported in August, 1921, went at 64 cents a bushel against $1.75 in August of last year; wheat, $1.40 per bushel against $2.90; flour $6.60 per barrel against $12.15 in August, 1920; bituminous coal, $4.83 per ton against $10.35; raw cotton, 11.9 cents per pound against 37.5 cents a year ago; pig iron, $26 per ton against $50; steel billets, $27.55 per ton against $61.60; mens' boots and shoes, $2.70 per pair against $5.16; crude mineral oil, 3.5 cents per gallon against 10 cents per gallon a year ago; refined sugar, 4.8 cents per pound against 10.5 cents in August of last year; and pitch pine lumber, $31.40 per M feet against $62.30 one year ago. Meats show a fall, but not so great as that of many other articles named; fresh beef exported having averaged 12.8 cents per pound in August, 1921, against 18 cents in August of last year; and bacon 16 cents per pound against 24 cents one year ago.

Although underwriters are well aware of the decrease in values, they probably will be interested in these precise figures.

Here and There

An appropriation of $45,000 included in the current budget of Tacoma, Washington, for the construction of a fireboat, has been ordered returned to the general fund by the city council. An item of $30,000, inserted in the new budget for the same purpose, the cost of the fireboat being put at $75,000, was stricken out.

* * *

Japanese marine insurance business written during August aggregated yen 719,685,000, as against yen 856,269,000 of July.

* * *

Approximate losses on recent Pacific casualties are: Yamashita Kisen Kaisha steamship Fukui Maru, abandoned in the North Pacific October 27 after a severe hurricane had disabled her, cargo, consisting of 2,000,000 feet of lumber and 1500 tons of wheat, about $350,000, hull placed in Japan; Balfour-Guthrie schooner David Evans, burned off Timor, $40,000 hull; Moore schooner Carrier Dove, ashore on Molokai, $77,000 cargo, no hull; Crowley-Mahoney steam schooner Thomas Crowley, ashore near Point Conception but pulled off, $175,000 hull.

* * *

The Supreme Court of British Columbia has ordered the restoration of the license of Captain William Bradley, master of the C. G. M. M. Canadian Exporter, lost off the Oregon coast a few months ago. His license had been suspended for six months. In his appeal Captain Bradley asserted that he did not know that he was being tried and that he had had no opportunity to defend himself.

* * *

The license of Captain D. G. Cameron, master of the General Petroleum tanker Liebre, has been suspended as a result of the grounding of the vessel on Anacapa Island in February.

* * *

The monthly return of casualties issued by the Liverpool Underwriters' Association, covering ships of more than 500 tons, shows that during August 19 vessels of 52,104 tons were totally lost. Of these there were six British steamers of 23,674 tons, three American steamers of 13,069 tons and four Japanese steamers of 7907 tons. Twelve of these losses were ascribed to strandings, five to fires and explosions, one abandoned, and one missing. This total compares with 16 vessels of 23,943 tons in August last year and 13 vessels of 26,980 tons in August, 1919. There were also reported 363 other casualties. Of these 16 were due to weather damage, 77 to stranding, 81 to collision, and 37 to fire or explosion. The number of steamers which suffered damage to machinery, shafts or propellers was 87.

* * *

Three suits for more than $30,000 in the aggregate were filed in the United States District Court, San Francisco, on November 15 by passengers of the Alaska, lost August 6, against the San Francisco & Portland Steamship Company. More than forty other claims remain to be filed by one attorney, it was said.

The American schooner Carrier Dove, wrecked on the Island of Molokai, Hawaii, November 2, was "lost" twice before, once in September, 1903, on the China coast, and again in February, 1920, during a hurricane that cast her on a reef of Fiji. She was salved both times. No salvage of the latest wreck is possible.

H. S. Bates, Pacific Coast director of Willcox, Peck & Hughes, announces the following changes in the Pacific Coast organization: John G. Johnston, manager fire insurance department, promoted manager; I. Barrett, assistant manager transferred to acquisition department; O. Tinnemann, formerly assistant manager fire department, promoted to manager; J. S. O'Neill, formerly in casualty department, appointed manager of department; G. W. Cortelyou, in charge marine business in Southern California, transferred to marine department, San Francisco; W. R. Hamilton, manager Seattle office, has resigned, and J. F. Beede, formerly in charge of marine department in Seattle, made manager of Seattle office.

About People

Personals

Captain John A. Spillman, general manager of the Globe Shipbuilding and Drydock Company's plant at Fairfield, Baltimore, has been elected president of the company, succeeding Benjamin C. Cooke, who resigned to enter other business. Although Captain Spillman has taken up his new duties, Mr. Cooke will continue to act for some time in an advisory capacity. Captain Spillman is a graduate naval constructor and has had many years' experience. He formerly had supervision over repair work in various yards for the Navy, and during the war was in charge of repair work at Brooklyn Navy Yard. **H. S. Brown,** formerly superintendent at the Globe plant, has been promoted to be works manager. No other changes were made in the staff.

S. W. Atkins has been made personal representative of the Java-China-Japan line, represented in San Francisco by J. D. Spreckels & Bros. Company. He succeeds J. A. Doyer, who has been transferred to Shanghai.

F. C. Devine, formerly freight agent for W. C. Dawson & Company, and Northwest traffic manager for the General Steamship Corporation, has been appointed Seattle agent of the Atlantic-Gulf & Pacific.

F. G. Phillips, formerly controller of the Los Angeles Shipbuilding & Drydock Company, has opened an office as certified public accountant in San Francisco.

Vance Thompson, editor of the Coast Seamen's Journal, the organ of the Sailors' Union of the Pacific, has been succeeded by Selim A. Silva, formerly business manager. Mr. Thompson had been accused by Andrew Furuseth of bolshevism.

Chandler P. Anderson of New York has been appointed by President Harding as an arbitrator to adjust Norwegian claims against the United States, which arose out of the requisition of vessels building at the time of the entrance of the United States into the war. **W. C. Bennif** of Indiana will represent the Shipping Board before the commission.

A. B. Natland, former manager of the Seattle branch, Atlantic-Gulf & Pacific, has resigned.

E. L. Fairbanks has been appointed Seattle manager of the Northwest Shipping Company of Portland, with offices in the Colman building.

A. H. Bryant, formerly in charge of the Portland office of the American Bureau of Shipping, has been made assistant to Captain W. C. McNaught, surveyor of the Board of Marine Underwriters of San Francisco.

S. L. Kreider was re-elected president of the World Traders of Los Angeles at the annual election in November. Other officials are: H. C. Mead, vice-president; E. A. Mills, secretary; J. Forsyth, treasurer; R. D. Kaufman, assistant secretary-treasurer; directors, Marius de Brabant, Maynard McFie, C. S. Beesemyer, C. H. Matson and Leo Chandler.

Captain J. S. Gibson, president of the International Stevedoring Company of Seattle, is one of fourteen regional directors of the emergency relief program of the national unemployment conference. He was appointed by Secretary of Commerce Hoover.

A. J. Mickley has been appointed assistant manager of the Puget Sound branch of the Northwest Shipping Company. E. L. Fairbanks is manager.

Edgar McKee has been appointed president of the Los Angeles Harbor Commission, and has been succeeded as a member of the commission by O. B. Kibele.

Frank W. Relyea, formerly traffic manager of Livermore, Dearborn & Company, has been appointed to succeed H. H. Ebey as district director, Shipping Board, San Francisco.

William B. Hamilton, former special deputy collector of customs, San Francisco, is now collector, succeeding J. O. Davis. Lawrence J. Flaherty is surveyor of customs, succeeding John S. Irby.

A. E. Carter and Charles T. Howard of Oakland were elected president and secretary of the Pacific Coast Association of Port Authorities at the recent annual convention. The next convention will be held in Oakland.

Captain Philip Svendsen, San Francisco port captain of the South American Pacific (Lindvig) Line prior to the withdrawal of the line from business, has returned as port captain of the Latin-American Line, the new Lindvig enterprise.

E. E. Remsberg, brother-in-law of President Harding, has been appointed Shipping Board agent at Los Angeles.

Sir Bertram Hayes, commander of the White Star liner Olympic, will take command of the Majestic when she is commissioned in the spring of 1922. Captain A. E. S. Hambleton of the Adriatic will succeed Sir Bertram on the Olympic.

A. A. Moran, of the San Francisco office of the Robert Dollar Company, has been made general traffic manager, with headquarters in New York. Traffic managers will be appointed for New York, San Francisco, Vancouver and Shanghai.

Harry Hill, president of Hill, Hubbell & Company and of the Bird-Archer Company of California, died at his home in San Francisco September 29, after an illness of four months. Mr. Hill was born in Saginaw, Michigan, in 1875, but had been a resident of San Francisco since 1900.

His first business connections in San Francisco were with the Progreso Steamship Company and the Saginaw Steel Steamship Company, most of the vessels of which were Lake freighters that were taken to the Pacific through the Welland Canal. Following upon his connection with these corporations as a director, Mr. Hill became president of the Santa Maria Steamship Company. In the ownership and operation of these vessels Mr. Hill was associated with James Jerome, and the two were among the pioneers of the Pacific Coast colliery trade and, when oil began to supplant coal, led in converting colliers to tankers.

In 1904 the Bird-Archer Company of California was formed and Hill, Hubbell & Company followed in 1907.

Prior to engaging in business Mr. Hill was first lieutenant in a Michigan volunteer regiment during the Spanish-American War.

He is survived by his widow, Mrs. Ruth Hill, and by two daughters, Areline and Juanita.

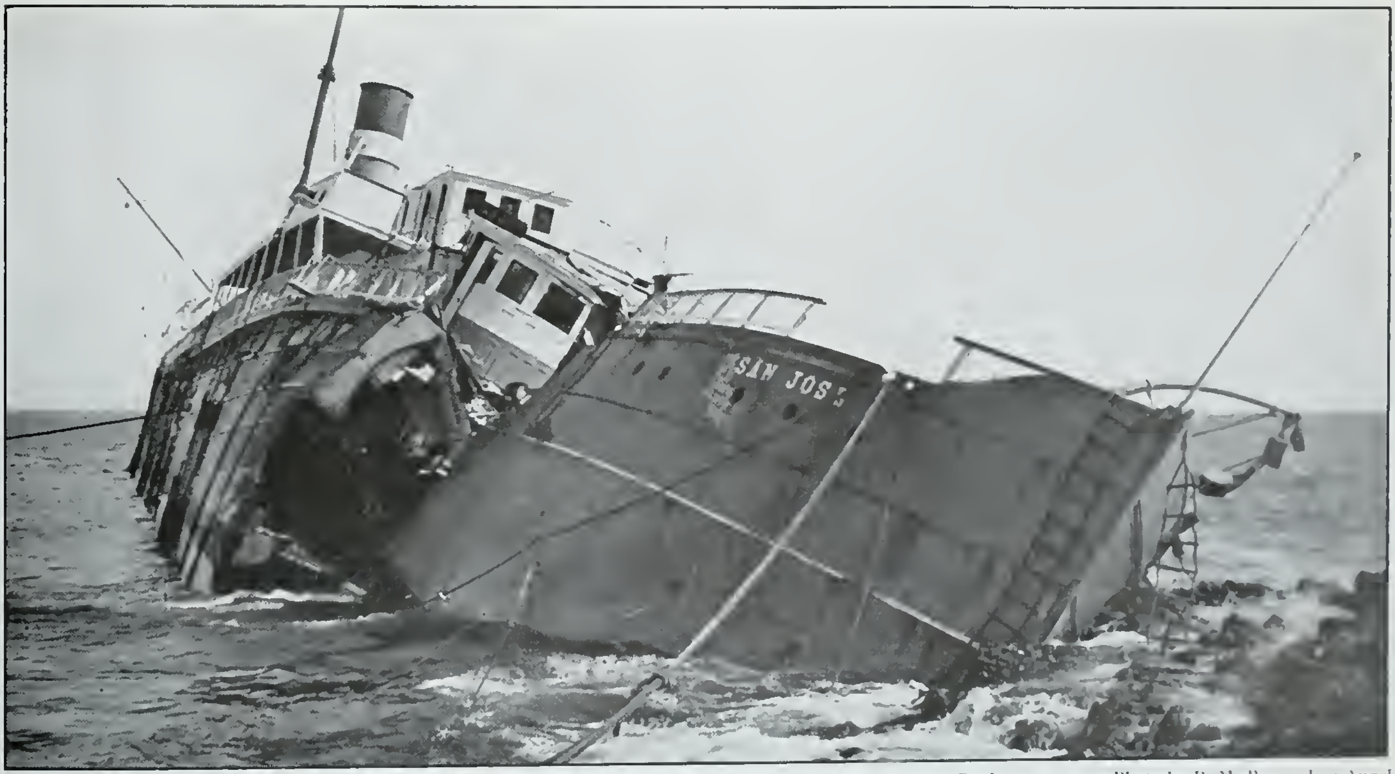
R. H. Hubbell has succeeded Mr. Hill as president of the Bird-Archer Company of California and Hill, Hubbell & Company.

John T. Byrne, secretary of Talbot, Bird & Company, New York, has been elected vice-president of the company. He retains his position as secretary.

Henry Dearborn, president of the American-Hawaiian Steamship Company, sailed for Europe November 14 on the Aquitania. He will spend several months in the United Kingdom and on the Continent in connection with the Pacific Coast-European service that the American-Hawaiian Steamship Company recently inaugurated. This service offers direct fortnightly sailings from the principal United States ports to Liverpool, Glasgow, Hamburg, Antwerp, and Havre.

Lieutenant F. X. Maher, C. C., U. S. N., has been detached from service on U. S. S. Melville, repair ship for destroyers at San Diego, and assigned to duty at the plant of the Los Angeles Shipbuilding & Drydock Company to supervise the drydocking of destroyers, submarines and fleet auxiliaries, which are being sent there for hull cleaning, painting and minor repairs.

Lieutenant M. B. Pollock, C. C., U. S. N., who has supervised the navy work at the Los Angeles plant for some months, has been detached and ordered to the U. S. S. Vestal, repair ship to the Pacific fleet, stationed in Los Angeles harbor.



Wreck of the Pacific Mail Steamship San Jose on San Roque Reef

Photo by R. M. Byrne, Los Angeles

DIESEL SHIP MANEUVERING

By ALEXANDER McNAB, M.I.M.E.

THE great interest shown in the Diesel electric drive by marine engineers throughout the world is evident by the many papers read on this subject by the members of the various engineering societies and also by the many articles which have appeared in the technical press from time to time.

It is generally admitted that the electric drive offers many attractive features, especially when applied to vessels of war. Such features, however, do not seem to attract the average commercial shipowner due to the fact that he generally regards the electric drive as something beyond the ability of the average crew to operate and maintain. It is also recognized that the electric drive cannot be compared to the direct Diesel drive when economy is to be considered.

The commercial success of the direct Diesel driven ship is evident by the success already attained, also by the amount of new tonnage under construction in Europe which will be fitted with this method of propulsion. Therefore, if the shipowner hopes to compete in the world's carrying trade, economy in the operation of the propelling unit must be his first consideration. The greatest testimony to the Diesel engine is the number of motorships in successful operation today and the fact that voyages are undertaken and marine conditions accepted without any trepidation because of the machinery installed. It is generally recognized that on long non-stop runs the Diesel engine has a reliability equal to that of the average steam reciprocating engine, the fuel consumption being about one-third the quantity of oil fuel. The maneuvering ability of the Diesel engine cannot be compared to that of the steam reciprocating engine and to overcome this the Diesel electric drive was first introduced.

To obtain that maneuvering ability so much desired, it should have been our aim to further simplify a known reliable and economical propelling unit, the Diesel engine, instead of adding further complicated electric mechanism which naturally destroys that economy so much desired and adds materially to maintenance and operative costs.

The first engine brought out by Dr. Rudolf Diesel was non-reversible. It was therefore natural that the marine engineer went to work to make this type of engine reversible before it could be successfully applied to ship propulsion. It may seem preposterous, at this late date, to state that the Diesel engine need never have been made reversible to accomplish the most exacting requirements necessary in ship maneuvering. This point I will refer to later.

The marine engineer has always devoted himself to that branch of design and construction pertaining to the propelling unit and the necessary auxiliaries which go to make up the engineering equipment of the modern ship, the hull design being left entirely to the naval architect; it would appear, however, from the success which has attended a recent invention that the marine engineer should have paid more attention to the ordinary ship's rudder which with slight alteration is capable of maneuvering a self-propelled ship in such a manner as never before equalled in the history of navigation. It is a somewhat remarkable fact that, with all the far-reaching developments in the construction and design of the modern ship, the design of the ship's rudder is practically the same today as it was in the days of the ancients, it also being thought today, as in the days of the ancients, that the rudder's only function was that of the steering of a ship.

The ingenious apparatus which brought the subject matter to the author's notice is the form of maneuvering and reversing rudders evolved by Mr. J. G. A. Kitchen. Already numerous articles have been published in the press and technical magazines of this country and abroad in connection with this subject; also, due to the fact that a large number of installations have successfully been made, it can hardly be expected that much of this material given here is new.

The essential parts of the Kitchen rudders consist of two curved deflectors which partly enclose the propeller; both deflectors are pivoted on top and bottom on common centers. By suitable mechanism the deflectors or rudders are made to turn together in the same direction or equally in opposite directions.

With these rudders the ship can be steered in the ordinary manner by carrying helm, excepting, however, that the power required for steering can be greatly decreased, this due to its being found that 25 degrees of helm is sufficient for all practical purposes. It has been practically demonstrated that the actual steering ability of these rudders in the ahead or astern direction is much greater than that of the usual form of rudder. It is therefore evident, by the many installations of Kitchen's rudders already made, that to also gain ship speed, control and maneuvering ability the steering quality of the rudder has not been sacrificed but greatly enhanced.

It is interesting to record the maneuvering ability of such Diesel-engined ships, already fitted with the Kitchen rudders, as compared with the maneuvering ability of the Diesel electric drive.

Any shipowner giving consideration to this new form of rudder will realize the saving in first cost and simplification of the Diesel propelling unit and auxiliaries; it should also appeal to engineers, as well as the saving in power and fuel by the increased efficiency of propulsion.

There is no reason why the rudders should not be fitted to the larger type of ocean freighter, as the many installations already made have proved eminently satisfactory, this due to the hard work and ingenuity which has already been done in bringing the rudders and operating gear up to its present state of efficiency.

Diesel Electric Drive With Ordinary Rudder	**Diesel Direct Drive With Kitchen Reversing Rudder**
1. Maneuvering control from bridge without reference to engine room.	1. Maneuvering control from bridge without reference to engine room.
2. Engine (non-reversible) runs in one direction only.	2. Engine (non-reversible) runs in one direction only.
3. Flexibility of ahead speed ranging from zero to maximum, as desired.	3. Flexibility of ahead speed ranging from zero to maximum, as desired.
4. Flexibility of astern speed same as above.	4. Flexibility of astern speed same as above.
5. From full ahead, ship **cannot** be brought to dead stop in less than 6 to 7 times her own length.	5. From full ahead, single screw ship can be brought to dead stop in **ship's own length.**
6. Single screw ship **cannot** repeat this maneuver.	6. Single screw ship can be rotated as if on a pivot on own axis.

THE PRELIMINARY TO A PROMISE

An Ardent Fisherman Projects Some Good Fish Stories

By H. A. B. SNEVE
Of the Weeks-Howe-Emerson Company

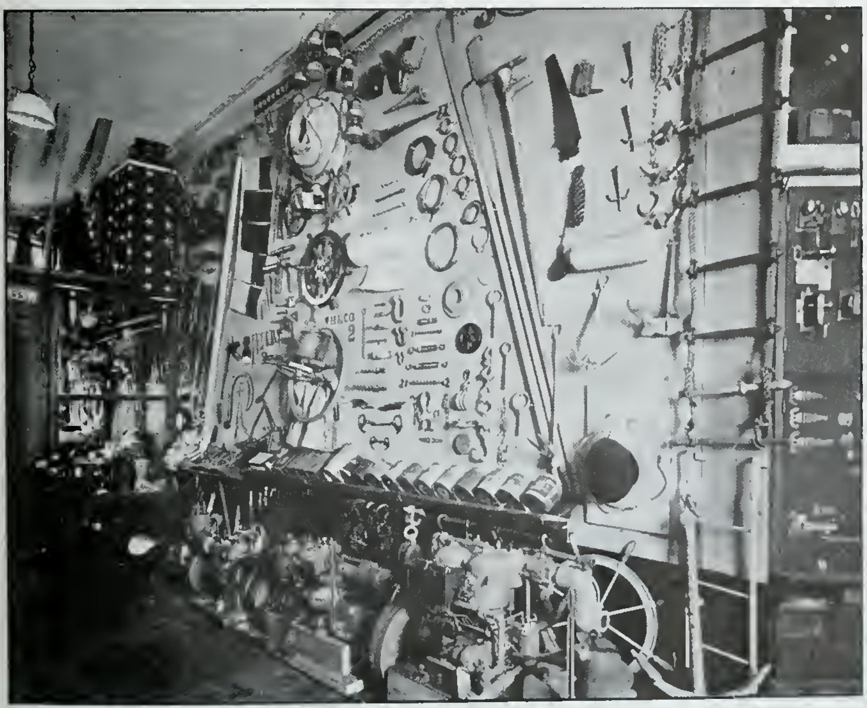
ON a recent visit to the Pacific Marine Review office it was insisted by "The Powers that Are," there, that the ideal man to send them interesting marine and commercial fishing news, as well as photographs taken along the path of travel along this coast and Hawaii, should be the traveling salesman selling ship chandlery, flags and fishing supplies to the trade at every port large and small between San Diego in the south to Vancouver and Seattle in the north, and the Hawaiian Islands in the west; and as that has been my lot since the war, their choice fell on me.

One corner of a window display showing ship chandlery, nets and twine

I have promised to write and "kodak as I go," both while at work and play. The most thrilling of the latter so far has been surf-board riding at Waikiki and fishing for the big ones out of Hilo, which sport was only equaled by a 40-mile ride I took via pack and saddle horse on the government trail up the St. Joe River on a week-end while working Coeur d'Alene Lake ports in Idaho last summer. The trout were the biggest and the hungriest, to say nothing of gamiest, I have ever tackled, second only to the fighting Uluas in the Hawaiian waters.

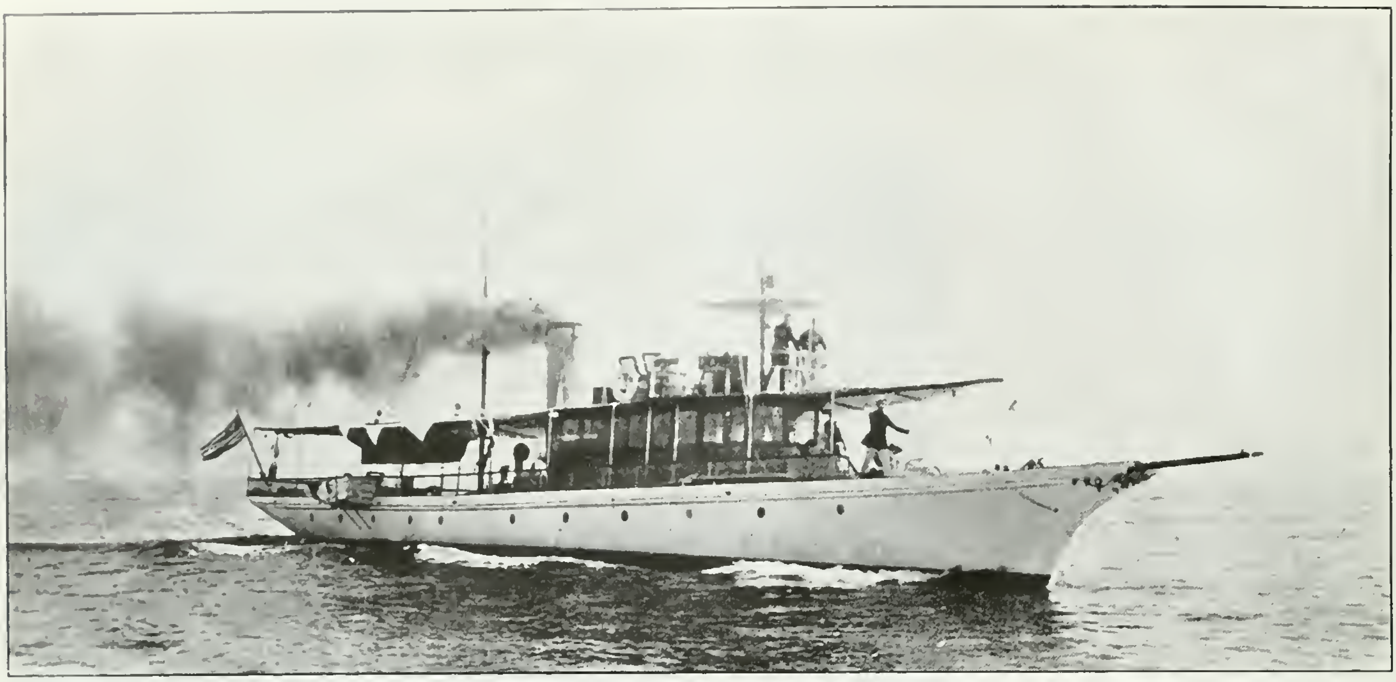
As this preliminary "leaves me" at the home port, my kodak offering in this issue will be of the work I enjoy most next to selling anchors and fish hooks—namely, arranging our goods in window display fashion—of which work my boss always has plenty saved up for me while sojourning in the home port at 90 Market Street.

Here endeth the preliminary—much is left unsaid.



A well arranged sample board

Corner of display window showing sportsman's fishing tackle and an arrangement of national and house flags



The steam cruising yacht Louise

THE STEAM YACHT LOUISE

ON October 2 the steam yacht Louise, owned by E. D. Burge of Newport, California, arrived in San Francisco thirty-four hours out of Newport on a special mission in connection with the moving picture industry of Southern California. A representative of Pacific Marine Review called on Captain William Reid, and gleaned the following particulars.

The Louise is a wooden vessel, 102 feet long over-all, 84 feet long on the water line, 14 feet extreme breadth, with a molded depth of 8 feet 2 inches and a draft of 4 feet 4 inches. She was designed by N. G. Herreshoff, probably the most famous yacht designer in the world, and built by the Herreshoff Manufacturing Company at Bristol, Rhode Island, in 1893.

She is powered with a triple expansion steam engine 7 inches by 11¼ inches by 17½ inches cylinder diameters and 10-inch stroke, and has one watertube boiler installed by the Seabury Company in 1910. The Louise has a net tonnage of 24 and a gross registered tonnage of 49. Her engines develop 340 horsepower, which drives the hull at a cruising speed of 12 knots. By forcing the boilers and engines she can be driven through the water for a short period at 15 knots. The fuel oil tanks have sufficient capacity for a 2000-mile steaming radius.

There are accommodations for seven of the crew and ten to twelve passengers. She is equipped with wireless, with specially built lifeboats, and has considerable capacity in refrigeration equipment for taking care of perishable stores for the commissary.

Recently in a Southern California shipyard the Louise was completely overhauled, replanked and refitted. Her owner has arranged an extended itinerary for cruising in Pacific Coast waters during the next two or three years. His plans include practically the entire West Coast of the two Americas.

The electrically propelled yachts New Era and Dawn on the Hudson River

A NEW ERA IN YACHTING

A FEW years back William T. Donnelly, consulting engineer of New York City, prominently known for his work in the design and construction of floating drydocks, conceived the idea of working small vessels in convoy, the leading vessel having an electric power plant which distributed power by cable to motors in the following vessels. Mr. Donnelly has now built and equipped two such boats for his own use; one, the New Era, being used as a power plant and workshop; the other, the Dawn, being supplied from the New Era with power and being fitted up as a floating home for Mr. Donnellys family. The family have had several extended cruises running as far south from New York as the Bermudas with great comfort and comparatively little expense. Mr. Donnelly recommends his idea to all those who love the life of the water.

DIESEL POWER FOR FISH BOATS

A MARKED degree of interest has been noted lately among fishermen of the San Francisco bay district in the application of crude oil motors to fishing craft. Several new installations have been made and quite a number of conversions from steam and from distillate engines to Diesel or semi-Diesel engines burning the heavier grades of oil fuel.

Notable among the conversion jobs is that of the Paladini fish carrier Three Sisters. This boat, 59 feet 10 inches over all length by 14 feet beam, was formerly operated by a distillate engine of 110 H. P. Her owner determined on making a change and ordered the replacing of this engine with a 100 H. P. 4-cylinder full Diesel engine as manufactured by the Enterprise Engine Company of San Francisco. She was taken to the boatbuilding yard of William Cryer on the Oakland estuary, and the installation of the engine and complete overhaul and refitting of the boat was finished there about three months ago.

This boat has now been running continuously for over ten weeks, a large part of that time for twenty-three hours during the day. She makes better time than formerly and is now considered one of the fastest boats in the local fishing fleet. With her distillate power plant the cost of operation for fuel was $2.56 per hour. With the present Diesel engine running on 14 degree gravity of fuel oil the cost is 24½ cents per hour. This saving alone amounts to over $8000 per year, and the saving in lubricating oil also amounts to considerable, so that the owner confidently expects his boat to pay for itself in a very short time.

The writer was told by a marine engineer, who happened to be present when the cylinders of this engine were uncovered for inspection after seven weeks' continuous running in sea service, that the surfaces and cylinder walls and the valve seats were as clean and as perfect as if they had just come off the grinder. The engine during these seven weeks had been running on fuel oil of 17 plus degrees Baume, using 27-degree fuel for a few moments on starting and before stopping, the 17-degree fuel being heated by the Enterprise system before introduction into the cylinders. ,

Another notable conversion job is that on the Osborn and Bornholdt tug Rover. The Rover was formerly operated by a steam plant and used as a general purpose tug on San Francisco Bay and the Sacramento River. Her steam plant is being replaced also with a 100 H. P. Enterprise Diesel engine. This boat is also being remodeled at Cryer's yard, and the owners are sparing neither time nor expense in their effort to make her the best towboat of her class on the bay.

She is 63 feet over-all length and 15 feet beam. Her propeller is 54 inches in diameter, 4-blade, and at full speed turns 320 revolutions, driving the hull at 10 miles per hour. The Rover will certainly be a very economical towboat, and many of the owners and operators of commercial craft on San Francisco Bay will be watching her operation with great interest.

Photo by Moulin, San Francisco

The boats Three Sisters and Rover pulled out at William Cryer's yard, Oakland, for overhauling and equipment with Enterprise Diesel engines

An Interesting Salvage

WHEN last spring the old American frigate Granite State, the keel of which was laid in 1812, was burned as she lay tied up to the east bank of the Hudson off Ninety-seventh street, New York City, officers of the United States Navy believed they were confronted with considerable expense for removing the charred ruin.

But the copper sheathing on her bottom and copper alloy spikes in the hull made it worth while for a firm of wreckers to purchase her, on the marine terms "as is and where is," and to go to the heavy expense of floating the hull in order to tow it to a point where the metal can be reclaimed.

The Granite State was the oldest warship in the American Navy. The copper sheathing on the bottom of the ship, which was applied at Portsmouth, New Hampshire, in 1846, was found to be in an excellent state of preservation.

A corps of thirty men, including two drivers, are at present at work closing the ship's hatches and completing the work of floating the hull. What remains of the Granite State will then be towed to Cow Boy, near Bayside, Long Island, where the hulk will be beached and the destruction of the vessel by fire completed. The ashes will then be washed and the metal reclaimed.

The Granite State did duty in four wars, but, as far as is known, a gun never was fired from her decks at a hostile ship. The ship was commissioned in 1846 as the New Hampshire, with a crew of 1000 men.

In 1861 she was sent to Port Royal and remained there during the Civil War, serving as a supply ship. In 1872 the Granite State was towed to New London, where it was used as a receiving ship. Newport, Rhode Island, was its next location, where in 1876 she went into service as a training ship for naval apprentices.

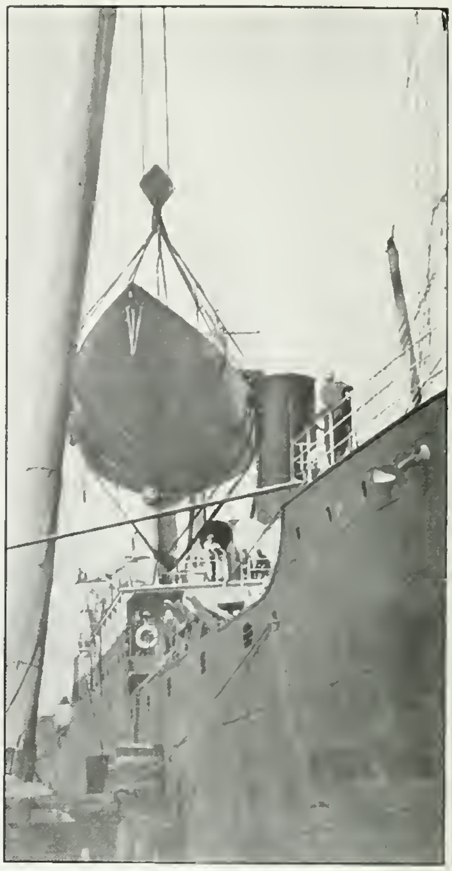
In 1889 the Granite State was anchored in Sandy Hook Bay, serving as a cholera ship during the epidemic at that time. Incoming passengers were landed at Fire Island and the contagious cases transferred to the Granite State.

An Unusual Shipment

THE illustration herewith shows the delivery at Los Angeles of a rather unusual deckload. C. B. Eyer, president of the Golden State Woolen Mills at Long Beach, is an enthusiastic yachtsman. Wishing to bring to this coast one of the best products of yacht-building talent on the Atlantic Coast, he commissioned his son-in-law, Mr. V. R. G. Wilbur, on a recent business trip to purchase for him a yacht.

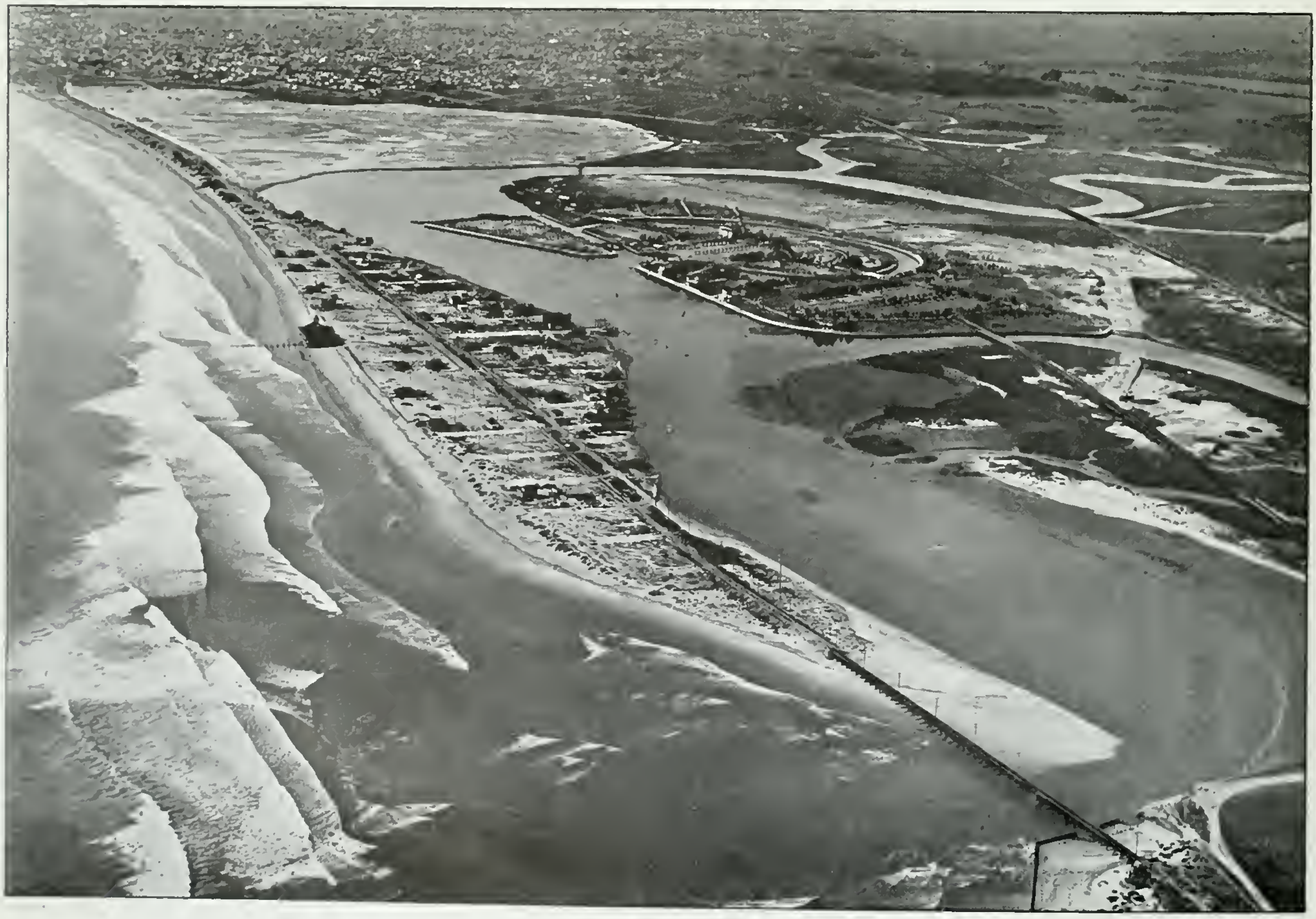
Mr. Wilbur selected the yacht Idalia, formerly known on the East Coast as the "black streak." She was designed by F. D. Lawley and built by George Lawley and Son Corporation at South Boston, Massachusetts, in 1906. She has an over-all length of 74 feet 6 inches, a water line length of 51 feet, extreme breadth of 16 feet, and a draft of 9 feet 9 inches and is schooner-rigged.

When purchasing this craft arrangements were made by the buyer to ship her to Los Angeles as a deckload on the West Haven of the Atlantic, Gulf & Pacific Steamship Company. Her masts were unstepped and with her booms and rigging were lashed to her deck, and she was firmly secured to a cradle built especially for her on the deck of the steamer. On her arrival at Los Angeles the West Haven took position under the 100-ton shearlegs at the outfitting wharf of the Los Angeles Shipbuilding and Dry Dock Company, and the Idalia, weighing 50 tons, was lifted clear of her cradle by properly adjusted slings and held suspended until the West Haven had steamed away to her own dock. The yacht was then gently lowered into the water and moored alongside the outfitting dock where she will be completely rigged for service in Southern California waters.



Lifting the sailing yacht Idalia off the deck of the SS. West Haven under the 100-ton shearlegs of the Los Angeles Shipbuilding & Drydock Co.

Below is an aeroplane view of Naples, California, and the southern environs of Long Beach. Note the large fill in the upper left hand corner. This work was recently completed by the United Dredging Company of Los Angeles, who reclaimed about 250 acres, raising the ground to about 4½ feet above high tide level and leaving in Alamitos Bay a beautiful fishing, bathing and boating area and small boat harbor 1000 feet wide by almost 10,000 feet long. The state highway connecting Long Beach with Capistrano will pass through the center of this property, and undoubtedly there will be large developments there in the near future.



Setting the broken nose of commerce

THE oxy-acetylene welding and cutting torches—those twin metal surgeons—are indispensable in ship yards.

Wherever metals must be cut or joined neatly, quickly and economically the oxy-acetylene process is invaluable.

Prest-O-Lite

DISSOLVED ACETYLENE

because of its portability, has made it possible to weld or cut in the most inaccessible places. Wherever the job may be—below or aloft, inside or out—Prest-O-Lite goes to the job!

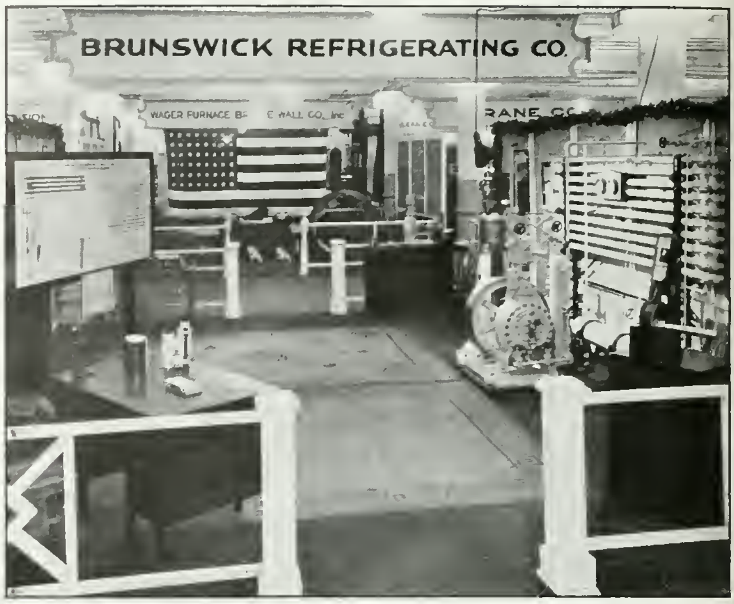
Forty Plants and Warehouses insure a constant and unlimited supply of uniformly pure gas. Write us about the Prest-O-Lite nation-wide service plan.

THE PREST-O-LITE COMPANY, Inc.
General Offices
Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco
In Canada: Prest-O-Lite Co. of Canada, Limited, Toronto

PW-503-21

NEW YORK'S BIG MARINE SHOW

Exposition Held Under the Auspices of the Marine Equipment Association of America a Huge Success



A notable exhibit of refrigerating machinery of the ammonia compression type. The chart at left shows by a well arranged color scheme the complete cycle in the refrigeration process with ammonia.

MR. J. S. HINES, publisher and owner of Pacific Marine Review, writes from New York of the "great pleasure experienced in attending the Marine Show" which was held in New York for six days, November 14 to 19, inclusive. "I was agreeably surprised at the efficient business manner in which this show was conducted. Practically every item in every exhibit was in the nature of a salesman's sample designed for business use. At the executive offices of the Marine Equipment Association, which occupied booths 35, 36, 37 and 38, officials or committeemen of that association were constantly on hand to extend courtesies to visitors or to aid in solving the problems of the exhibitors."

The following brief notices and the illustrations accompanying this article will give some idea of a few of the exhibits.

American Brass Company, Waterbury, Connecticut, exhibited a full line of samples of their brass and composition wire, pipe, screens and sheets. This exhibit occupied booth 75.

American Car & Foundry Company, 165 Broadway, New York, had a very interesting exhibit of their well known line of electric heaters, including the rivet heater, which has come into considerable use recently in shipbuilding and general construction work. This exhibit occupied booth 150, and the company was well represented by F. C. Cheston and W. M. Earl.

American Engineering Company, Philadelphia, Pennsylvania, occupied booths 81 and 96, with exhibits of electric and electro-hydraulic auxiliary machinery, including a 35 horsepower deck winch, an electro-hydraulic steering engine with hydraulic telemotor, an electric windlass, and an electrohydraulic winch. P. E. Kribel, marine sales manager, and six assistants did the honors for this exhibit.

American Manganese Bronze Company, Holmesburg, Pennsylvania, exhibited bronze and manganese bronze propeller blades, and a very instructive display of comparative tests of metals used for casting propeller blades and of photographs of installations. "Messrs. C. R. Spare and C. S. Bower were representing this company at the time of our visit to booth 63."

American Steel Foundries, Chicago, had filled booth 159 with examples of their line of cast steel anchors. "Their genial representative, Mr. A. P. Jones, was kept busy dispensing literature setting forth the advantages of cast steel for this purpose."

Asbestolith Manufacturing Company, New York, represented by Mr. R. C. Burnside, its president, displayed in booth 206 several exhibits showing the adaptability of asbestolith as a protective covering for steel plates on ships' decks and also its adaptability in covering both wood and steel for general construction and building purposes.

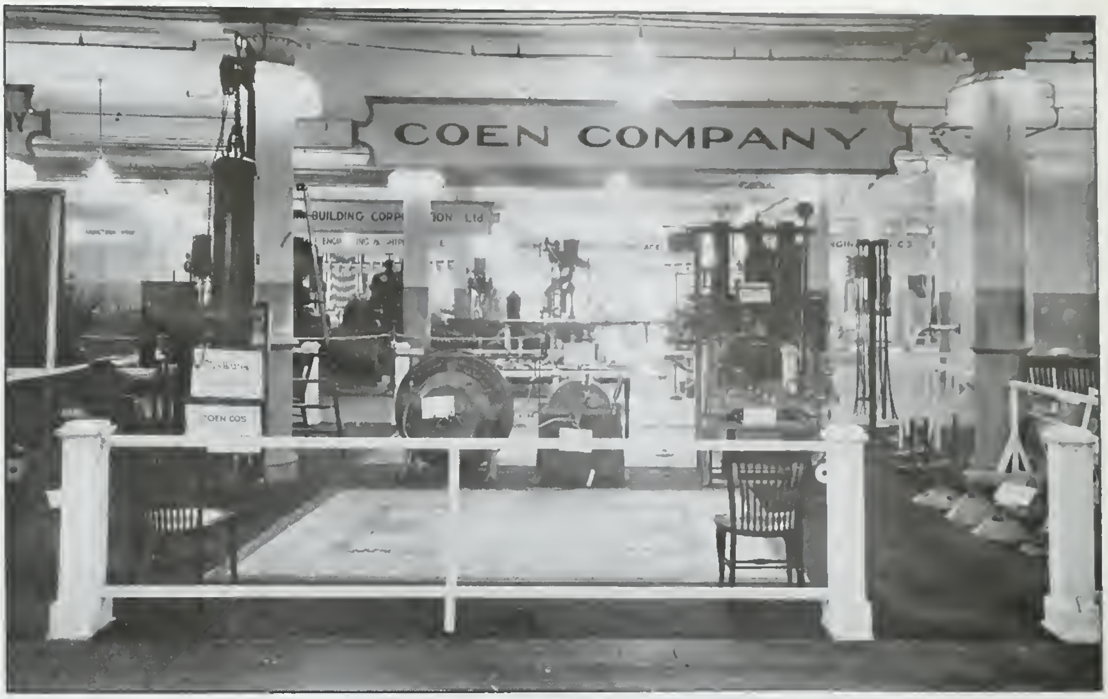
Ashton Valve Company, New York, under the supervision of Charles W. Buckelew, exhibited its line of whistles, gauges, testing outfits, and safety and relief valves in booth 219.

Babcock & Wilcox Company, New York, occupied four booths with large drawings on a scale of one-half actual size, showing the details of their various types of boilers. They also had on display numerous models of furnace fronts, oil burners, headers, and a full line of boiler fittings and valves.

The exhibit of the Bethlehem Shipbuilding Corporation featured the marine engineering activities of that firm largely in auxiliary machinery

They had six representatives, including J. Coleman, T. B. Stillman, and E. A. Colson.

Bethlehem Shipbuilding Corporation, Ltd., Bethlehem, Pennsylvania, were represented by K. W. Heinrich, sales engineer, and a number of other representatives from the sales department. Their exhibit occupied four booths and included as a main feature a large showing of the new Bethlehem-Weir line of marine auxiliaries. This line as exhibited consisted of 25-ton evaporator; 14-inch centrifugal pump direct connected to 9-inch by 8-inch vertical steam engine; 9½-inch by 7-inch by 15-inch dual air pump; 3½-inch by 2½-inch by 5-inch feed pump; 8½-inch by 6-inch by 18-inch feed pump; 7¼-inch by 5-inch by 10-inch horizontal fuel oil pump; 10½-inch by 8-inch by 22-inch pair of feed pumps and tank pump body and valve chest, 21-inch by 14-inch by 27-inch feed pump; 7-inch by 8-inch by 18-inch general service pump; 4½-inch by 5-inch by 12-inch general service pump. Other products included were a Bethlehem duplex ram hydraulic telemotor connected up in working order, a complete Bethlehem-Dahl mechanical oil-burning system with pumps and a section of the furnace front; also an exhibit of the complete line of Bethlehem-manufactured marine valves and fittings.



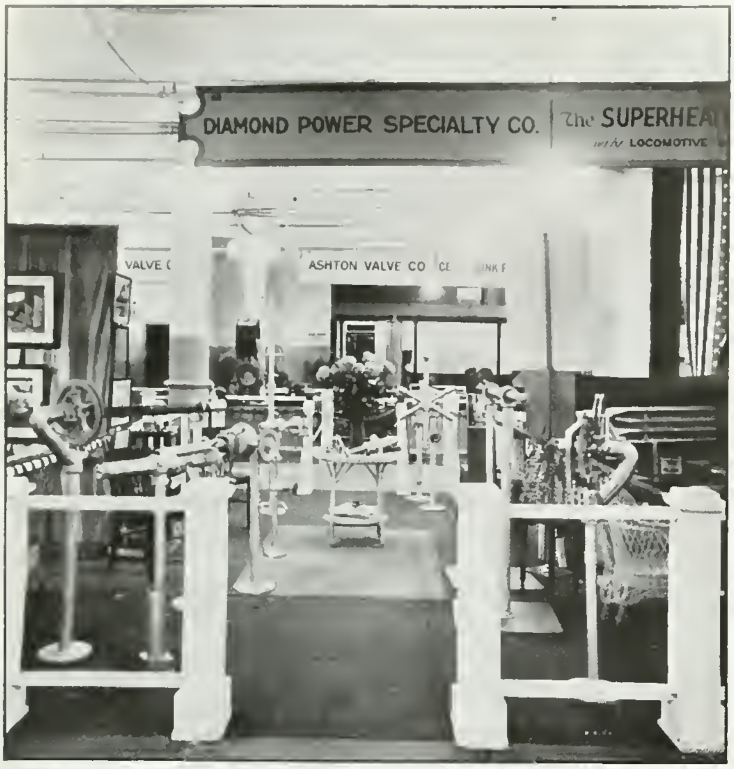
This exhibit of the products of a San Francisco firm featured working models of their efficient oil burning system for marine boilers

H. E. Boucher Manufacturing Company, New York, with Dwight S. Simpson in charge, exhibited in booths 84 and 93 a line of miniature marine specialties which had been gotten up with the idea of educating schoolboys in marine engineering and interesting them in nautical affairs. This line includes quite a number of types of engines from the single cylinder oscillating to a miniature compound towboat engine, with a line of boilers and bolts to match. Miniature sailboats and power boats run by spring motors and by electric storage battery motors were also shown. The exhibit was arranged somewhat in the nature of a miniature shipyard.

Brunswick Refrigerating Company, New Brunswick, New Jersey, exhibited one of their two-ton steam engine driven compressors complete and in working order. This machine was operated by an electric motor through a friction drive. A ¼-ton compressor also was shown with the crankcase cover removed and half of the cylinder cut away. This was operated by hand to show the action of the various parts and created a great deal of interest among many engineers who had operated such a compressor but never before seen the inside of one. The walls of booth 135, which housed this exhibit, were decorated with many photographs of vessels equipped with Brunswick machines. Underneath each photograph was posted a diagram showing the layout of the plant from that particular ship. A large chart displayed a diagram colored in green for liquid ammonia, red for gaseous ammonia and yellow for condensing water. This diagram showed the course of the ammonia in a Brunswick refrigerating plant and the gradual change from liquid to gas on passing the expansion valve.

Chase Metal Works and Chase Rolling Mill Company, Waterbury, Connecticut, rep-

An interesting display of wire, bar and tubing in non ferrous alloys



No soot allowed in this booth

resented by J. R. Griffin and four other members of the sales organization force, exhibited in booth 46 the process of manufacture and the finished product of brass, copper, and bronze in sheets, rod, wire, and tubing.

James Clark, Jr., Electric Company, Louisville, Kentucky, occupied booth 231 with a full line of examples of their portable and stationary electric driven drills, grinding machines and reamers, under the supervision of W. W. Krooper, their sales engineer.

The Coen Company, San Francisco, exhibited a complete fuel oil-burning system, including a duplex pump, their patent air register, and the 1921 model burner and new model cleanable heater. This exhibit occupied booth 136 under the supervision of William Wampler and three assistants.

Crandall Engineering Company, East Boston, Massachusetts, displayed in booth 58 an exhibit of photographs and models of drydock and marine railway installation, in charge of J. Stuart Crandall. There was a great demand for "What Does She Weigh?", a very interesting booklet describing the methods used in estimating the docking weight of any vessel, which Mr. Stuart was kept busy handing out to visitors.

Crane Company, Chicago, filled two booths, 116 and 147, with a complete line of valves and fittings for marine use. This exhibit was in charge of F. C. Bradbury, J. F. Duffy, D. Morgenthal, and G. E. Barker.

Crane Packing Company, New York, staged a most interesting exhibit in booth 232, showing the process of packing surface condensers. In this exhibit actual demonstrations and experiments with various kinds of packing were carried on for the benefit of marine engineers and others interested in the behavior of surface condensers at sea. There was also exhibited in this booth a complete line of flexible metallic packings, the entire exhibit being under the care of Julian N. Walton and A. W. Payne.

M. T. Davidson Company, New York, exhibited their line of marine pumps, ash ejectors, and other machines. Special stress was laid upon an improved valve gear for vertical marine pumps which is especially adaptable for use with high steam pressures and without internal lubrication.

Diamond Power Specialty Company, Detroit, Michigan, exhibited a full line of working models of various marine soot blowers, including rear and front end blowers for Scotch marine boilers, revolving blower, valve-in-head blower, and right angle drive blower for watertube boilers, and samples of calorized and uncalorized metals which had been tested at high temperatures. F. W. Leahy and F. W. Lambert had charge of this exhibit, which was housed in booth 158.

Ellcon Company, New York, exhibited a line of specialties in marine fittings in booth 127 under charge of William Wampler and three assistants. This line included safety tread stepping for engine and fire room ladders, engine room grating and fire room floor plates; enamel pipes for hand rail, special metal for electric light fittings; curtains for steamships, and reinforced flexible oil tubing for oil-burning furnace fronts.

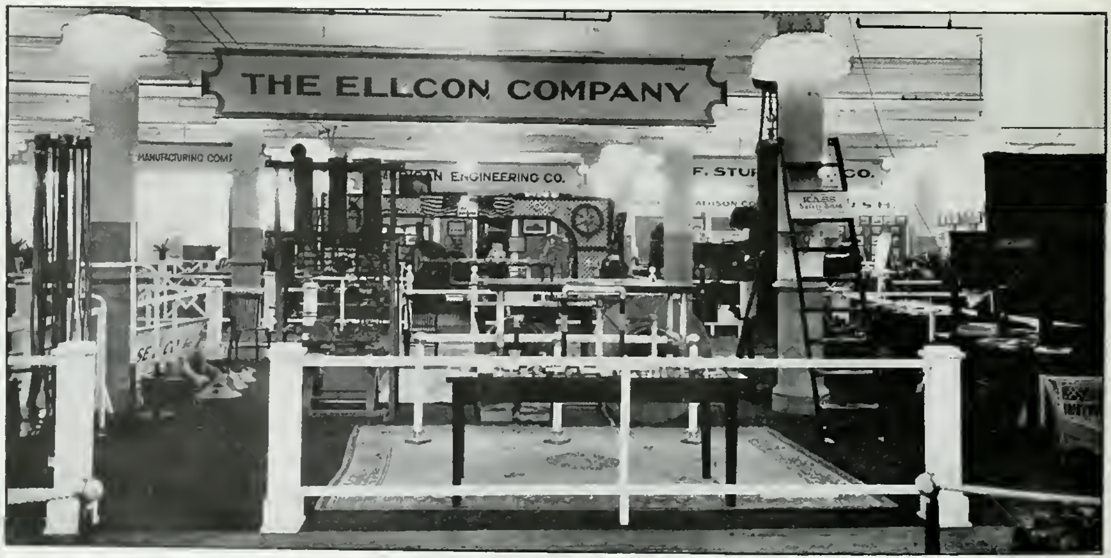
Fairbanks, Morse & Company, New York, exhibited their oil-burning engines, one of 200 horsepower directly reversible for direct connection to propeller shaft, one of 30 horsepower directly connected to generating set for ship lighting. Included in this exhibit were marine type power pump, marine type centrifugal pump, and a motor driven refrigerating machine of ½-ton capacity. This exhibit occupied booths 121, 122, 141 and 142, in charge of J. Jernberge and T. Drennan.

Foster Marine Boiler Corporation, New York, had three sales representatives in booth 190 distributing literature on their marine watertube boiler and exhibiting a few of the specialties manufactured by this company, such as keycaps and the special roller tool used in applying these caps.

General Electric Company, Schenectady, New York, had seven representatives in booth 9, using their space only for reception purposes and for the distribution of literature.

Great Lakes, Hudson and Atlantic Waterways Association, New York, occupied booths 47, 48 and 49 with educational displays of charts showing the proposed improvements in water communication between New York and the Great Lakes, and ample supplies of literature designed to interest visitors in the problems of the internal waterways in the northeastern part of the United States.

Griscom-Russell Company, New York, in booths 112 and 151 under the supervision of Robert Colston and A. S. Hoffman exhibited a full line of their evaporators, distillers, feed water heaters, steam



Enameled hand rails, safety treads, and other marine specialty fittings displayed by the Ellcon Company

A few heaters, evaporators, distillers and separators which have become very popular in American ships, both naval and merchant

separators, grease extractors, strainers, and oil coolers.

Horne Manufacturing Company, Jersey City, New Jersey, sent L. W. Horne and A. E. Rackliffe, who fitted up booth 199 to display the line of electric fixtures, fittings and instruments, manufactured by them for the marine trade. This line includes mechanical ships' telegraphs, speaking tube fittings, thermostats for fire alarm systems, running light indicators, cargo reflectors, watertight lighting fixtures, and a complete list of marine wiring fittings.

H. J. Hush, New York, exhibited a varied line of small power machinery for use in shipyards, on docks, and on shipboard, including engine derricks, with a special complete hoist unit for New York lighters, a 5-kilowatt direct connected lighting set, three 4-cylinder heavy duty gas engines, an arc welding set, all of which were arranged in booth 21 under the personal supervision of H. J. Hush himself.

International Compositions Company, Inc., New York, exhibited their line of anti-fouling and anti-corrosive coverings and general marine paints with attractive displays of color cards and a very effective set of booklets. This exhibit in booth 60 was in charge of F. W. Petry.

International Mercantile Marine Company, New York, fitted up booths 194 and 195 with a portable moving picture outfit and entertained hundreds of visitors with splendid pictures illustrating sea travel.

T. P. Jarvis Manufacturing Company, San Francisco, represented by Messrs. Owen O'Beirne, Harry Cunningham, J. E. McCauley and M. Appleman, exhibited in booth 230 their system for applying oil-burners to ships' galley ranges.

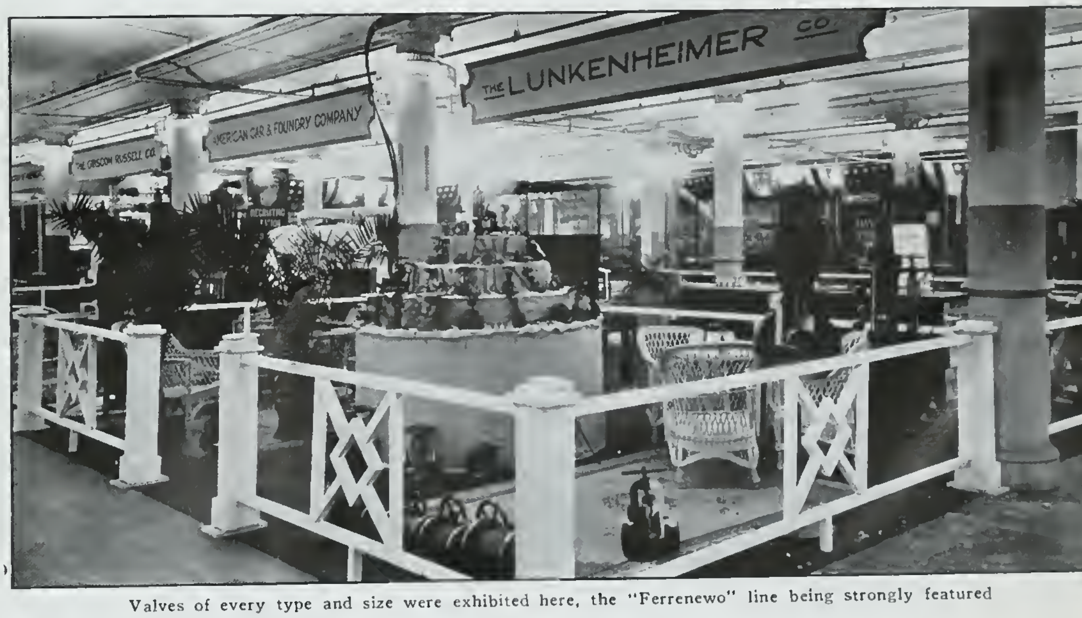
H. W. Johns-Manville Company in booth 114 exhibited refrigerating machines and asbestos products for marine purposes, the former of the well known Audifren-Singram type and the latter including the famous Johns-Manville Sea-Ring packing, Kearsarge boiler gaskets, heat insulation of the asbesto-sponge felted type, the vitribestos insulation and stack lining, air cell insulation, brine and ammonia pipe insulation, anti-sweat insulation, and zero insulation. Johns-Manville refractory cements, monolithic baffle walls and Vulcabeston pump valves were also featured. This exhibit was in charge of R. F. Massa.

Keasbey & Mattison Company, Amber, Pennsylvania, represented by L. L. Barrett and A. Hovey-King, exhibited a general line of asbestos textiles and particularly those entering into the manufacture of "85 per cent magnesia" pipe and boiler coverings and marine gaskets and packings. The exhibit featured a number of steam pipes filled with steam under pressure and with thermometers laid on the outside of the insulating covering so as to indicate the respective efficiency of various thicknesses and types of heat insulating.

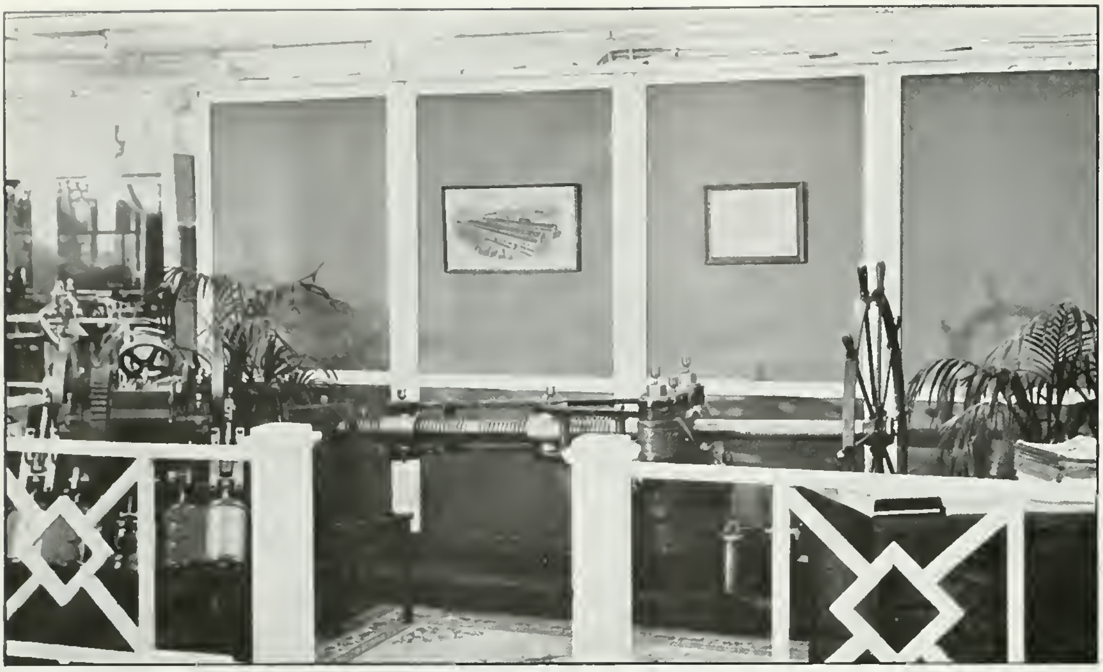
Kingsbury Machine Works, Frankford, Pennsylvania, under the personal supervision of Albert Kingsbury with three assistants featured in booths 165 and 178 an exhibit showing marine thrust bearings of the Kingsbury adjustable and equalizing type, with a testing machine especially set up to demonstrate the operation of these bearings and of the new system of air lubrication, wherein it was shown that with this system there was complete separation of bearing faces.

Lee & Simmons, New York, exhibited in booth 12 a complete set of models and photographs of the various types of vessels used in the lighterage business in New York harbor.

Lunkenheimer Company, Cincinnati, Ohio. Brass and composition valves and the name "Lunkenheimer" have been practically synonymous for many years in American marine practice, so that, as would naturally be expected, booth 149 featured mainly



Valves of every type and size were exhibited here, the "Ferrenewo" line being strongly featured



An ash hoist and a hand steering gear which are built for efficient service under hard conditions

gate, safety and check valves. There were in addition, however, oil cups, various oiling devices, grease cups, lubricators, whistles, injectors and various boiler room and engine room fittings, all under the charge of Walter A. Reynolds with four other representatives from the sales department.

Marine Decking & Supply Company, Philadelphia. Pennsylvania. This well known marine supply house occupied booths 200 and 225 with W. L. Peebles and G. W. Selby in charge. Their exhibit featured tackle blocks, shackles and shives, and a general line of ship hardware. They had also a very attractive exhibit of decking and flooring.

Marine Draftsmen's Association, meeting in annual convention in New York City, made booth number 40 their headquarters for the week. The booth was fitted up for reception purposes only, and many of the visiting draftsmen found a keen interest in comparing and analyzing the machines, fittings, and systems on exhibit in the various booths.

Mercantile Specialties Company, New York, in booth 61 had an interesting exhibit showing the working of a safety port hole.

J. S. Mundy Hoisting Engine Company, Newark, New Jersey, under the personal supervision of C. L. Mundy, president, and C. H. Foster, marine manager, staged in booth 132 an interesting ex- their hand steerer. The Mundy ash hoist is built to United States Navy standard requirements and is fitted with a follow-up gear and an adjustable automatic stop so that the bucket is positively stopped at either limit of the desired travel. The hand steerer was designed to fill the need for a reliable hand gear for sailing vessels or for emergency gear on steamships. It is a right and left-hand screw arrangement with two heavy bronze nuts connected by forged steel links to the massive cast steel cross arm, which may be fixed by removable pins to the crosshead keyed on the rudder stock. The after end of the screw shaft is carried in a universal self-aligning bearing fitted with coil springs hibit of their ash hoist and to take the shock of heavy seas.

National Malleable Castings Company, Cleveland, Ohio, had in booth 161 three representatives and an exhibit of several sizes of "Naco" cast steel anchor chain with shackles and swivels, and on display a few broken links, together with microphotographs to show the crystalline structure and charts, diagrams and tables showing the results of tests of cast steel chain.

Newport News Shipbuilding & Drydock Company, Newport News, Virginia, had fitted up four booths to represent a full sized afterbridge with cabin and open deck space and the usual hand rail. The cabin made a gallery for the display of photographs and literature illustrating and describing the harbor facilities of Hampton Roads, and a series of views taken by the Army Air Service showing the bombing by aircraft of old battleships of the German and American navies.

Albert T. Otto & Sons, New York, were represented by Stuart Otto and P. G. Schilling. In booth 155 fitted up as a reception room they exhibited a very instructive and complete line of drawings and photographs illus-

A demonstration of the combination of elegance, comfort and economy made possible by the use of Pantasote products

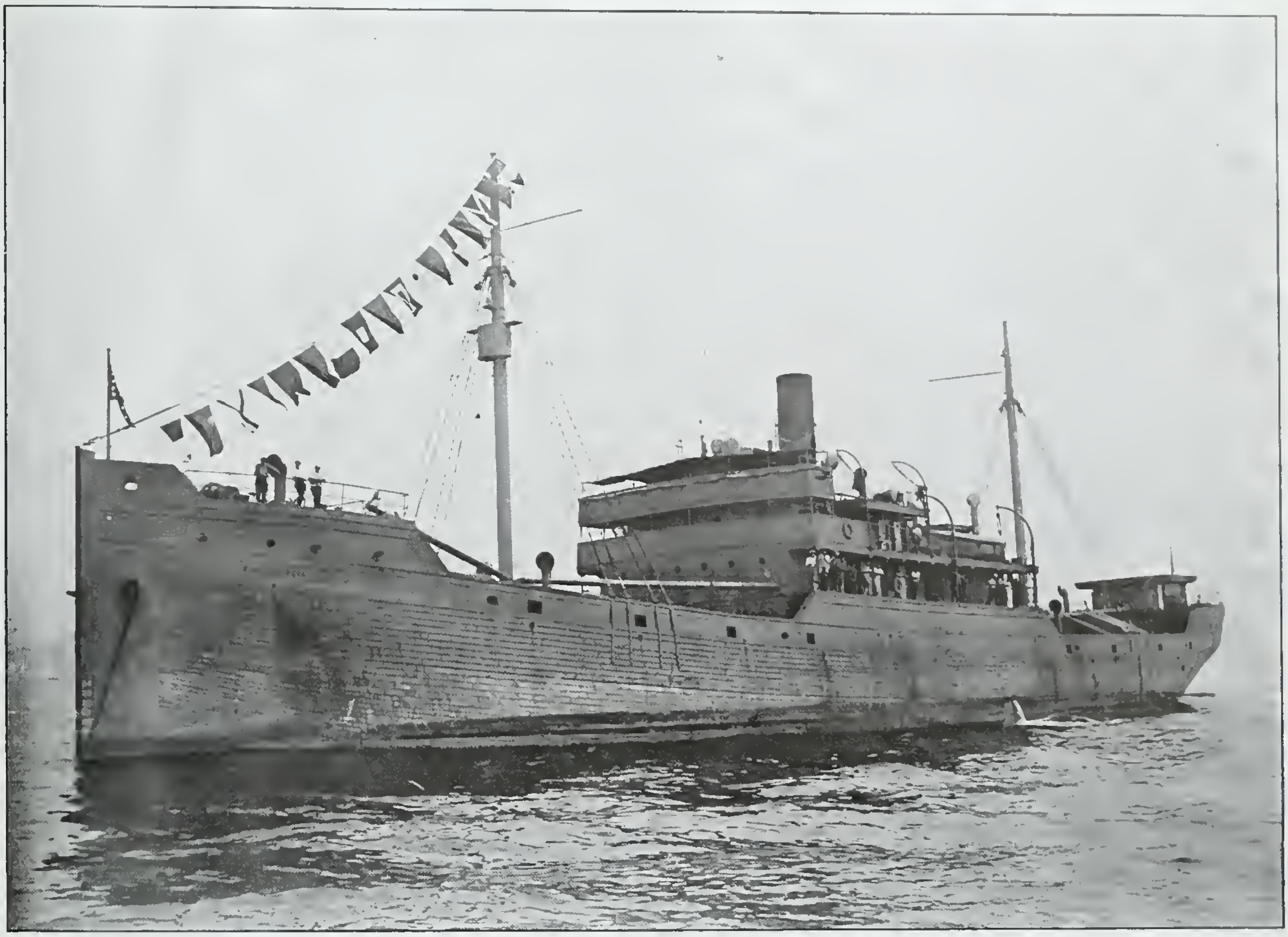


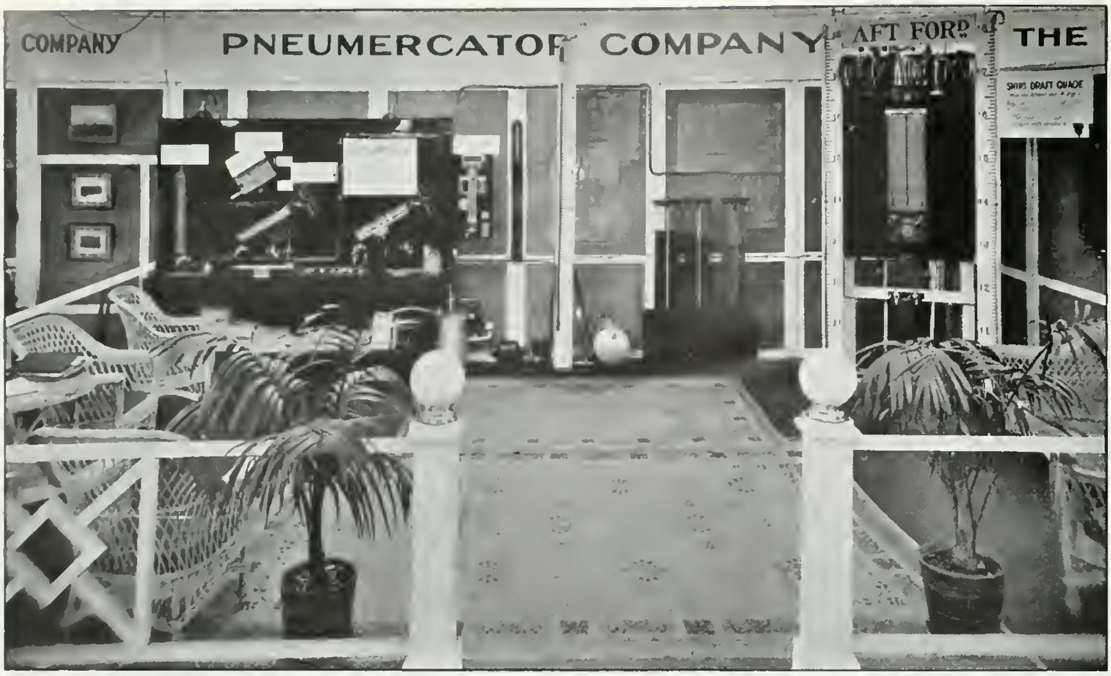
Photo by
Edw. Levick,
N. Y.

ONE of the Emergency Fleet wooden steamships that may soon be sold at bargain prices.

Over 80% of these boats are caulked with *Stratford Oakum* which made a war record of not a single complaint or rejection and receives the highest approval of both Lloyd's and American Bureau.

Stratford Oakum contains least waste, requires least labor, and is the best and most economical caulking material to be had at any price.

George Stratford Oakum Co.
JERSEY CITY, N. J.

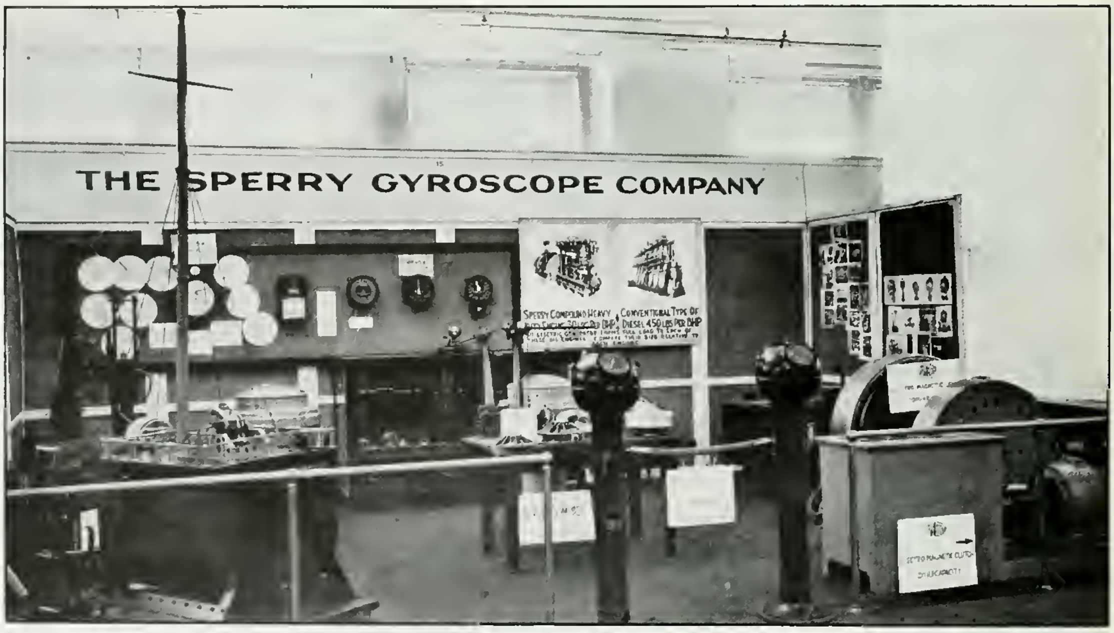


trating Diesel engines and air compressors.

Pantasote Company, New York, filled booths 162 and 181 with exhibits of bulkheads, floor coverings, and ceilings made from its products in various attractive patterns and colorings. Included in this exhibit was a model ship stateroom lined with Vehisote. This firm was represented by H. G. Lake.

Peabody Engineering Corporation, New York, represented by W. A. Ebsen and J. P. Leask, in booth 154 exhibited their new wide range mechanical atomizer fuel oil burner. This burner was arranged to spray water instead of fuel oil into a glass box so that its operation could be observed by all visitors. Water under constant pressure was delivered to the burner by a pump. A bypass valve was arranged on the return line and located at a point near the booth rail so that it could be operated. This valve controlled the quantity of fluid delivered at the burner tip. It was readily demonstrated that the burner gave perfect atomization at all points from 15 per cent up to full load. There was also a complete burner and register mounted on the furnace front of a marine boiler.

Pneumercator Company, Inc., New York, had a very fine exhibit showing various types of the Pneumercator gauge for ships' draft, for depths of liquids in tanks, and also their electric whistle operator. This exhibit was housed in booth 14 under the care of Gardner Cornett and Harry S. Parks.


THE SPERRY GYROSCOPE COMPANY
SPERRY COMPOUND HEAVY
CONVENTIONAL TYPE OF DIESEL 450 LBS PER BHP

Power Specialty Company, New York, exhibited superheaters, featuring a complete element with core illustrating the method of closing handhole openings in header. J. J. Nelis and J. C. McKenzie distributed much literature describing this company's products.

Row & Davis, Engineers, Inc., New York, filled booths 73 and 104 with an exhibit of evaporators, feed water heaters, oil heaters, and grease extractors under the personal supervision of H. C. Davis and R. R. Row.

Scovill Manufacturing Company, Waterbury, Connecticut, put up a very attractive exhibit in booth 111 under

Brass tubing effectively displayed

the supervision of P. Davidson and two assistants, featuring brass tubing and especially Scovil Admiralty condenser tubing, which is made of a special mixture consisting of 70 per cent copper, 1 per cent tin, and 29 per cent zinc, mixed and manufactured into the finished product in such a manner as to conform with all of the highest specifications for U. S. Navy standards. A very attractive booklet, "Tube Facts," was distributed from this booth.

Shepard Electric Crane & Hoist Company, Montour Falls, New York, exhibited a ½-ton and a 1-ton capacity overhead monorail direct lift hoist. The booth, No. 126, was in charge of A. J. Barnes and G. G. Habershaw.

The Show headquarters for the **American Society of Naval Architects and Marine Engineers** were in booth 39.

Sperry Gyroscope Company, New York, exhibited a gyro-compass in actual operation in connection with one of their new continuous course recorders and an electric log. There was also the model of a gyroscopic stabilizer now building for an 18,000-ton passenger liner. This model was in operation and demonstrated in a practical, visual way the results of stabilization. Pictures of the new Sperry compound Diesel engine and a working exhibit of one of the company's new electric clutches were also featured. This exhibit in booth 15 was under the personal supervision of Mr. Robert B. Lea of the merchant marine sales department, with four assistants.

Stamford Foundry Company, Stamford, Connecticut, represented by Frank W. Brant, exhibited an interesting line of cooking ranges for ships' galleys in booth No. 226.

B. F. Sturtevant Company, Boston, Massachusetts, filled two booths, No. 94 and No. 95, with examples of their forced draft direct connected steam driven fan units for the United States Navy, a 5-K. W. direct connected gasoline engine generating set, a vertical steam engine, a steam turbine for auxiliary pump drive, and a portable ventilating set. Eugene B. Williams and Edward L. Moran had charge of this exhibit.

Sun Shipbuilding Company, Chester, Pennsylvania, displayed two very fine models and a large number of photographs showing their plant and its products. They were represented by J. T. Borden and J. W. Hudson.

Superheater Company, New York, exhibited a model of their firetube superheater for Scotch marine boilers, a model of their superheater as applied to marine watertube boilers, a boiler feed pump, and a pyrometer for measuring steam temperatures. Seven members of the staff of the marine department of this company were detailed to supervise this exhibit and to make all visitors to the Marine Show feel at home in New York.

Texas Company, New York, filled booth 105 with an attractive line of samples of their marine lubricants. Nine members of their sales and advertising departments were on hand to demonstrate perfect lubrication.

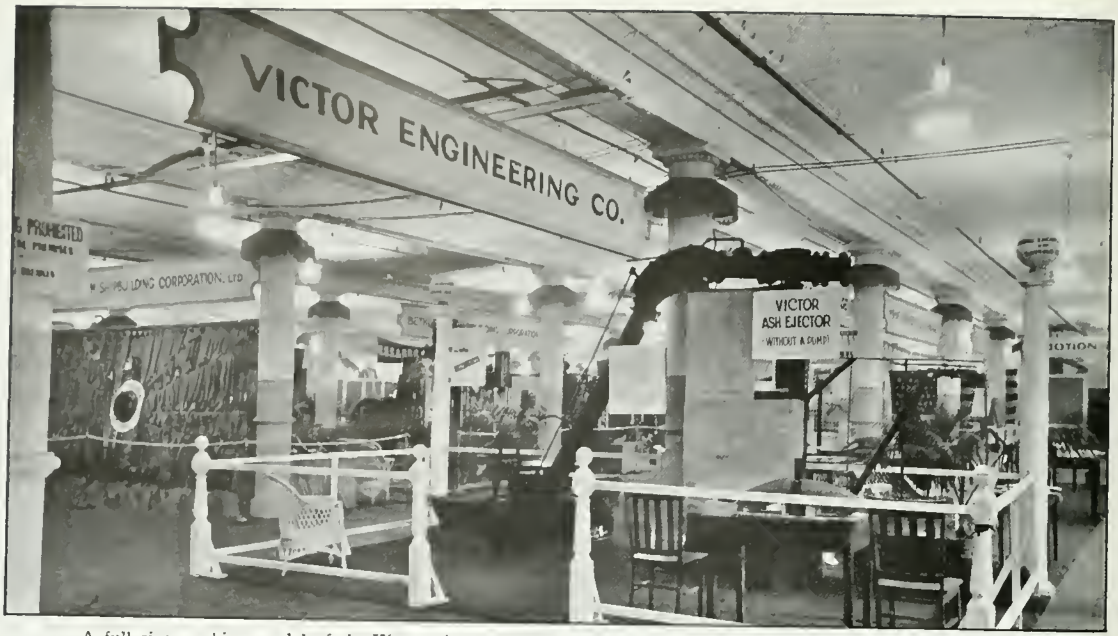
Todd Shipyards Corporation, New York, were represented by William H. Raab and H. Nightengale. They exhibited their famous model of the 6-section floating drydock known as No. 4 of the Robins Drydock & Repair Company, with the model of a modern ocean liner on the dock. This model is complete in every detail, measures 11 feet 6 inches overall, and attracted a great deal of attention from visitors. The Tietjen & Lang Company and the Tebo Yacht Basin Company exhibited the scale model of a 750-H. P. marine type Diesel engine fitted for electric drive and a geared turbine drive in position in the engine room of a modern steamship. There was also a 12-foot over-all model of an oil-burning fruit and passenger liner recently built at the Tebo plant. The White Fuel Oil Engineering Corporation exhibited a Scotch marine boiler fitted with the latest improved Todd-White oil-burning system.

United States Navy, Washington, D. C., occupied fifteen booths with exhibits in charge of Michael D. Shaefer, including models of various types of navy vessels, paintings of historic deeds, citations, Liberty motors and propellers, Lewis, Browning and Colt machine guns, photographs and charts showing recreational, athletic, hygiene, piloting, radio station, and educational work.

United States Shipping Board, Washington, D. C., under the supervision of W. W. Harrison in booths 54 to 57, exhibited model staterooms and a full scale model

OCEAN SHIPPING
by
ERICH W. ZIMMERMAN, Ph.D.
The latest authoritative work on this subject from an American standpoint
$5.00 Net
Order Through Pacific Marine Review, Literary Editor

S. L. KREIDER
SHIPPING
Gen'l Agent
TOYO KISEN KAISHA
WILLIAMS S.S. CO., INC.
At Los Angeles
375 Pacific Electric Building
At San Diego
239 Spreckels Building



A full size working model of the Victor ejector which simplifies the handling of ashes in coal-burning ships

of one of the new combination American Legion class Shipping Board liners.

Valentine & Company, New York, staged an exhibit designed to show the quality of their varnishes under the action of hot and soapy water. This consisted of a number of panels finished by Valspar and with other varnishes, over each of which a stream of hot water flowed; also of a washing machine with a glass front in which a panel made up in the form of a submarine and finished with Valspar was subjected to a continual spray of soapy water. There was also a table whose top was finished in strips of mahogany, oak and other stains made by the Valentine Company upon which boiling water was poured to demonstrate the ability of these stains to withstand such usage. This exhibit occupied booths 64 and 65 in charge of Dorning Walker.

Victor Engineering Company, Philadelphia, Pennsylvania, exhibited its ash ejector, which is operated by a special steam nozzle. This ejector especially commends itself in coal-burning vessels on account of the small space occupied in the boiler room, the taking of ashes through the boiler room floor without lifting, the impossibility of flooding the bilge or boiler room by its use, as no water is employed. The Victor ejector will handle clinkers up to 5 inches and will discharge a ton of ash in about 12 minutes with one man feeding. It is operated by one bar or rod which controls the sea gate, the valve on sanitary water line, the automatic valve on the steam nozzle, and so interlocks every action of the ejector as to make it positively foolproof. This exhibit in booth 191 was under the charge of Eugene Hahn and C. L. Bachman.

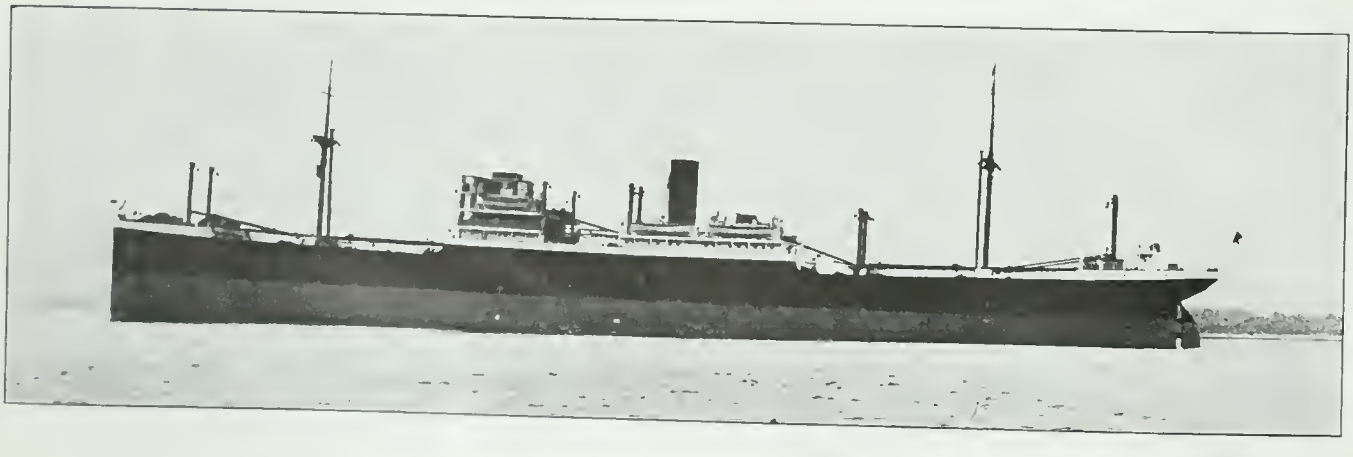
Wager Furnace Bridge Wall Company, New York, exhibited in booth 117 their patent bridge wall for marine furnaces, a large number of which have been supplied to and are operating in ships of the American merchant marine, both for the United States Shipping Board and for private owners. The Wager Furnace Bridge Wall Company were represented by Louis F. Fenwick and Alexander Halley.

Elisha Webb & Son Company, Philadelphia, Pennsylvania, had an attractive exhibit of galley equipment in booth 59 under the personal supervision of Elisha Webb. This display included steam tables, ranges, lights and mess kettles.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania, filled six booths under the supervision of W. H. Easton, with a display of their marine products. One novel feature and one of the most interesting items of the entire exhibition was the wireless receiving set with loud speaking attachment which transmitted to exposition visitors the marine news, concerts and other messages as broadcasted by the Westinghouse Company's high-power radio station at Newark, New Jersey. In this exhibit also were many models of turbine gears, turbines, Diesel electric equipment, electric deck machinery, and a moving picture exhibit showing the manufacture of marine machinery in the company's shops.

C. H. Wheeler Manufacturing Company, Philadelphia, Pennsylvania, exhibited many types of air pumps, condenser pumps and their accessories, and an interesting example of their dynamometer especially adapted for testing Diesel engines. This was in booth 13 under the supervision of C. H. Lang.

Worthington Pump & Machinery Corporation, New York, occupied booth 146 and were represented by W. A. Cather, M. L. Katzenstein and four other members of their sales organization. They exhibited a number of types of centrifugal and vertical simplex and duplex pumps for marine boiler and condenser service.



The Best Sport on Shipboard Can be Had with a CRAIG

Golfmeter

Excerpt from Denver Post, Denver, Colo., Nov. 2nd, 1921:

YOU NEED NOT GIVE UP GOLF IF YOU'RE AT SEA

Liners have many ways of amusing passengers

> *"Golf has been reduced to the deck accommodations by means of a swivel device, a captive ball attached by cable to the swivel and a meter which faithfully records the distance travelled by the ball under the impetus of the golfer's stroke."*

THESE SHIPS HAVE RECENTLY INSTALLED THEM:

Pacific Mail S. S. Co.
San Francisco

S. S. Hawkeye State
S. S. Golden State
S. S. Hoosier State
S. S. Empire State

Matson Line
San Francisco

S. S. Maui
S. S. Matsonia
S. S. Buckeye State

Toyo Kisen Kaisha S. S. Co.
San Francisco

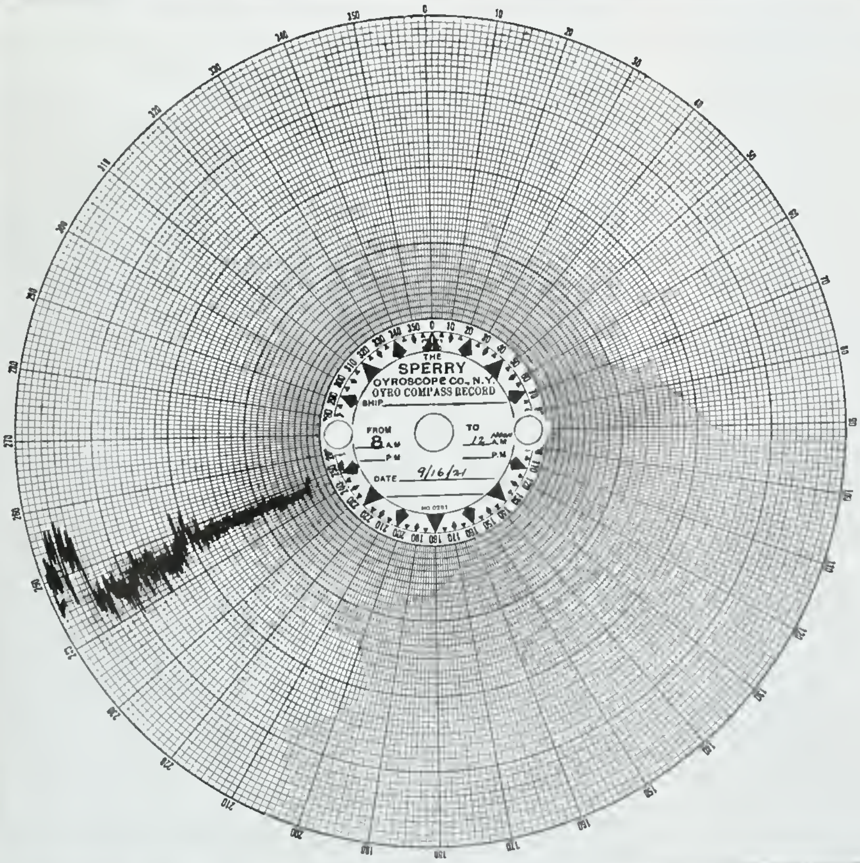
S. S. Taiyo Maru
S. S. Siberia Maru
S. S. Tenyo Maru
S. S. Shinyo Maru
S. S. Korea Maru

Pacific S. S. Co.
Seattle

S. S. Silver State
U. S. S. Tennessee
U. S. S. Nevada
U. S. S. Idaho

590 Howard St., San Francisco — **CRAIG GOLFMETER COMPANY** — 51 East 42nd St., N. Y. City

---



EFFICIENCY AND ECONOMY

The operation of your vessel today must be on a basis of efficiency and economy.

To compete in the world's trade every effort must be exerted to speed up your vessel.

Economy of operation is a prime factor, but false economy pays no dividends.

Twenty-two large operating companies of the world's merchant marine are enjoying the efficiency and economy of the Sperry Gyro-Compass.

Note the steering on the Gyro-Compass Recorder Chart.

The experienced helmsman steered a straight course from 8 A. M. to 10 P. M., when the wheel was turned over to a beginner, who allowed the vessel to yaw badly and could not hold her on her course.

The watch officer failed to take notice until 11:25 A. M., when he found it necessary to change the course to 253 for twenty minutes to bring the vessel back to the desired position.

Let us supply you with facts regarding the Efficiency and Economy of The Sperry Gyro-Compass.

The Sperry Gyroscope Co.
Manhattan Bridge Plaza, Brooklyn, N. Y.

THE ADMIRAL LINE

P.S.S.CO.

H.F. ALEXANDER *PRESIDENT*

ANYWHERE ON THE PACIFIC

Operating the

LARGEST FLEET ON THE PACIFIC

UNDER THE AMERICAN FLAG

PUGET SOUND-TRANS PACIFIC SERVICE

Regular, frequent service (freight and passengers) between Puget Sound and Yokohama, Kobe, Shanghai, Hong Kong, Manila *Dairen, *Vladivostok, *Singapore. (*Freight only.)

CHINA-JAVA FEEDER SERVICE

Regular service (freight only) between Hong Kong and Saigon, Singapore, Samarang, Soerabaia, Batavia and way ports connecting at Hong Kong with Puget Sound trans-Pacific services.

PUGET SOUND-CALIFORNIA SERVICE

Tri-weekly service (freight and passengers) between Seattle, Tacoma, Victoria and Vancouver and San Francisco, Los Angeles and San Diego.

COLUMBIA RIVER-CALIFORNIA SERVICE

Through weekly service (freight and passengers) between Portland and Astoria and San Francisco, Los Angeles and San Diego. Regular local service (freight and passengers) between Portland, and Astoria and Marshfield, Coos Bay, Eureka and San Francisco.

CALIFORNIA SERVICE

Frequent service (freight and passengers) between San Francisco and Los Angeles and San Diego.

INTERCOASTAL SERVICE

Frequent, regular service (freight only) between Seattle, Tacoma, Portland, San Francisco and Los Angeles and Boston, Philadelphia, New York and Portland, Me.

PUGET SOUND-ALASKA SERVICE

Frequent, regular service between Puget Sound and all points in Southeastern and Southwestern Alaska.

ROUND-THE-WORLD SERVICE

Regular service (freight only). Agents on the Pacific Coast, Philippine Islands, Straits Settlement, China, Japan and Siberia for Barber Steamship Line's services New York to the Orient and round the world.

GENERAL OFFICES:

NEW YORK: 17 State Street
CHICAGO: 142 South Clark Street
SEATTLE: L. C. Smith Bldg.
SAN FRANCISCO: 112 Market Street
LOS ANGELES: Citizens Nat. Bank Bldg.
PORTLAND: 101 Third Street
TACOMA: Rust Building
SHANGHAI: Cor. Kiangse & Nanking

A. F. HAINES
Vice-Pres & Gen. Mgr.

H. C. CANTELOW
Asst. Gen. Mgr.

M. F. CROPLEY
Mgr. Oregon Dist.

E. G. McMICKEN
Passenger Traffic Manager

M. J. WRIGHT
Freight Traffic Manager

75 INDIVIDUAL ADMIRAL LINE AGENCIES
in the United States, Alaska, Hawaiian Islands, The Straits Settlements, Philippine Islands, China, Japan and Siberia.

Trade Literature

Bulletin No. 3A, James Howden & Company of America.

A six-page folder describing the Howden double-acting, high-speed, forced lubrication, enclosed steam engine, as especially adapted for direct coupling to electric generators for ship lighting.

These engines can be supplied separately or directly coupled on a common bedplate to direct current 125 to 250 volt generators. They are manufactured in eight sizes, ranging in capacity from 7½ to 20 kilowatts.

James Howden & Company, Ltd., of Glasgow, Scotland, began the manufacture of this engine about eighteen years ago in shops especially built for that purpose. The engine at first was used principally in connection with the Howden system of forced draft in driving fans for supplying air to the furnaces of marine boilers. Its use was gradually extended to ventilation and the generation of electric power, and thousands of these engines are now in use all over the world. In the fall of 1918 James Howden & Company of America, Inc., established a plant at Wellsville, New York, for the manufacture of this engine and other products in connection with their forced-draft system.

The manufacture is standardized under the limit gauge system. All surfaces are designed so as to give ample areas and extremely low working pressures, and it is claimed that there has not been a single case of renewal of the crosshead slipper due to wear. The idea of James Howden & Company in manufacturing these generating sets for the marine trade is that the use of the same size and type engine for lighting and for forced draft makes it possible for the marine engineer to get along with a smaller stock of spare parts.

The illustration on the cover of the bulletin shows eight 15-kilowatt and 110-volt 500 R. P. M., D. C. generating sets supplied on one order to the Kiangnan Dock & Engineering Works, Shanghai, China, for use on ships building by that yard for the United States Shipping Board.

Specialized Pipe Service—American Spiral Pipe Works, Chicago.

An eight-page, profusely-illustrated folder setting forth the advantages of American spiral pipe and illustrating some typical installations. This product has been largely used in hydro-electric power station work, city water works, and dredging operations in the United States, Canada, various South American countries, and Europe.

The American Spiral Pipe Works' specialty is spiral-riveted, pressure pipe. In developing joints for this pipe they have produced a very excellent pipe flange of forged steel which they can supply to order in any size or weight. They also manufacture an excellent quality of lap-welded steel pipe. Our readers will, however, be more interested in their corrugated furnaces for Scotch marine boilers, many of which have shown excellent service qualities at sea in the boilers of ships built for the Emergency Fleet Corporation of the United States Shipping Board.

Bulletin No. 15—The Silent Hoist Company, Brooklyn, New York.

A six-page folder featuring two self-contained engine-driven hoisting units, the Model D-5 friction drum hoist and the Model D-10 vertical capstan winch. The Silent Hoist Company are the pioneer manufacturers of worm-drive in this class of machinery.

The 5-horsepower gas engine-driven friction drum hoist illustrated in this folder is a self-contained unit on a single bedplate consisting of a 5-horsepower new-way air-cooled gasoline engine connected by a silent chain drive, a worm and worm wheel, to the hoisting drum. The drum has a capacity for 500 feet of one-half inch cable. At a line speed of 100 feet per minute the engine will give a 1600-pound pull on the rope. Over-all dimensions are 25 by 69 inches. The weight of the unit is 1100 pounds. This same unit can be furnished geared for a 4000-pound lift at 40 feet per minute.

Trade Literature

The vertical capstan, Model GT-10, has practically the same specifications as the friction drum hoist, with the exception that the worm wheel is mounted on a vertical shaft driving a vertical capstan head with a lifting capacity of one ton on a single line of 50 feet per minute. This machine makes a very efficient hoisting or hauling unit for riggers, wreckers, house movers, or general contractors.

Coes Genuine Screw Wrenches—The Coes Wrench Company, Worcester, Mass.

Eighty years ago Loring Coes invented the original screw wrench, and from that time to the present day he and his descendants have been making wrenches of quality for the mechanics not only of the United States but of practically the entire world.

At this late day it seems to be superfluous to be calling the attention of the readers of a technical journal to such a standard product as the Coes wrench. There have, however, been constant improvements in this product, among them being the steel handle wrench especially adapted for heavy duty. This wrench is becoming the standard equipment of many railroads and mining companies and is practically a weatherproof, foolproof, unbreakable tool. The bar and head are of special steel, finished hot and water-forged, carefully heat treated, and with all wearing surfaces hardened. The jaw is a semi-steel casting in one piece. The screw with its knurled head is in one piece, the thread being especially designed of ample section to withstand hard usage. A ball race is machined on the head of the screw to take a ball set in a socket in the bar. This ball race is polished, and the ball is standard steel ball such as is used in ball bearings. The handle is a semi-steel casting of special design, the hole for the bar being broached to a drive fit and the handle being fitted under pressure. Comparative tests have shown that this wrench will stand a greater strain than any screw wrench made. Eight sizes are manufactured, ranging from 4 to 21 inches.

For larger sizes up to 72 inches the Coes Wrench Company manufacture a key model. This was first developed and is still very largely used for handling work in reseating large valves. The 72-inch size has a maximum jaw opening of 12¼ inches. This extreme size was taken off the manufacturing list as a war conservation measure and has not been returned to stock. Specifications and deliveries on this or larger sizes can be had on request.

Kolster Radio Compass and Position Finder — Bulletin No. 12A of the Federal Telegraph Company, San Francisco.

Much attention has been given recently by navigation experts to the safeguarding of ships and their passengers while navigating in fog. Light and sound signals from United States lighthouses and lightships have proved extremely unreliable in dense fog, and it is proposed under the Kolster system that automatic radio stations be installed on lightships, at lighthouses, and in various situations in the vicinity of harbor entrances and dangerous channels. These radio stations would send out characteristic signals in the same way that lighthouses now send out flashes of light. Fog is no barrier to a radio signal. Vessels equipped with radio compass can under the Kolster system immediately get the bearing and the approximate distance of the sources of these radio signals.

It is true that under the present navy system vessels can get their bearings from the naval radio stations, but to do so they are dependent on two or more operators ashore and are liable to interference caused by many ships trying to get bearings from the same station. With the radio compass aboard the vessel and automatic radio signals coming in from the lighthouse or lightship of known location any number of vessels can simultaneously establish their position without interference or delay. Radio compass bearings can be taken with the Kolster radio compass as easily and as quickly as they can by pelorus sighting.

The cost of a complete installation of this system on

REINFORCED by wide experience covering many important marine operations, the Willamette plant is well prepared to undertake and complete your work with satisfaction, economy and dispatch.

MARINE MACHINERY
MARINE AND STATIONARY BOILERS
DECK MACHINERY AND AUXILIARIES
MARINE REPAIRS OF ANY CHARACTER

Willamette
IRON & STEEL WORKS
Portland, Oregon, U. S. A.
1043 Monadnock Bldg., San Francisco, Cal.
1920 L. C. Smith Bldg., Seattle, Wash.
Canadian Office
916 Rogers Bldg., Vancouver, B. C.

The McIntosh & Seymour Diesel-engined motorship Cethana

shipboard is so small when compared with the benefits which may be derived that it would seem the part of ordinary commercial sense for every shipowner to seriously consider this system as part of the navigation equipment of his vessel. No special training is required for the care and operation of the installation on shipboard or that in the lighthouse or lightship.

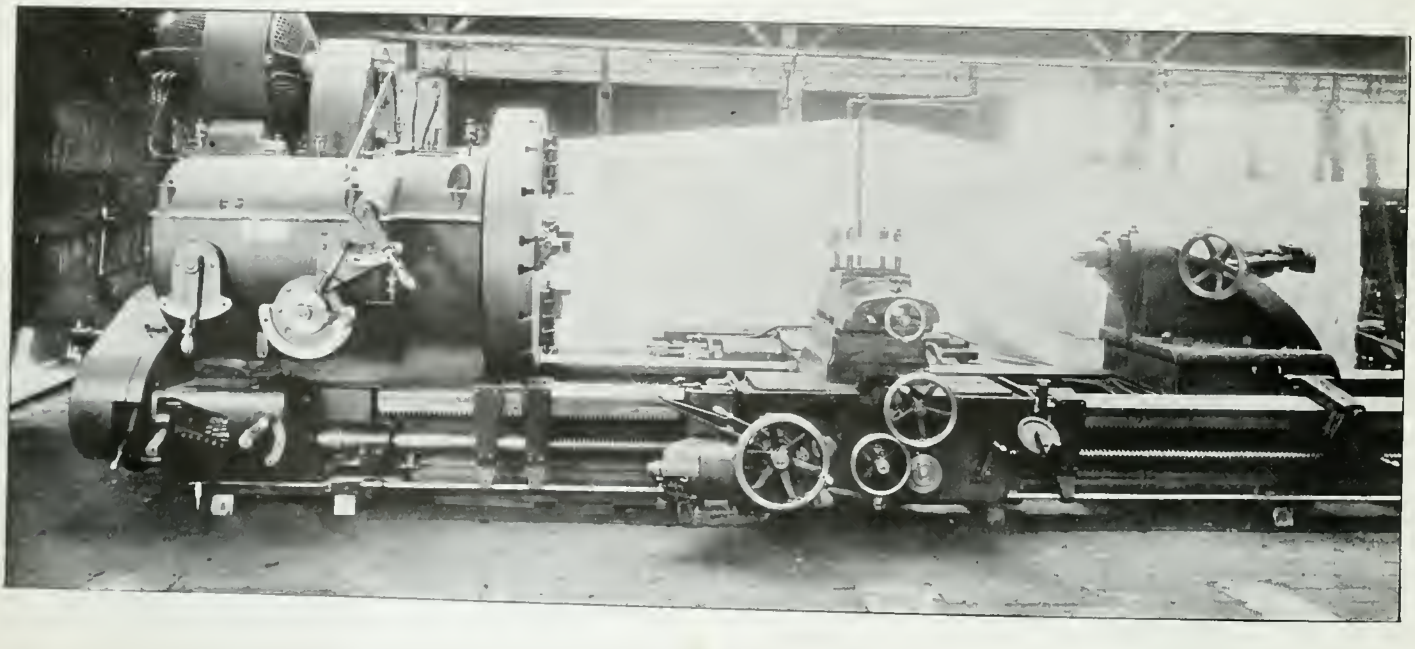
Achievement in Motorships—McIntosh & Seymour Corporation, Auburn, N. Y.

A forty-page book profusely illustrated and bound in parti-colored pressboard with gold stampings, setting forth the Diesel engine as built by the McIntosh & Seymour Corporation and applied by them to marine propulsion.

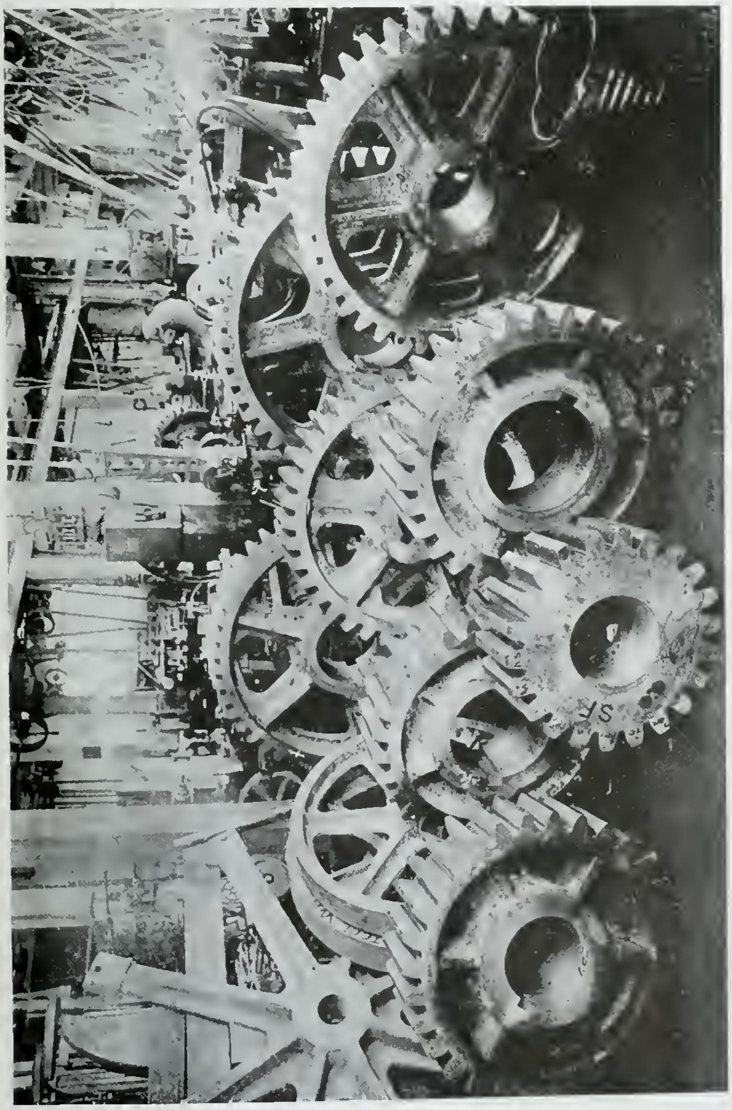
The McIntosh & Seymour Corporation have been building engines since 1885. In stationary steam engines of large sizes this company was probably more successful than any other firm in America. In 1913, recognizing the tremendous advantages of the Diesel principle in prime movers, the firm made arrangements with the Aktiebolaget Diesels Moterer of Stockholm to build Diesel engines from the designs of this Swedish firm. In these designs McIntosh & Seymour embodied certain features which were known to them to be advantageous in American practice. From the first in their Diesel engine practice for marine use McIntosh & Seymour have built only slow-speed 4-cycle engines. There are now in service equipped with these engines 24 ships, all of which have given excellent results in operation even under adverse sea conditions.

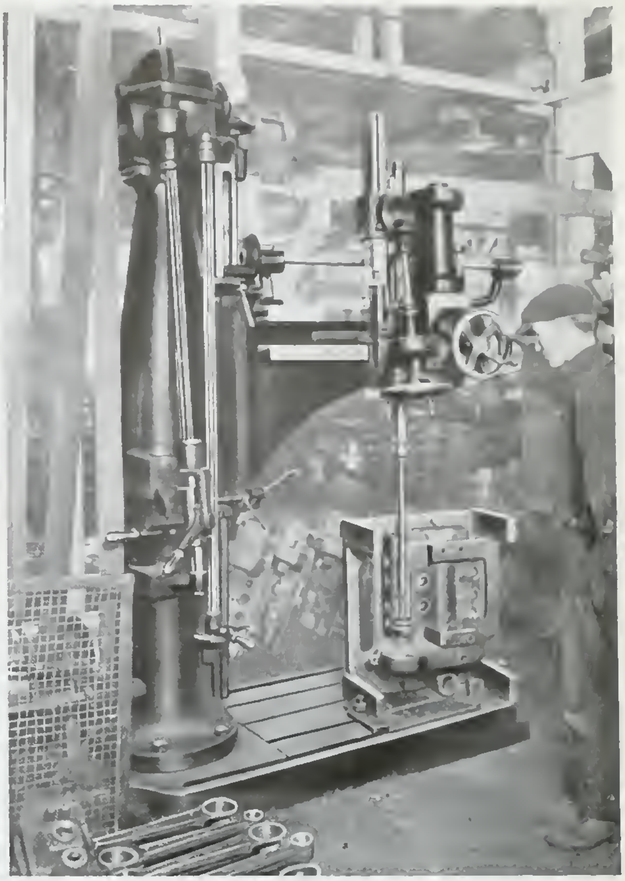
The present plant at Auburn covers 12 acres, has direct track connections with both the New York Central and the Lehigh Valley railway systems, and is so arranged that the raw materials are received at one end of the plant and passed through the various processes of manufacture until the finished parts are assembled, the engine erected and tested, and the complete product shipped from the other end of the plant with a minimum of handling of materials.

The firm is especially proud of its foundry, which is of the daylight pattern, the walls being entirely of glass, and is equipped with the most modern and efficient molding machinery for turning out the high-grade of iron castings which are so necessary to the successful manufacture of Diesel engines.



Above is shown one end of the lounging room of the S. S. America as reconditioned by the Morse Dry Dock & Repair Company. Below, a group of gears and blanks at the shop of the Pacific Gear & Toool Works. Note: We know very well that this illustration is on edge. We placed it that way to attract attention.





Ship Repairs by Experts

Builders of Seventeen steel vessels, including their engines, windlasses and condensers.

GENERAL MARINE REPAIR WORK

HULL AND ENGINE

Contractors for some of the largest Repair Jobs Ever Done at the Port of Portland.

Drydock Facilities Ample for Vessels up to 15,000 Tons.

Albina Engine and Machine Works

PORTLAND OREGON

THE NIPPON YUSEN KAISHA

In the October issue of Pacific Marine Review we published an article telling a little of the history and work of the Nippon Yusen Kaisha, which had then recently celebrated the twenty-fifth anniversary of its Seattle services. The following additional detailed information may be of interest to our readers.

The S. S. Mikke Maru, Captain Young, sailed from Yokohama for Seattle August 5, 1896, stopping at Honolulu for two days for coaling and arriving at Seattle three p. m. August 31, 1896, at the old Arlington dock. She sailed from Seattle on her return trip to Japan at one p. m. September 6, 1896. Since 1896 the N. Y. K. has maintained regular freight and passenger service to and from Japan.

From 1896 to the present time a total of 608 steamers of 3,732,149 gross tons have arrived at Seattle under the N. Y. K. flag, while 593 vessels of 3,657,149 gross tons have sailed from Seattle. The total of arrivals and departures of N. Y. K. steamers is 1201 vesels of 7,389,298 gross tons. By way of comparison, this total gross tonnage is nearly the same as the total gross tonnage of all American seagoing merchant vessels of 500 gross tons and over employed in foreign trade on October 31, 1919.

The cargo carried during this period amounted to over 2,500,000 tons of the imports and 3,000,000 tons of exports, or a total of 5,500,000 tons. To obtain the significance of this figure, it is interesting to note that the weight of the forty-two-story L. C. Smith building is 32,650 tons, and the service by N. Y. K. vessels to and from the Orient in the period of twenty-five years is equivalent to moving the Smith building to or from the Orient 170 times.

The regular passenger service of the N. Y. K. was inaugurated with the arrival of the S. S. Kamakura Maru, June 26, 1901. Previous to this time a few passengers were carried, but the S. S. Kamakura Maru was the first regular passenger steamer employed on the Seattle-Orient Line. The total number of passengers carried by vessels of this company to and from Seattle number over 140,000. This is equivalent to over one-third of the present population of Seattle or the present population of Spokane plus one-third of Tacoma's population. Standing single file, these passengers would form a line over fifty-three miles in length.

During the period that the N. Y. K. has conducted business in Seattle many millions of dollars have been spent in this city. To give an idea of the expenditures it may be noted that in the last four or five years over $4,000,000 has been spent in taxes alone.

An interesting sidelight on this amalgamation of companies is given in a reported interview with Viscount Okuma, who states that when he went down to Nagasaki in the capacity of president of the Formosan Aborigines Punitive Expedition Affairs he found himself in a ridiculous situation because the expeditionary forces were ready for departure, and no provision had been made by him for vessels to take them across the intervening sea. For this purpose he chartered American and British ships but was immediately stopped in the use of these ships by protests from the British and American governments, the Island of Formosa being at that time Chinese territory. The captains were ordered by their respective ambassadors not to lend their ships for such a purpose. Okuma thereupon determined without the consent of his government to purchase several of the American steamers. This move was afterward endorsed by his own government after considerable discussion and criticism.

The point that we wish to make is that in the mind of Okuma this incidental purchase of foreign vessels was really the beginning of the modern Japanese seafaring business, which eventually developed into the Nippon Yusen Kaisha.

Air Seasoning

A Study of Its Application in the Lumber Business

In co-operation with the sawmills and wood utilization plants throughout the country, the Forest Products Laboratory, Madison, Wisconsin, is organizing an extensive field study on the air seasoning of wood. This study, it is believed, will be of extreme interest to the lumber manufacturer and to the wood-using industries. The purpose is to determine the piling practice which will result in the fastest drying rates consistent with the least depreciation of stock, the least amount of required yard space, and the least handling costs. The study will be carried on concurrently on both hardwoods and softwoods. All the important commercial woods of the United States will eventually receive consideration.

The air seasoning of wood is an old practice. No systematic attempt has ever been made, however, to work out the exact conditions under which drying time and drying costs can be reduced to a minimum. It is not actually known which of the numberless methods of piling will give the quickest and the cheapest results under given climatic conditions. The new project will furnish a comparison of the effects of such piling variables as sticker heights, the spacings of boards in layers, the heights of pile foundations, and the directions of piling with relation to prevailing winds and yard alleyways.

The study is expected to decide whether from a business standpoint lumber should be dried partly at the mill and partly at the plant of utilization, or whether it should be completely dried at the mill. The data collected will also go a long way toward showing whether air seasoning or kiln drying is the more profitable.

A tentative working plan of the air seasoning study has been prepared by the Forest Products Laboratory, and copies are being sent to the secretaries of the various lumber and wood-using associations, state foresters, forest school heads, and others eminently qualified to comment on the plan.

Co-operation in the air seasoning study is being offered on every side. As yet the plants at which the work will actually be done have not been definitely chosen, but the extreme interest already manifested indicates that there will be no difficulty in securing co-operation with plants ideal for the study. Actual field work will soon be well under way.

THE NMCo

Safeguarded by
"NACO"
ANCHOR CHAIN CABLE

The WEST LEWARK is one of five 11,000 ton flush deck steel freighters recently built by the Los Angeles Ship building & Dry Dock Co., for the U. S. Shipping Board.

All five vessels are equipped with

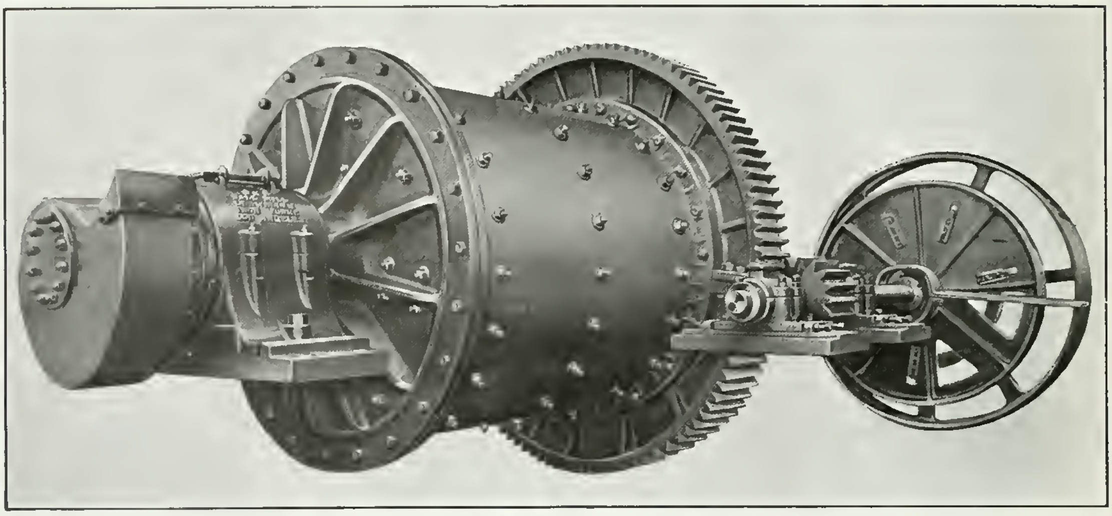
"NACO"
Anchor Chain Cable.

THE NATIONAL MALLEABLE CASTINGS CO.
CLEVELAND, OHIO

BALL MILLS AND CRUSHERS

Built at a Southern California Marine Engine Shop

THE Llewellyn Iron Works' ball mill is a new departure in the construction of this class of machinery in the feature that the mill shell and heads and gears are of steel castings instead of cast iron. The trunnions upon which the mill revolves are extra large in diameter, giving a long life to these bearings. All parts are built heavy and strong in order to make a machine that will give long service under severe working conditions with a minimum amount of repairs and attendant shut-downs.



Cast steel ball mill built by the Llewellyn Iron Works of Los Angeles for the Arizona Standard Copper Company. This mill weighs 30 tons

The ball mill is the most modern and approved type of machine for fine grinding ores for treatment by the cyanide or other leaching process and for concentrating by gravity or floatation and for fine grinding cement clinker.

The barrel of the mill is lined with renewable steel wearing plates and hard steel balls are used for crushing and grinding. These balls as a rule are about 5 inches diameter, but the correct size to use is determined by the hardness of the ore or rock to be ground.

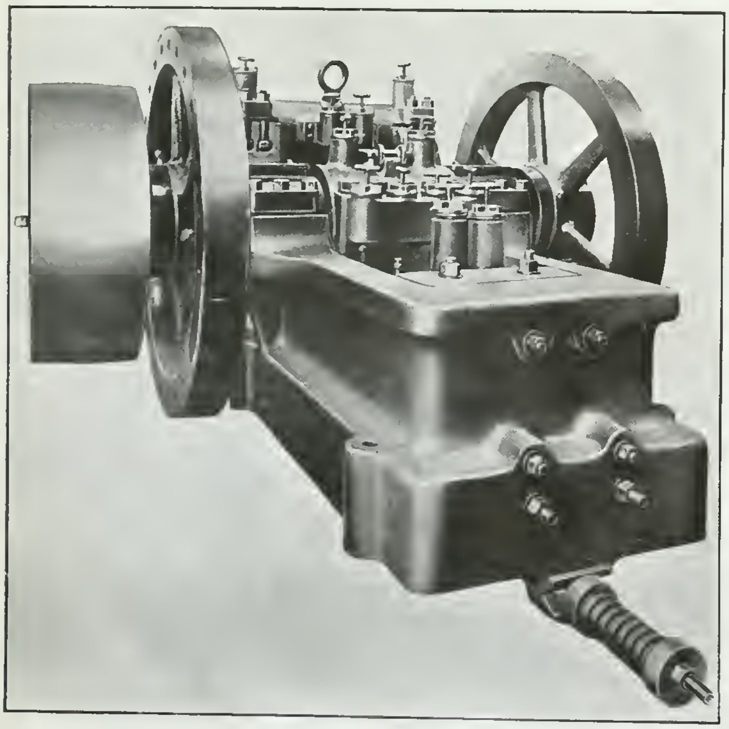
The ball mill illustrated is 6 feet diameter by 6 feet long and has a capacity for crushing about 300 tons of ordinary ore from ½ inch size to 24 mesh in 24 hours.

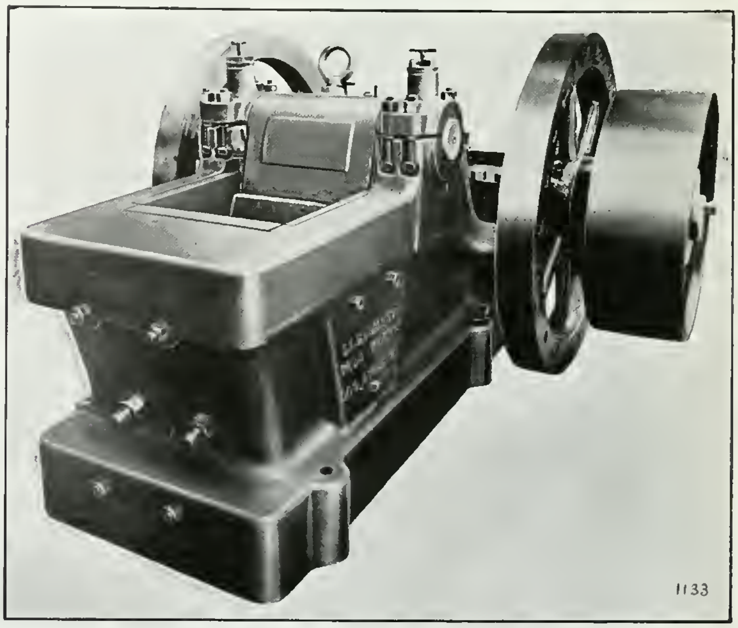
The crusher shown is of the Blake type and is of all steel construction. The design of this crusher embodies some new features among which is the system of lubrication. The bearings are provided with large grease cups which are cast integral with the parts they lubricate. This prevents their ball mills in all commercial and customary sizes from being knocked or rattled off. A grease pressure of several hundred pounds per square inch may be attained which insures forcing dirt and old grease out of the bearings and new grease in.

The system of jaw-plates is worthy of attention, inasmuch as the jaws are so placed in the crusher that both jaws are alike and of such construction that from two to three times the amount of jaw plate material can be worn out than with crushers of the standard design.

The crusher illustrated has a jaw opening 18 inches by 24 inches.

Llewellyn Iron Works is building these crushers and the smallest to the largest commercially practicable.





Two views of an all steel ore crusher built by the Llewellyn Iron Works of Los Angeles for the Arizona Standard Copper Company. This crusher weighs 20 tons

The photographs shown were taken from machines designed and built by Llewellyn Iron Works for the Arizona Standard Copper Company, near Bouse, Arizona, where the mining company has a very large body of copper ore of exceptional values which can be leached.

The machinery will be used in connection with a copper leaching plant which is now being built in which the ore will be ground to the required fineness and the copper leached out in a solution of sulphuric acid and precipitated on scrap iron or electrolytically.

The ball mill weighs about thirty tons and the crusher about twenty tons.

TIME AND TIDE
WAIT FOR NO INSURANCE
TO BE PLACED
• DO IT NOW •
- DRIVEN ASHORE -
WHEN THIS HAPPENS, YOU WILL FEEL NO WORRY IF YOUR INSURANCE IS IN THE HANDS OF
C.H. WILLIAMSON Co
322 CALIFORNIA ST. SAN FRANCISCO.

MARINE COPPER WORK

Pacific Coast shipbuilders, shipowners and the marine trade in general have learned that their requirements are satisfactorily handled by the modern manufacturing plant which is *specializing on Marine Copper Work.*

C. W. SMITH COPPER WORKS
16 Washington Street SAN FRANCISCO Telephone Kearny 3992

COMMERCIAL IRON WORKS
Portland, Oregon
ENGINEERS, FOUNDERS, MACHINISTS
GENERAL MARINE REPAIRS

CAM, CRANK STEAMSHIP SHAFTING, SHOES AND DIES, PULVERIZING BALLS

Forrest FORGINGS

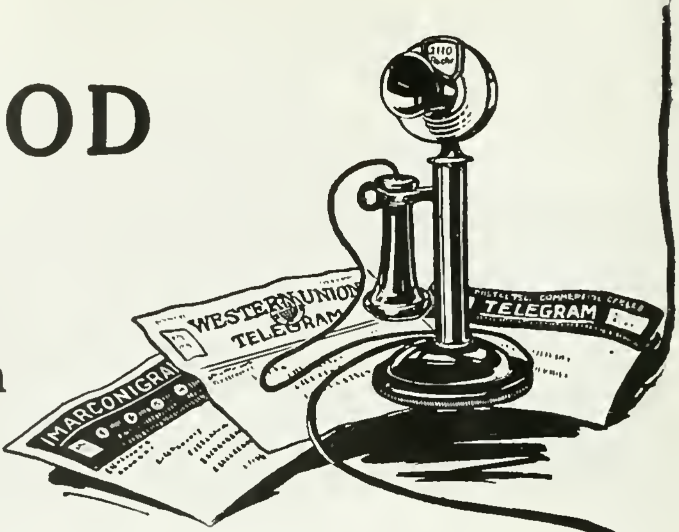
OIL AND WATER WELL MACHINERY TOOLS AND SUPPLIES

OAKLAND EDWIN FORREST FORGE COMPANY SAN FRANCISCO

MARINE WELDING COMPANY
SAN PEDRO CALIFORNIA
Barge on Call Beside Your Ship Day and Night
ACETYLENE AND ELECTRIC WELDING
MARINE BOILER WORK A SPECIALTY

LIDGERWOOD SERVICE

follows the winch at work.



It is prompt, satisfactory and far-reaching.

FOR INSTANCE:

S. S. "Somme" in New York was due to leave port on January 12th, Order received over the telephone at 10.00 A. M. January 12th for a complete set of winch spares. Before 5 o'clock that afternoon the parts were delivered to the "Somme."

S. S. "Sunewco" at Norfolk, Va., needed two connecting rods. We received the order at New York office on March 11th at noon and telegraphed our Norfolk agents to supply connecting rods from stock. Rods delivered to ship early next morning.

Note: We have stocks of repair parts for our No. 1917 ship's winch at our offices in the following ports:

NEW YORK
Lidgerwood Manufacturing Co.

BOSTON
Hubbard, Floyd Co., Inc.

NORFOLK
John D. Westbrook, Inc.

JACKSONVILLE
D. J. Carrison & Co.

SAN FRANCISCO
N. B. Livermore & Co.

SEATTLE
Lidgerwood Manufacturing Co.

CHICAGO
Lidgerwood Manufacturing Co.

LONDON, ENGLAND
Lidgerwood, Ltd.

Send for our Winch Part List. It illustrates every part of the winch.

When you have to order a Lidgerwood repair part it will fit. Your deck engineer makes the replacement. Lidgerwood ship's winches are built on the duplicate part system, and are interchangeable. Parts are built from jigs and templates.

All you need do is send us name of part wanted, and serial number OF WINCH which is STAMPED (not cast) on edge of rear cylinder head. Do not send number cast on part.

TELEPHONE OR WIRE NEAREST OFFICE!

LIDGERWOOD MANUFACTURING CO.

96 LIBERTY STREET, NEW YORK, N. Y.

Branches:—Chicago, Cleveland, Detroit, Pittsburgh, Philadelphia, Seattle,
Los Angeles, London, England